

May 2016

STAR Q SP/AS

User Manual



Version 1



9002650

Hamilton Bonaduz AG
Via Crusch 8
7402 Bonaduz
SWITZERLAND

R2

1099422

Contents

1	Introduction	6
1.1	About this user manual	6
1.2	General information	7
1.2.1	Technical assistance	7
1.2.2	Policy statement	7
1.2.3	Version management	7
1.3	Intended use of STAR Q SP/AS	7
1.4	Requirements for STAR Q SP/AS users	8
2	Safety Information	9
2.1	Proper use	10
2.2	Electrical safety	12
2.3	Biological and chemical safety	12
2.4	Mechanical hazards	13
2.5	Waste disposal	14
2.6	Maintenance safety	14
2.7	Symbols on STAR Q SP/AS	16
3	General Description	18
3.1	Platform	18
3.2	Modular pipetting arm	19
3.2.1	System pipetting configuration	20
3.2.2	CO-RE gripper	21
3.3	Air displacement pipetting	22
3.4	Tip recognition	22
3.5	Liquid level detection	23
3.6	Monitored air displacement	23
3.7	Autoload function	24
3.8	Carriers	25
3.8.1	Multiflex carrier	25

3.9	Heater shaker	26
3.9.1	Loading of labware on heater shaker	27
3.10	Disposable tips	27
3.10.1	Tip packaging	28
3.11	Computer requirements	30
3.11.1	STAR Q SP/AS Software	30
3.11.2	Security and data protection	31
3.11.3	Electronics and interfaces	32
3.12	Power/voltage	33
3.13	Training	33
4	Sample Processing Using STAR Q SP/AS Kits	34
4.1	DNA purification	35
4.1.1	Setup of extraction run specifications	35
4.1.2	Loading an extraction run	44
4.2	Setup for PCR quantification of DNA eluates	57
4.2.1	Setup of quantification run specifications	57
4.2.2	Loading a quantification run	63
4.3	Normalization of DNA eluates and PCR reaction setup	72
4.3.1	Setup of normalization and STR run specifications	72
4.3.2	Loading a normalization and STR run	78
4.4	Cherry pick samples mode	87
5	Troubleshooting	90
5.1	Error handling	90
5.1.1	Barcode reading error	90
5.1.2	Pipetting error	92
5.2	Log files	94
6	Maintenance	96
6.1	Maintenance intervals	97
6.1.1	Preventative maintenance	97
6.2	Materials required for maintenance procedures	97

6.3	Maintenance procedures	98
6.3.1	Daily maintenance.....	99
6.3.2	Weekly maintenance	101
6.4	Printing a maintenance report	104
6.5	Maintenance of the heater shaker.....	104
6.6	Instrument decontamination.....	105
6.6.1	Surface decontamination using liquids	106
6.6.2	Decontamination using gases.....	107
6.6.3	Decontamination using UV light.....	108
7	Glossary	109
	Appendix A — Ordering Information.....	112
	Appendix B — Technical Specifications	114
	STAR Q SP/AS instrument specifications	114
	Operating data.....	115
	QIAGEN standard computer specifications	116
	Labware for STAR Q SP/AS	117
	Pipetting specifications for disposable tips (individual 1000 µl channels)	118
	CO-RE gripper 1000 µl specifications.....	119
	Autoload: barcode and reader specifications	120
	Barcode symbologies	120
	Reading accuracy	120
	Barcode specifications.....	121
	Tube barcodes.....	122
	Plate barcodes.....	123
	Heater shaker specifications	124
	Appendix C — Instrument Dimensions.....	127
	Appendix D — Chemical Compatibility.....	128
	Appendix E — Verification	130
	Appendix F — Waste Electrical and Electronic Equipment (WEEE)	131
	Appendix G — Warranty Statement.....	132
	Appendix H — Declaration of Conformity	134

Appendix I – FCC Declaration.....	135
Appendix J – Safety Information (French, FR)	136
Utilisation appropriée	136
Sécurité électrique	139
Sécurité biologique et chimique	140
Dangers mécaniques	141
Traitement des déchets.....	141
Sécurité relative à la maintenance.....	141
Symboles sur le STAR Q SP/AS	143
Appendix K – Safety Information (German, DE).....	146
Sachgemäße Handhabung.....	146
Elektrische Sicherheit	149
Biologische und chemische Sicherheit	150
Gefahren durch mechanische Teile.....	151
Abfallentsorgung.....	151
Sicherheitshinweise – Wartungsarbeiten	151
Symbole auf dem STAR Q SP/AS	153
Index	156

1 Introduction

Thank you for choosing the STAR (Sequential Transfer and Aliquoting Robot) Q SP/AS instrument. We are confident it will become an integral part of your laboratory.

Before using the STAR Q SP/AS instrument, 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 instrument and to maintain the instrument in a safe condition.

1.1 About this user manual

This user manual provides information about the STAR Q SP/AS instrument in the following sections:

1. Introduction
2. Safety Information
3. General Description
4. Sample Processing Using STAR Q SP/AS Kits
5. Troubleshooting
6. Maintenance
7. Glossary

The appendices include the following:

- Ordering Information
- Technical Specifications
- Instrument Dimensions
- Chemical Compatibility
- Verification
- Legal information
- Regulatory information
- Safety information in French (FR)
- Safety information in German (DE)

1.2 General information

1.2.1 Technical assistance

At QIAGEN we pride ourselves on the quality and availability of our technical support. Our Technical Services department is staffed by experienced scientists with extensive practical and theoretical expertise in sample and assay technologies and the use of QIAGEN products. If you have any questions or experience any difficulties regarding STAR Q SP/AS 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, please see our Technical Support Center at www.qiagen.com/goto/TechSupportCenter or call one of the QIAGEN Technical Service Departments or local distributors (see back cover or visit www.qiagen.com).

1.2.2 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.

1.2.3 Version management

This document is the *STAR Q SP/AS User Manual*, version 1.

1.3 Intended use of STAR Q SP/AS

The STAR Q SP/AS instrument is designed to perform automated DNA extraction, quantification setup and short tandem repeat (STR) PCR setup in molecular biology applications.

The STAR Q SP/AS is intended to be used only in combination with QIAGEN Investigator® kits listed in Appendix A for sample preparation, quantification and STR setup for applications described in the respective QIAGEN kit handbooks.

If the STAR Q SP/AS instrument is used with other than QIAGEN kits, it is the user's responsibility to validate the performance of such product combination for any particular application.

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

1.4 Requirements for STAR Q SP/AS users

This table covers the general level of competence and training necessary for transportation, installation, use, maintenance and servicing of the STAR Q SP/AS instrument.

Task	Personnel	Training and experience
Delivery	No special requirements	No special requirements
Installation	QIAGEN service personnel or service technicians of an authorized agent	Trained and authorized by QIAGEN
Routine use	Laboratory technicians or equivalent	Appropriately trained and experienced personnel familiar with use of computers and automation in general
Preventive maintenance	Laboratory technicians or equivalent	Appropriately trained and experienced personnel familiar with use of computers and automation in general
Servicing	QIAGEN service personnel or service technicians of an authorized agent	Trained and authorized by QIAGEN

2 Safety Information

Before using STAR Q SP/AS, 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 STAR Q SP/AS and to maintain the instrument in a safe condition.

Note: Translations of the Safety Information in French and German are available in Appendix J – Safety Information (French, FR) and Appendix K – Safety Information (German, DE).

The following types of safety information appear throughout this user manual.

WARNING



The term WARNING is used to inform you about situations that could result in **personal injury** to you or others.

Details about these circumstances are provided to avoid personal injury to you or other persons.

CAUTION



The term CAUTION is used to inform you about situations that could result in **damage to the instrument** or other equipment.

Details about these circumstances are provided to avoid damage to the instrument or other equipment.

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

2.1 Proper use

CAUTION



Loss of data

Do not open the front cover during a run. An aborted run, that is one stopped by opening the front cover, cannot be recovered. To open the window during a run, click **Pause** in the run screen, wait until the instrument stops and then open the window.

CAUTION



Loss of data and damage to the instrument

Use only labware defined in this manual with the STAR Q SP/AS instrument. Failure to do so may result in damage to the instrument and incorrect results.

WARNING/ CAUTION



Risk of personal injury and material damage

Improper use of STAR Q SP/AS may cause personal injuries or damage to the instrument. STAR Q SP/AS must only be operated by appropriately trained and experienced personnel.

Servicing of STAR Q SP/AS must only be performed by QIAGEN Field Service Specialists or service technicians of an authorized agent.

CAUTION



Damage to the instrument

Direct sunlight may bleach parts of the instrument and cause damage to parts. STAR Q SP/AS must be located out of direct sunlight, away from heat sources and away from sources of vibration and electrical interference.

CAUTION



Damage to the instrument

Avoid spilling water or chemicals onto STAR Q SP/AS. Damage caused by water or chemical spillage will void your warranty.

**WARNING/
CAUTION**



Risk of personal injury and material damage

Do not attempt to move STAR Q SP/AS during operation.

Never lift a fully installed instrument for transportation from one location to another. It must be reinstalled in the new location by an authorized service engineer.

**WARNING/
CAUTION**



Risk of personal injury and material damage

STAR Q SP/AS weighs approximately 150 kg (330 lbs). Necessary safety precautions should be taken when transporting the instrument.

**WARNING/
CAUTION**



Explosive atmosphere

STAR Q SP/AS is not designed for use in an explosive atmosphere.

WARNING



Risk of explosion

STAR Q SP/AS is intended for use with reagents supplied with QIAGEN kits. Use of other reagents and substances may lead to fire or explosion.

In case of emergency, switch off STAR Q SP/AS at the power switch and unplug the power supply from the power outlet.

The instrument should be positioned in the laboratory in a way permitting personnel to access the front and sides of the instrument in order to operate, maintain, open and close the protective covers. Consider the dimensions of the instrument (see "Appendix B — Technical Specifications," page 114) and calculate sufficient room for a person to move and work comfortably.

2.2 Electrical safety

Note: Disconnect the line power outlet before servicing.

WARNING



Electrical hazard

Any interruption of the protective conductor (earth/ground lead) inside or outside the instrument or disconnection of the protective conductor terminal is likely to make the instrument dangerous.

Intentional interruption is prohibited.

Lethal voltages inside the instrument

When the instrument is connected to line power, terminals may be live.

Opening covers or removing parts is likely to expose live parts.

Avoid spilling liquid onto or into the instrument. In case of spilling liquid over the instrument, immediately disconnect the instrument from the mains power.

To ensure satisfactory and safe operation of STAR Q SP/AS, follow the guidelines below:

- The line power cord must be connected to a line power outlet that has a protective conductor (earth/ground).
- Keep mains plug easily accessible in case the equipment needs to be disconnected quickly from mains power.
- Use only power supplies and cords supplied with the system.
- If the instrument becomes electrically unsafe, prevent other personnel from operating it and contact QIAGEN Technical Services. The instrument may be electrically unsafe when:
 - The line power cord appears to be damaged.
 - It has been stored for a prolonged period of time in conditions which are outside of the storage conditions outlined in "Appendix B — Technical Specifications," page 114.
 - It has been subjected to severe transport stresses.
 - Liquid has entered the instrument.

2.3 Biological and chemical safety

When handling biological material, use safe laboratory procedures as outlined in publications such as Biosafety in Microbiological and Biomedical Laboratories, HHS (<http://www.cdc.gov/biosafety/publications/bmbl5/index.htm>).

WARNING**Biological materials**

Handle biological material with the greatest of care and in accordance with the required safety regulations. Always wear safety glasses, 2 pairs of gloves and a lab coat.

The responsible body (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 infectious agents as defined in the applicable Safety Data Sheets (SDSs) or OSHA,* ACGIH† or COSHH‡ documents.

For more information, visit www.qiagen.com/safety.

Venting for fumes and disposal of wastes must be in accordance with all national, state and local health and safety regulations and laws.

WARNING**Hazardous chemicals**

Always wear safety glasses, gloves and a lab coat.

The responsible body (e.g., laboratory manager) must take the necessary precautions to ensure that the surrounding workplace is safe and that the 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.

For more information, visit www.qiagen.com/safety.

Venting for fumes and disposal of wastes must be in accordance with all national, state and local health and safety regulations and laws.

2.4 Mechanical hazards

WARNING**Moving parts**

To avoid contact with moving parts during operation of STAR Q SP/AS, the instrument must be operated with the cover closed.

Do not remove the cover panels since there are no user-serviceable parts inside. If there is a problem with STAR Q SP/AS, contact QIAGEN Technical Services immediately.

WARNING**Risk of personal injury**

Do not touch the heater shaker during run time and for 1 hour after finishing a run as it might be hot.

* 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).

2.5 Waste disposal

CAUTION



Disposal of plasticware

Used plasticware may contain hazardous chemicals, or contagious/biohazardous materials. Such wastes must be collected and disposed of properly according to local safety regulations.

2.6 Maintenance safety

Perform the maintenance as described in Section 6. QIAGEN charges for repairs that are required due to incorrect maintenance.

WARNING/ CAUTION



Risk of personal injury and material damage

Only perform maintenance that is specifically described in this user manual.

WARNING/ CAUTION



Risk of electric shock

Do not open any panels on the STAR Q SP/AS instrument.
Only perform maintenance that is specifically described in this user manual.

CAUTION



Damage to the instrument

Do not use solvents or reagents containing acids, alkalis or abrasives to clean the STAR Q SP/AS instrument. Do not use disinfecting materials which contain hypochlorite or other bleaching fluids. Use non-corrosive, neutral liquids.

CAUTION



Damage to the instrument

Autoclaving cannot be used for instrument components or accessories (channels, transport tools, heaters, shakers and carriers).

CAUTION**Damage to the instrument**

Ethylene oxide fumigation may increase service and maintenance requirements (O-rings exchange, greasing of spindles, etc.) and may make shorter maintenance intervals necessary.

CAUTION**Damage to the instrument**

Hydrogen peroxide fumigation leads to bleaching or discoloration of many instrument materials and may increase service and maintenance requirements (O-rings exchange, greasing of spindles, etc.) and may make shorter maintenance intervals necessary.











CAUTION**Damage to the instrument**



Do not use formaldehyde fumigation or chlorine oxides (chemical compounds of chlorine and oxygen such as bleach). They are not suitable for the STAR Q SP/AS instrument because of chemical reaction and corrosion.

CAUTION**Damage to the instrument**

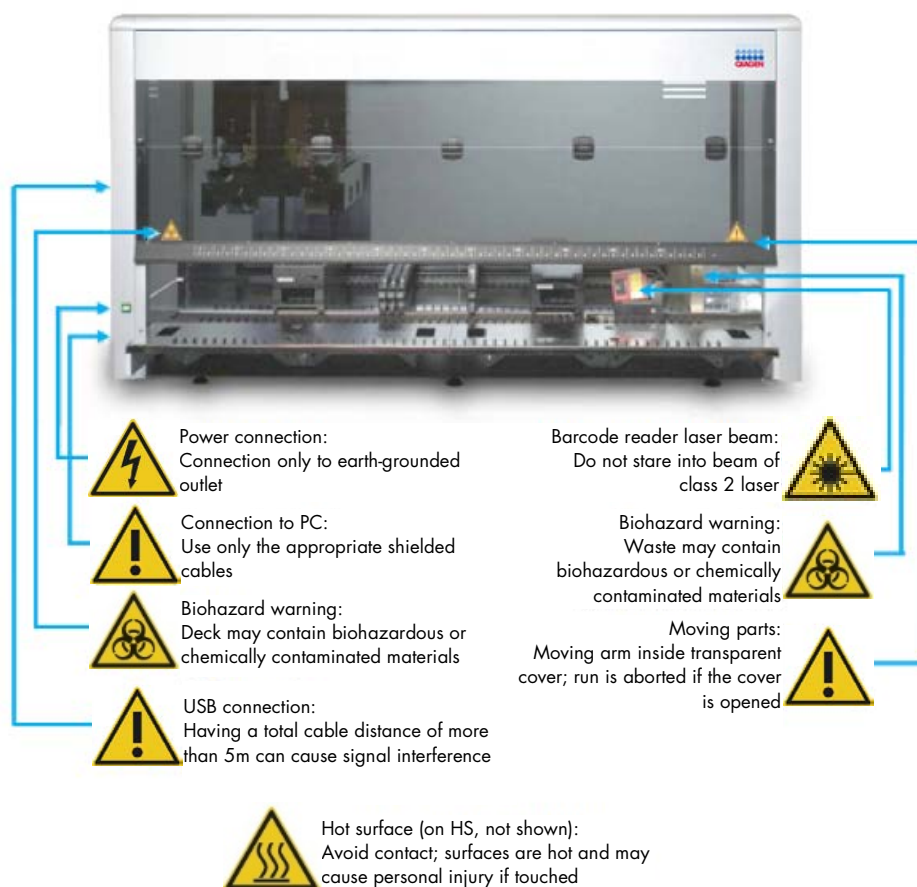
UV irradiation causes many synthetic materials to become brittle. This may increase service and maintenance requirements and may make shorter maintenance intervals necessary.

2.7 Symbols on STAR Q SP/AS

Symbol	Location	Description
	Type plate on the instrument	Manufacturer
	Type plate on the instrument	Waste Electrical and Electronic Equipment (WEEE)
	Type plate on the instrument	FCC mark of the United States Federal Communications Commission
	Type plate on the instrument	RoHS mark for China (the restriction of the use of certain hazardous substances in electrical and electronic equipment)
	Type plate on the instrument	RCM mark for Australia/New Zealand
	Type plate on the instrument	Serial number
	Type plate on the instrument	Global trade item number
	On the instrument	General warning sign
	On the instrument	Warning, dangerous voltage
	On the heater shaker	Warning, hot surface

Symbol	Location	Description
	On the barcode reader	Warning, laser
	On the instrument	Warning, biological hazard

Location and explanation of warning and attention labels:

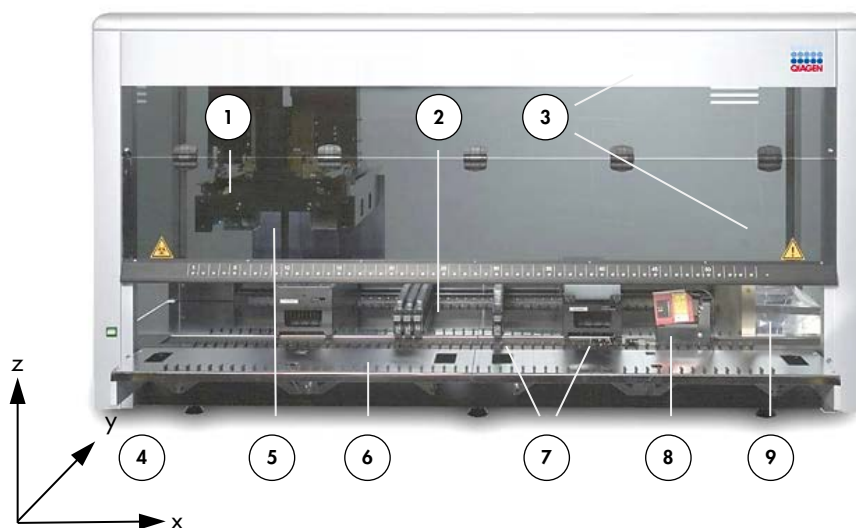


3 General Description

The STAR Q SP/AS instrument performs pipetting operations of liquids between containers and transfers microplates placed on the work surface. Pipetting is the transfer of small quantities of liquid from one container to another by aspirating (drawing) liquid from a source container then transferring and dispensing (dropping) it into a target container.

3.1 Platform

The STAR Q SP/AS instrument work surface, the deck, is used for placing loadable carriers. The carriers are available in three different sizes and hold reagent containers, such as tubes, microplates or other kinds of labware. For a comprehensive list of input and output labware, see "Labware for STAR Q SP/AS," page 117.



- | | |
|--|--|
| 1 Pipetting arm | 6 Loading tray |
| 2 Deck | 7 Carrier: tubes left, microplates right |
| 3 Front cover frame and window | 8 Autoload drive |
| 4 Pipetting axes and coordinates (x, y, z) | 9 Waste station |
| 5 Pipetting channel | |

CAUTION**Loss of data**

Do not open the front cover during a run. An aborted run, that is one stopped by opening the front cover, cannot be recovered. To open the window during a run, click **Pause** in the run screen, wait until the instrument stops and then open the window.

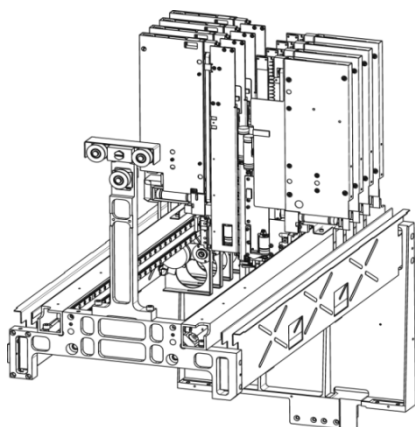
The instrument is fully covered by an acrylic glass hood. The front cover consists of a hinged transparent window made of acrylic glass. The window is equipped with a magnetic switch that is monitored during a run. Opening the cover will abort the run.

The instrument deck is divided into 54 equal tracks (T) for loading carriers in predetermined positions. This eliminates the need for precise measurement of positions. The deck has partitions of 22.5mm equivalent to 1-T. The labware carriers are adapted to the partitions: 1-T carriers for sample tubes, or 6-T carriers for microplates or Compression-induced O-Ring Expansion (CO-RE) tips and other labware. An additional partition provides space for the tip waste. The deck partitions accommodate a maximum of 54 1-T carriers for sample tubes, or a maximum of nine 6-T carriers for microplates and CO-RE tips. A total of 45 SBS (Standard format of the Society for Biomolecular Screening) positions can be placed onto the STAR Q SP/AS deck.

The instrument's internal coordinate (x, y, z) system is shown in the picture above, located at its origin. Please note that the ZERO position is 100 mm below the metal deck sheet.

3.2 Modular pipetting arm

The modular pipetting arm contains a set of eight 1000 µl pipetting channels which work independently.



The minimum distance between two 1000 µl pipetting channels on the arm is 9 mm.




3.2.1 System pipetting configuration

The STAR Q SP/AS instrument has eight 1000 µl pipetting channels working in parallel for simultaneous transfer of liquids. Each pipetting channel moves independently on the y-axis, as well as the z-axis. Each channel uses its own high-precision motors and electronics to reach the pipetting position.



Note: The system reports an error if pipetting positions outside the access range of the instrument are used.

The eight 1000 µl channels support pipetting with disposable tips. The following table shows the disposable tips used for pipetting.

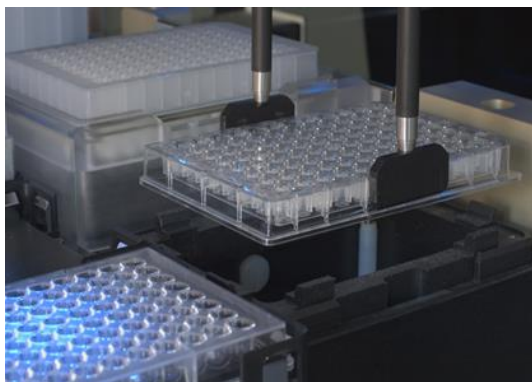
Tip	Example
50 µl tip	
300 µl CO-RE tip	
1000 µl CO-RE tip	

The 1000 µl pipetting channels have a set “traverse height” of 245 mm above the origin, or 145 mm between the top of the disposable tip and the deck of the instrument. This means that when a channel moves from one location on the deck to another, it automatically does so at that particular height. This is a safety precaution to prevent the channels from colliding with items that may be on the deck.

3.2.2 CO-RE gripper

The CO-RE gripper is a plate handling tool picked up by two pipetting channels. The CO-RE gripper transports microplates, lids for microplates, archive plates, filter plates and other labware to and from positions on the instrument deck. Plates can be gripped in landscape or portrait format within the working area. Rotation of plates is not an option.

The traverse height of the channels with the gripping jaws is the same as with tips: 145 mm above the deck.



CO-RE gripper on the 1000 µl 8-channel pipetting head.

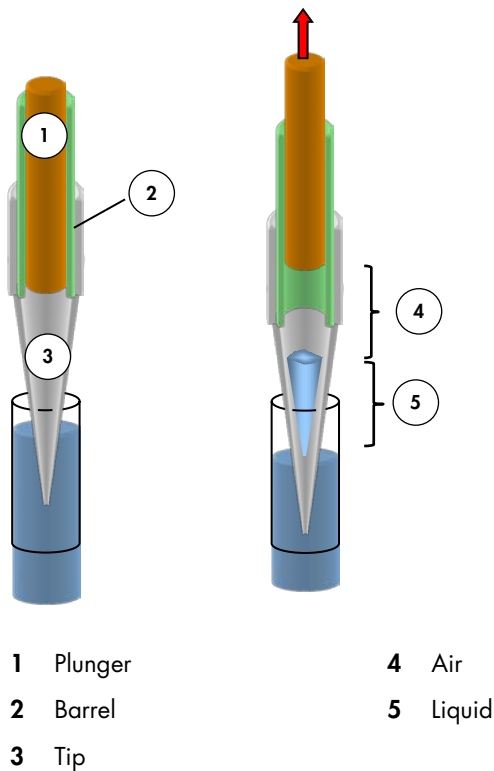
The holder of the two gripping paddles is on the waste block.



Gripping paddles in park position in the waste block.

3.3 Air displacement pipetting

STAR Q SP/AS operation is based on the air displacement pipetting principle, comparable to the functioning of handheld pipets. Air displacement means that the liquid is aspirated into and dispensed from a disposable tip by the movement of a plunger. Only air is present between the plunger and the liquid surface and no system liquid of any kind is involved in the instrument.



Pipetting with the STAR Q SP/AS instrument is identical to pipetting with a handheld plunger pipette. The pipetting head's barrel and plunger are not intended to be cleaned.

3.4 Tip recognition

The tips used in a pipetting procedure are matched with the pipetting channel to prevent damage to the instrument. The STAR Q SP/AS instrument uses two methods for recognition of the tip type. All tip trays and racks have color-coded barcode labels for automated recognition.

The color and text on the barcode labels distinguish the tip volumes by eye.

Tip volume	Barcode label	Color code
50 µl		Light red
300 µl		Yellow
1000 µl		White

3.5 Liquid level detection

The liquid level in a container can be detected before aspiration of the liquid by the liquid level detection (LLD) feature of the STAR Q SP/AS instrument. LLD is based on either capacitive (cLLD) or pressure (pLLD) signal detection. Usually cLLD is used for conductive liquids. The sensitivity of the cLLD depends on the vessel size, volume and the conductivity (or polarity) of the liquid to be detected.

For non-conductive liquids, or where there is an insufficient coupling between container bottom and carrier, pLLD is used; pLLD only works with new and empty tips for the aspiration of liquids and is available on the individual pipetting channels only.

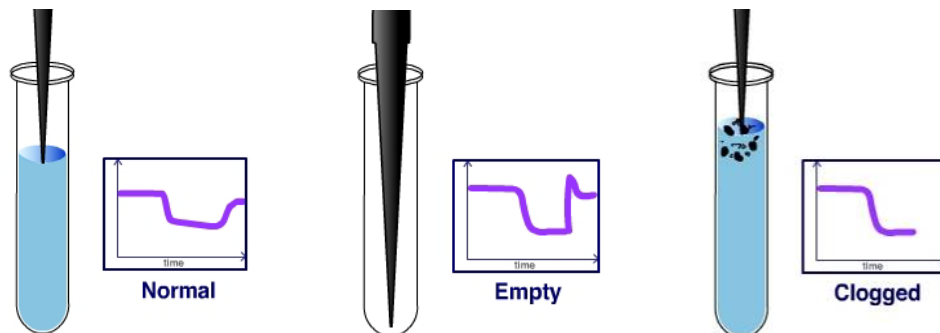
In cases of LLD under demanding circumstances, e.g., foaming liquids, cLLD and pLLD can be used at the same time.

3.6 Monitored air displacement

STAR Q SP/AS is equipped with an aspiration monitoring feature. During the aspiration process, the pressure within the pipetting channel is measured in real time. By analyzing the shape of the $p(t)$ curve, the system can distinguish the following situations:

- A correct aspiration had taken place
- Air is aspirated into the tip (because, for example, the container has not been filled properly)
- A clot has blocked the tip

The diagram shows the functioning of monitored air displacement (MAD) based on pressure.



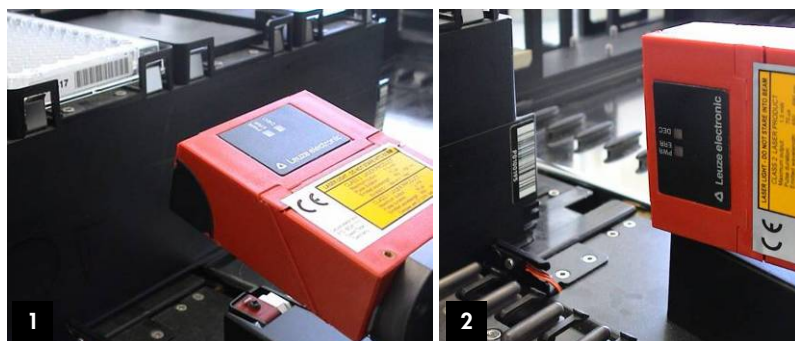
Aspiration monitoring based on pressure.

The MAD feature is available on the individual pipetting channels only.

3.7 Autoload function

The Autoload drive is a device enabling automatic loading of carriers onto the STAR Q SP/AS instrument deck. The features of the Autoload are:

- Moves in x-direction,
- Shunts carriers onto and off the deck
- Reads the barcodes of tubes, microplates and tip trays in carriers



The Autoload option including the barcode reader is shown reading horizontally (1) for plates and vertically (2) for carriers and tubes.

Carrier identification by barcodes and reading of barcodes on plates and tubes is possible in combination with the Autoload drive. Barcodes of tip trays and racks are read automatically when loading tips to exclude the risk of mixing up tip types. This method is suitable for all tip types.



Tip carrier with five bar-coded tip trays loaded.

The following barcode types can be read by the Autoload:

- ISBT Standard
- Code 128 (Subset B and C)
- Code 39
- Codabar
- Code 2 of 5 interleaved
- UPC A

Barcodes must be black bars on white background. We recommend using the barcode type Code 128 (Subset B and C).

Note: Barcodes must have a minimum readability (i.e., good contrast, size, correct orientation and distance between bars) to be fully functional. Make sure that the barcode is in the correct orientation for tubes and plates. For details of barcodes, see the specifications given in “Autoload: barcode and reader specifications,” page 120.

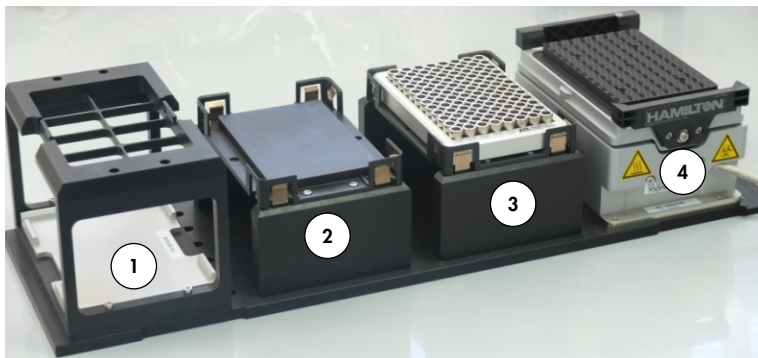
3.8 Carriers

Labware such as plates or tubes are placed on a carrier loaded onto the STAR Q SP/AS instrument deck. Standard carriers are loaded to the deck by the Autoload drive.

3.8.1 Multiflex carrier

The Multiflex carrier consists of a multiple-use carrier base providing space for up to 5 modules. Several modules are provided with the STAR Q SP/AS instrument: tip rack module, microplate module, plate stacker module, module for heating or cooling labware, reagent trough module, tube or cup module or modules for other labware.

The modular design of the Multiflex carrier allows optimization of space and customizing of the instrument. This carrier will occupy 6 tracks of the instrument deck.



- | | |
|----------------------------|------------------------------------|
| 1 Tip reuse position | 3 Position for 96-well ring magnet |
| 2 Deep well plate position | 4 Heater shaker |

3.9 Heater shaker

The heater shaker (HS) is designed to heat and/or shake standard microplates in SBS format.

The shaking speed is predefined according to the labware used. The HS is a compact module designed for operation on the STAR Q SP/AS instrument. It is not a stand-alone product. Specific adapters are required for efficient and evenly distributed heating of plates.



3.9.1 Loading of labware on heater shaker

WARNING



Risk of personal injury

Do not touch the heater shaker during run time and for 1 hour after finishing a run as it might be hot.




The appropriate labware is loaded automatically by using the CO-RE gripper from STAR Q SP/AS.

Plates are placed on the HS without lids since a lid is not locked during a shaking process. Before heating or shaking is started, the plates are locked and positioned in the center of the HS. When heating or shaking has finished the plates are unlocked and are removed from the HS.

3.10 Disposable tips

A variety of disposable tips is designed for use with 1000 µl 8-channel pipetting heads.

The following table shows the disposable tips used for pipetting.

Tip	Example
50 µl tip	
300 µl CO-RE tip	
1000 µl CO-RE tip	

CO-RE tips are the only tips designed to work with the STAR Q SP/AS instrument and have been developed to meet the demands of the most flexible and reliable automated pipetting tasks. Channels lock on to the tip rather than the standard method of forcing a tip on a mandrel. This design assures superior tip alignment, seals the tip to the pipette channel, eliminates tip distortion and mitigates aerosol contamination.

The use of non-CO-RE tips is not supported on the STAR Q SP/AS instrument. Non-CO-RE tips do not have the annular space to receive the O-ring. Use of non-CO-RE tips may result in unintended deformation of the O-ring and the tip material itself. It may lead to misalignment of the tip, improper sealing, reduced O-ring life, improper drop-off and potential aborted runs from randomly dropped tips. Therefore, QIAGEN does not support the use of non-CO-RE tips on the STAR Q SP/AS instrument.

Important: Only CO-RE disposable tips should be used with the pipetting channels of the STAR Q SP/AS instrument. Other tips may cause contaminated or damaged pipetting channels.

Note: Pipetting specifications are only guaranteed when using CO-RE tips.

Disposable CO-RE tips are produced under clean room conditions (class 8), based on ISO 14644 standards. "Biological purity tested" tips are free of DNA, DNase/RNase, PCR inhibitors and endotoxin (non-pyrogenic). In addition to these criteria, "Biological purityPLUS" tips are sterile, according to ISO 11135, and free of ATP.

- Filter tips prevent aerosol contamination.
- Conductive (black) tips are specifically designed for cLLD

Note: Make sure to match the tip type(s) used with the method and channel. Refer to "Tip recognition," page 22, for more information.

3.10.1 Tip packaging

All CO-RE disposable tip types are available in trays with a sealed paper lid (blister pack). The tip trays are barcode labeled for automatic identification during the loading process. QIAGEN instruments are able to check for loading of the correct tip type via the barcode reader.



The trays are compatible with the respective tip carriers.



Tip carrier TIP_CAR_480 containing 5 tip trays.

Tips for pipetting sample volumes from 1–50 µl

The low-volume CO-RE tip, 1–50 µl, is available as a conductive (black) tip for use with cLLD, with filter for use with 1000 µl channels. The 1–50 µl tip is compatible with the MAD feature.

CO-RE tips, 1–50 µl, come in trays of 96 tips. One blister pack contains 5 trays.

Tips for pipetting sample volumes from 10–300 µl

The CO-RE tip, 10–300 µl, is available as a conductive (black) tip for use with cLLD, with filter. The 10–300 µl tip can be used with 1000 µl channels and is compatible with the MAD feature.

CO-RE tips, 10–300 µl, come in trays of 96 tips. One blister pack contains 5 trays.

Note: Observe caution when using the CO-RE tips 1–50 µl and 10–300 µl on the same system. Do not mix up one tip type with the other during the process of loading the deck. The wrong tip causes bad pipetting results and/or damaged pipetting channels. The Autoload function is used for loading tip carriers. For more information, consult the local QIAGEN representative.

Tips for pipetting sample volumes from 10–1000 µl

The CO-RE tip, 10–1000 µl, is available as a conductive (black) tip for use with cLLD, with filter for use with 1000 µl channels. It is compatible with the MAD feature.

CO-RE tips, 10–1000 µl, come in trays of 96 tips. One blister pack contains 5 trays.

Note: Observe caution when using the CO-RE tips 10–1000 µl and 10–300 µl on the same system. Do not mix up one tip type with the other during the process of loading the deck. The wrong tip causes bad pipetting results and/or damaged pipetting channels. The Autoload function is used for loading tip carriers.

3.11 Computer requirements

STAR Q SP/AS is controlled by dedicated STAR Q SP/AS Software which manages all functions of the daily work routine.

QIAGEN offers standard computers for use with the software. For specifications of the QIAGEN standard computers, refer to “QIAGEN standard computer specifications,” page 116.

Note: Computer requirements as well as operating systems described in this manual are subject to change without notice.

The STAR Q SP/AS instrument configuration and the processor board implemented have the following interfaces for linking the instrument to the control computer:

- Serial interface RS-232C with dual processor board
- Unified Serial Bus (USB) interface with dual processor board and LAN dual processor board
- Ethernet with LAN dual processor board

The communication interface used on the computer is set by the configuration editor. For further information about the recommended computer model refer to “QIAGEN standard computer specifications,” page 116, and “Electronics and interfaces,” page 32.

To avoid data loss, use of an uninterruptible power supply (UPS) for the computer is recommended.

3.11.1 STAR Q SP/AS Software

The STAR Q SP/AS Software provides everything needed to control the STAR Q SP/AS instrument.

It is a Microsoft® Windows®-based, menu-driven interface allowing the user to run the instrument.

Note: STAR Q SP/AS function has been verified using Windows 7. Running the instrument under any other operating system may lead to severe problems and/or malfunction.

If not using a QIAGEN computer, the customer must make sure that a suitable control computer is available for installation of the STAR Q SP/AS Software. The STAR Q SP/AS instrument will be unpacked and installed and the initial set-up will be performed by a trained QIAGEN Field Service Specialist or service technician of an authorized agent.

3.11.2 Security and data protection

Use the necessary precautions against software viruses. Use only manufacturer's original installation DVD/CD-ROM sets for installation of the operating system.

Running other software in parallel to the STAR Q SP/AS Software may negatively affect the operation of the STAR Q SP/AS instrument.

Any manipulation to the software data files or other information determining or affecting the functions of the STAR Q SP/AS instrument can result in erroneous test results or instrument failure.

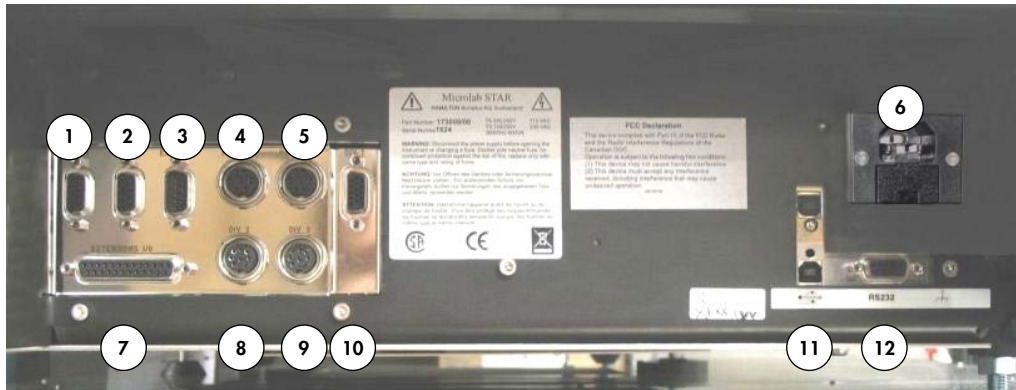
Only the STAR Q SP/AS Software may be used to control the instrument.

For reasons of data security and integrity, the use of an uninterrupted power supply (UPS) is recommended, since a loss of power may cause data to be lost or corrupted.

To avoid computer breakdowns, configure a hard disk of sufficient space in the computer. Make sure that there is always enough storage capacity on the hard drive. Delete the log files from time to time. Generated data within the log files directory, e.g., traces and pipetting files, should be backed up on the laboratory's host device and deleted from the control computer's hard disk at weekly intervals. See "Log files," page 94, for more information.

3.11.3 Electronics and interfaces

All the electrical connections are placed on the left side of the instrument, as shown below:



- | | | | |
|---|--------------|----|---------------------|
| 1 | TCC1 | 7 | Extensions I/O |
| 2 | TCC2 | 8 | DIV 2 |
| 3 | External CAN | 9 | DIV 3 |
| 4 | Power 1 | 10 | DIV 1 |
| 5 | Power 2 | 11 | USB communication |
| 6 | Main power | 12 | RS232 communication |

The main power connection is located near the front of the instrument (on the right side in the picture above). The communication connections to the computer are positioned beneath this main power connection. The STAR Q SP/AS instrument can communicate either via USB (the preferred option) or via RS232.

Important: Never use both connections, USB and RS232, together!

Note: Do not attempt to install a 3rd party device via the electrical connections of the STAR Q SP/AS instrument on your own! Always consult a local QIAGEN representative for installation.

The heater shaker is powered via the connectors labeled “TCC 1” and “TCC 2”.

The connectors labeled “Power 1” and “Power 2” provide different power supply voltages. There is also a CAN bus for communication.

The connectors "DIV 1", "DIV 2", "DIV 3" and "Extensions I/O" deliver several digital input/output signals as well as pulse-width-modulated (PWM) outputs, CAN bus and the TTL levels.

3.12 Power/voltage

Make sure that the instrument is connected to a 100/115/230 VAC (50 or 60 Hz) socket. The instrument can be used with any voltage within the range 100–230 VAC. The main plug is on the left-hand side of the instrument at the front. We recommend using an uninterruptible power supply (UPS) for the instrument. Plug the main cables for the computer and the instrument into the same electrical outlet. Connect them only to a grounded outlet.

Ensure that the instrument is correctly grounded when connected to the electrical outlet.

The fuses for the instrument are placed in the main power socket (see picture below). During installation/IQ, the appropriate fuse is selected by the QIAGEN Field Service Specialist.



Note: When replacing a fuse make sure to use the appropriate fuse (see "Appendix B — Technical Specifications," page 114) and place it in the main power switch before switching on the instrument.

3.13 Training

Training in operation of the STAR Q SP/AS instrument and general use of the STAR Q SP/AS Software will be provided by QIAGEN personnel at initial setup.

4 Sample Processing Using STAR Q SP/AS Kits

The purpose of the QIAGEN STAR Q SP/AS Graphical User Interface (GUI) described in this user manual is to perform the following sample processing steps, either separately or in sequence:

- DNA purification from forensic casework samples
 - Minimum: 1 reaction
 - Maximum: 96 reactions
- Setup of quantification PCR reactions from final DNA eluates
 - Minimum: 1
 - Maximum: 80 (96 reactions with 16 reactions for standards and controls) if a 96-well PCR plate is used
 - Maximum: 56 (72 reactions with 16 reactions for standards and controls) if Rotor-Gene® Q strip tubes are used
- Normalization of DNA eluates and STR reaction setup
 - Minimum: 1
 - Maximum: 96 (less positions of the ladder; less number of positive and negative controls)

All listed workflows are in association with QIAGEN reagents. To order kits, refer to “Appendix A — Ordering Information,” page 112.

Important notes

- Do not exchange positions of sample and reagent tubes, or switch microplates after they have been identified by the barcode reader. This could result in incorrect test data or an instrument crash.
- Microplates must be placed on the carrier such that well A1 is located in the top-left position.
- When pouring liquid into the containers, ensure that there is no foam on the surface of the liquid. Note that foam may cause pipetting problems.
- Do not overfill reagent containers, tubes or other liquid containers.
- Do not mix tip size and type (e.g., with or without filter, or different volumes) in the same tip rack. Make sure to match the tip types to be used with the particular method. Take care if using tips which cannot be distinguished by the tip recognition feature (refer to “Tip recognition,” page 22, and “Disposable tips,” page 27).
- Do not fill partially consumed tip racks with tips from other racks. Tip racks should be loaded into the tip rack carriers as they are provided in the original package. The tip racks are individually labeled with a barcode for identification.

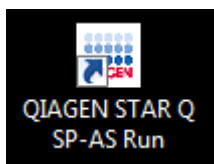
- Do not try to open the front cover of the instrument during a run because the system will abort and this may cause a loss of data.
- When the system is paused, do not wait too long before resuming the run. Loss of liquid from a full tip may result in invalid data.
- Discard used tips. Do not reuse them.
- Do not empty the tip waste during a run.
- Do not leave tips on the pipetting channels for a long period of time, e.g., overnight. This may cause damage to the CO-RE O-rings. A daily maintenance procedure will remove the tips.

For routine use of the STAR Q SP/AS instrument, refer to the Quick Start Guide.

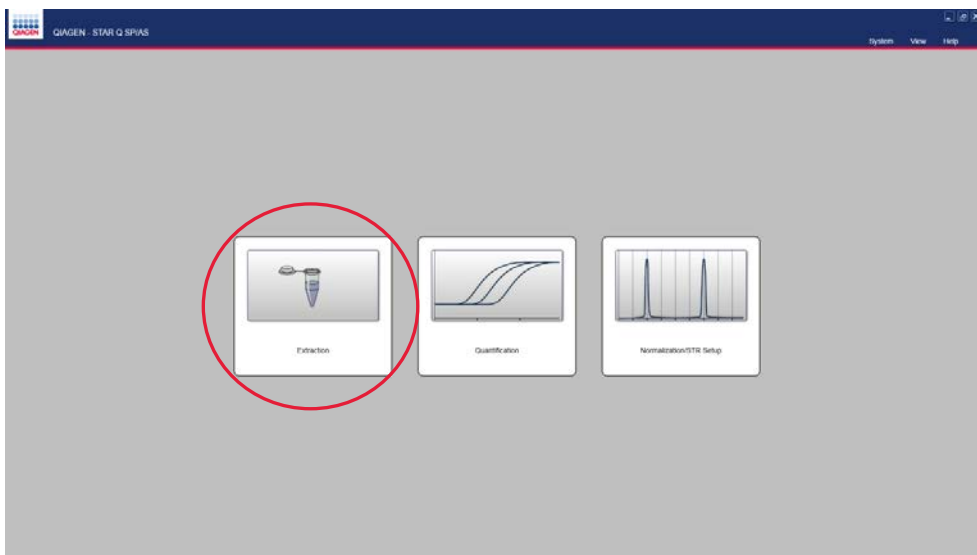
4.1 DNA purification

4.1.1 Setup of extraction run specifications

1. Launch the QIAGEN user interface from the computer desktop.



2. Select **Extraction** from the home screen.



3. Enter the run specifications in the **Extraction** screen.

4. In the **Labware** panel, select the labware format for the sample input (how your samples are loaded on to the instrument). For a comprehensive list of input and output labware, see “Labware for STAR Q SP/AS,” page 117.

5. Select the type of labware to load (**Note:** “Treff 2.0ml” tubes are Lyse&Spin tubes).

6. Select the labware format for your output (where you want your eluates to be placed).

7. Select the type of labware you will load.

Extraction	
Labware	
Input labware	Tubes
Input labware type	Sarstedt 1.5ml
Output labware	Plates
Output labware type	Bio-Rad 96well PCR
Use input labware barcodes	Bio-Rad 96well PCR
Use output labware barcodes	ABI MicroAmp 96well PCR

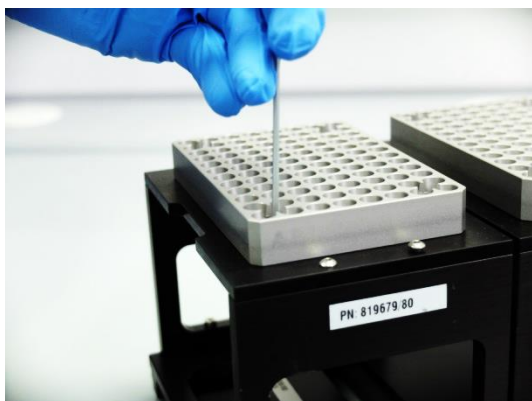
Important: The system is configured for the “ABI MicroAmp 96well PCR” plate (Applied Biosystems® MicroAmp® 96-well plate). If the user chooses the “Bio-Rad 96well PCR” plate (Bio-Rad® Microseal® 96-well PCR plate), the instrument carriers must be modified according to the following workflow.

Example of an unmodified carrier:



Modify all 5 PCR plate positions on the carrier according to this procedure.

7a. Using a hex tip screwdriver, unscrew the 4 screws attaching the PCR plate holder to the PCR plate adapter on the carrier.

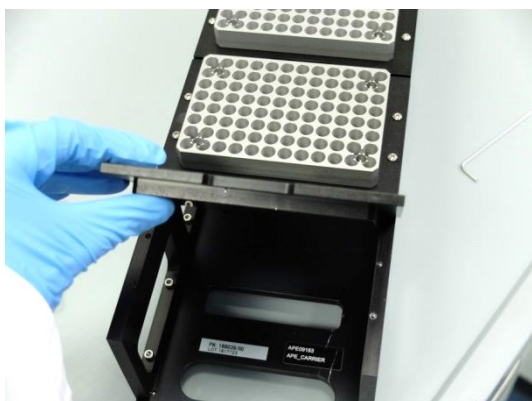


The black plate underneath the silver PCR plate holder is the PCR plate adapter.

7b. Remove the 4 screws from the PCR plate adapter.



7c. Flip the PCR plate adapter.



7d. Replace and tighten the 4 screws in the PCR plate adapter.



7e. Place the PCR plate holder on the repositioned PCR plate adapter.



7f. Replace and tighten all 4 screws on the PCR plate holder.

7g. Repeat steps 7a to 7f for the remaining 4 PCR plate positions.

8. Check the boxes to specify if your input and output tubes/plate have/has barcodes.

Extraction	
Labware	
Input labware	<input type="text" value="Tubes"/>
Input labware type	<input type="text" value="Sarstedt 1.5ml"/>
Output labware	<input type="text" value="Plates"/>
Output labware type	<input type="text" value="Bio-Rad 96well PCR"/>
Use input labware barcodes	<input checked="" type="checkbox"/>
Use output labware barcodes	<input type="checkbox"/>

- In the **Sample information** panel, select whether you will use a worklist or not. If not, then enter the number of samples in the **Sample number** field.

Sample information

Use worklist ☒

Worklist file path

Sample number (enabled / disabled) /

Sample transfer error recovery mode ☒ Available ☐ Exclude

If **Sample transfer error recovery mode** is set to **Available**, the available volume of a sample will be used if there is insufficient volume of sample. If this option is set to **Exclude**, a sample with insufficient volume will be excluded from the extraction process.

- If you are using a worklist, click on the blue folder icon, browse to the worklist and load your worklist. A worklist must be a *.csv file.

Sample information

Use worklist ☒

Worklist file path

Sample number (enabled / disabled) /

Sample transfer error recovery mode ☒ Available ☐ Exclude

Example of a worklist in Microsoft Excel®:

	A	B	C	D	E	F	G	H	I
1	Sample ID	Sample Plate/Tube Barcode	Sample Well Position	Comments					
2	Sample_1	Barcode_1		Comment_1					
3	Sample_2	Barcode_2		Comment_2					
4	Sample_3	Barcode_3		Comment_3					
5	Sample_4	Barcode_4		Comment_4					
6	Sample_5	Barcode_5		Comment_5					
7	Sample_6	Barcode_6		Comment_6					
8	Sample_7	Barcode_7		Comment_7					
9	Sample_8	Barcode_8		Comment_8					
10	Sample_9	Barcode_9		Comment_9					
11	Sample_10	Barcode_10		Comment_10					
12	Sample_11	Barcode_11		Comment_11					
13	Sample_12	Barcode_12		Comment_12					
14	Sample_13	Barcode_13		Comment_13					
15	Sample_14	Barcode_14		Comment_14					
16	Sample_15	Barcode_15		Comment_15					
17	Sample_16	Barcode_16		Comment_16					
18	Sample_17	Barcode_17		Comment_17					
19	Sample_18	Barcode_18		Comment_18					
20	Sample_19	Barcode_19		Comment_19					
21	Sample_20	Barcode_20		Comment_20					
22	Sample_21	Barcode_21		Comment_21					
23	Sample_22	Barcode_22		Comment_22					
24	Sample_23	Barcode_23		Comment_23					

The contents of the worklist are displayed in the right-hand **Sample list** panel of the **Extraction** window.

Sample list				
Selected	Sample ID	Barcode	Well position	Comments
<input checked="" type="checkbox"/>	Sample_1	Barcode_1		Comment_1
<input checked="" type="checkbox"/>	Sample_2	Barcode_2		Comment_2
<input checked="" type="checkbox"/>	Sample_3	Barcode_3		Comment_3
<input checked="" type="checkbox"/>	Sample_4	Barcode_4		Comment_4
<input checked="" type="checkbox"/>	Sample_5	Barcode_5		Comment_5
<input checked="" type="checkbox"/>	Sample_6	Barcode_6		Comment_6
<input checked="" type="checkbox"/>	Sample_7	Barcode_7		Comment_7
<input checked="" type="checkbox"/>	Sample_8	Barcode_8		Comment_8
<input checked="" type="checkbox"/>	Sample_9	Barcode_9		Comment_9
<input checked="" type="checkbox"/>	Sample_10	Barcode_10		Comment_10
<input checked="" type="checkbox"/>	Sample_11	Barcode_11		Comment_11
<input checked="" type="checkbox"/>	Sample_12	Barcode_12		Comment_12
<input checked="" type="checkbox"/>	Sample_13	Barcode_13		Comment_13
<input checked="" type="checkbox"/>	Sample_14	Barcode_14		Comment_14
<input checked="" type="checkbox"/>	Sample_15	Barcode_15		Comment_15
<input checked="" type="checkbox"/>	Sample_16	Barcode_16		Comment_16
<input checked="" type="checkbox"/>	Sample_17	Barcode_17		Comment_17
<input checked="" type="checkbox"/>	Sample_18	Barcode_18		Comment_18
<input checked="" type="checkbox"/>	Sample_19	Barcode_19		Comment_19
<input checked="" type="checkbox"/>	Sample_20	Barcode_20		Comment_20
<input checked="" type="checkbox"/>	Sample_21	Barcode_21		Comment_21
<input checked="" type="checkbox"/>	Sample_22	Barcode_22		Comment_22
<input checked="" type="checkbox"/>	Sample_23	Barcode_23		Comment_23
<input checked="" type="checkbox"/>	Sample_24	Barcode_24		Comment_24
<input checked="" type="checkbox"/>	Sample_25	Barcode_25		Comment_25

11. Deselect samples that you do not wish to include by unchecking the box in the left-hand column.

In the **Sample information** panel, the **Sample number (enabled/disabled)** fields show the number of samples selected to be processed and the number that are deselected.

Note: It is the operator's responsibility to ensure the order of samples on the instrument is aligned to the order of the worklist.

12. In the **Kit information** panel, select the lysate volume.

Kit information	
Kit type	Investigator STAR Lyse&Prep Kit
Volume lysate	300
Volume eluate	300 500
Q-Card barcode	
Kit part number	
Kit lot number	
Kit expiry date (mmyy)	

13. Select the desired elution volume.

Kit information	
Kit type	Investigator STAR Lyse&Prep Kit
Volume lysate	300
Volume eluate	50
Q-Card barcode	50 100
Kit part number	
Kit lot number	
Kit expiry date (mmyy)	

14. Locate the Q-Card supplied with the Investigator STAR Lyse&Prep Kit.

Example of a Q-Card:



15. Scan the barcode into the **Q-Card barcode** field and the remaining fields will automatically populate with the relevant kit details.

Kit information	
Kit type	Investigator STAR Lyse&Prep Kit
Volume lysate	300
Volume eluate	50
Q-Card barcode	123456712345678901299000
Kit part number	1234567
Kit lot number	1234567890
Kit expiry date (mmyy)	1299

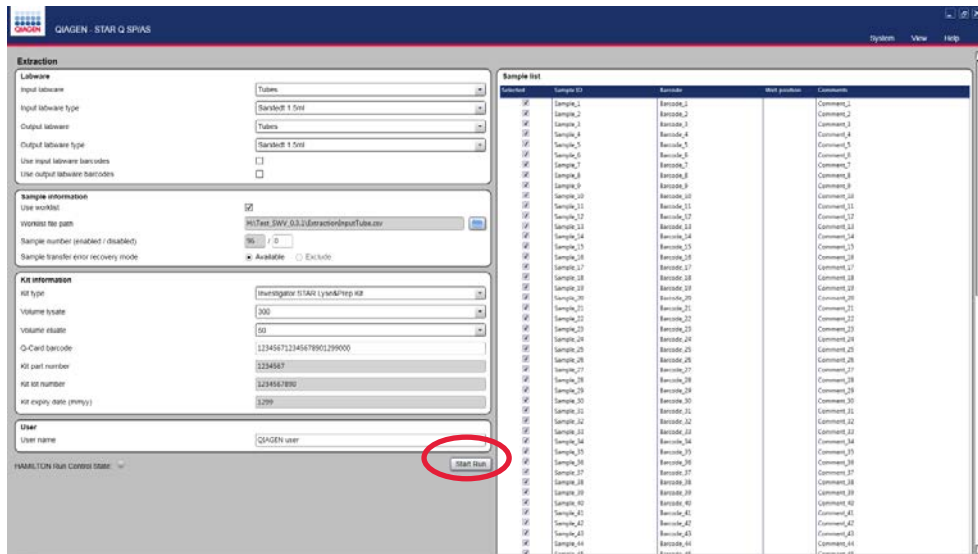
Note: The instrument will identify an out-of-date kit by highlighting the **Kit expiry date** field in red and warning the user. The software will consider the kit as expired when the first day of the month of the expiry date is reached.

16. Enter the name of the operator in the **User name** field in the **User** panel. This information will be entered into the final Trace file containing all of the run information.



The screenshot shows a 'User' panel with a 'User name' label and a text input field. The input field contains the text 'QIAGEN user'.

17. Now that all fields have been filled in, click on the **Start Run** button.



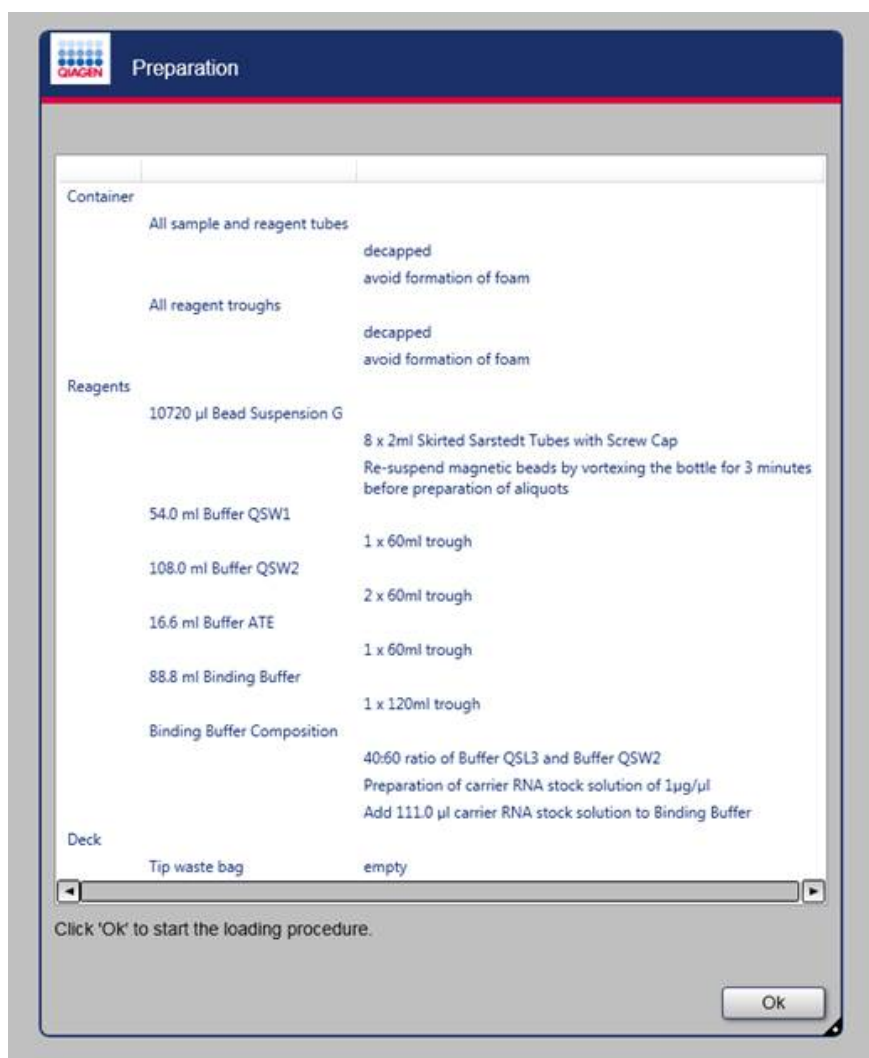
The screenshot shows the main interface of the QIAGEN STAR Q SP/AS software. On the left, there are several panels for configuration: 'Extraction' (input/output labware, barcode settings), 'Sample information' (worklist path, sample number, transfer mode), 'Kit information' (kit type, volume, barcode, lot number, expiry date), and 'User' (user name). The 'User' panel shows 'QIAGEN user' entered. On the right, there is a 'Sample list' table with columns for 'Selected', 'Sample ID', 'Barcode', 'Well position', and 'Comments'. The 'Start Run' button is located at the bottom of the configuration panels and is circled in red.

Selected	Sample ID	Barcode	Well position	Comments
<input checked="" type="checkbox"/>	Sample_1	Barcode_1		Comments_1
<input checked="" type="checkbox"/>	Sample_2	Barcode_2		Comments_2
<input checked="" type="checkbox"/>	Sample_3	Barcode_3		Comments_3
<input checked="" type="checkbox"/>	Sample_4	Barcode_4		Comments_4
<input checked="" type="checkbox"/>	Sample_5	Barcode_5		Comments_5
<input checked="" type="checkbox"/>	Sample_6	Barcode_6		Comments_6
<input checked="" type="checkbox"/>	Sample_7	Barcode_7		Comments_7
<input checked="" type="checkbox"/>	Sample_8	Barcode_8		Comments_8
<input checked="" type="checkbox"/>	Sample_9	Barcode_9		Comments_9
<input checked="" type="checkbox"/>	Sample_10	Barcode_10		Comments_10
<input checked="" type="checkbox"/>	Sample_11	Barcode_11		Comments_11
<input checked="" type="checkbox"/>	Sample_12	Barcode_12		Comments_12
<input checked="" type="checkbox"/>	Sample_13	Barcode_13		Comments_13
<input checked="" type="checkbox"/>	Sample_14	Barcode_14		Comments_14
<input checked="" type="checkbox"/>	Sample_15	Barcode_15		Comments_15
<input checked="" type="checkbox"/>	Sample_16	Barcode_16		Comments_16
<input checked="" type="checkbox"/>	Sample_17	Barcode_17		Comments_17
<input checked="" type="checkbox"/>	Sample_18	Barcode_18		Comments_18
<input checked="" type="checkbox"/>	Sample_19	Barcode_19		Comments_19
<input checked="" type="checkbox"/>	Sample_20	Barcode_20		Comments_20
<input checked="" type="checkbox"/>	Sample_21	Barcode_21		Comments_21
<input checked="" type="checkbox"/>	Sample_22	Barcode_22		Comments_22
<input checked="" type="checkbox"/>	Sample_23	Barcode_23		Comments_23
<input checked="" type="checkbox"/>	Sample_24	Barcode_24		Comments_24
<input checked="" type="checkbox"/>	Sample_25	Barcode_25		Comments_25
<input checked="" type="checkbox"/>	Sample_26	Barcode_26		Comments_26
<input checked="" type="checkbox"/>	Sample_27	Barcode_27		Comments_27
<input checked="" type="checkbox"/>	Sample_28	Barcode_28		Comments_28
<input checked="" type="checkbox"/>	Sample_29	Barcode_29		Comments_29
<input checked="" type="checkbox"/>	Sample_30	Barcode_30		Comments_30
<input checked="" type="checkbox"/>	Sample_31	Barcode_31		Comments_31
<input checked="" type="checkbox"/>	Sample_32	Barcode_32		Comments_32
<input checked="" type="checkbox"/>	Sample_33	Barcode_33		Comments_33
<input checked="" type="checkbox"/>	Sample_34	Barcode_34		Comments_34
<input checked="" type="checkbox"/>	Sample_35	Barcode_35		Comments_35
<input checked="" type="checkbox"/>	Sample_36	Barcode_36		Comments_36
<input checked="" type="checkbox"/>	Sample_37	Barcode_37		Comments_37
<input checked="" type="checkbox"/>	Sample_38	Barcode_38		Comments_38
<input checked="" type="checkbox"/>	Sample_39	Barcode_39		Comments_39
<input checked="" type="checkbox"/>	Sample_40	Barcode_40		Comments_40
<input checked="" type="checkbox"/>	Sample_41	Barcode_41		Comments_41
<input checked="" type="checkbox"/>	Sample_42	Barcode_42		Comments_42
<input checked="" type="checkbox"/>	Sample_43	Barcode_43		Comments_43
<input checked="" type="checkbox"/>	Sample_44	Barcode_44		Comments_44
<input checked="" type="checkbox"/>	Sample_45	Barcode_45		Comments_45

4.1.2 Loading an extraction run

The **Preparation** window provides a list of the reagents needed as well as the tube or container type in which the reagents need to be loaded. Where a reagent must be prepared manually prior to the start of the run, the composition of the reagent is displayed.

The **Preparation** window serves as a general overview; detailed information regarding the loading of the reagents is given at a later stage in the loading process.



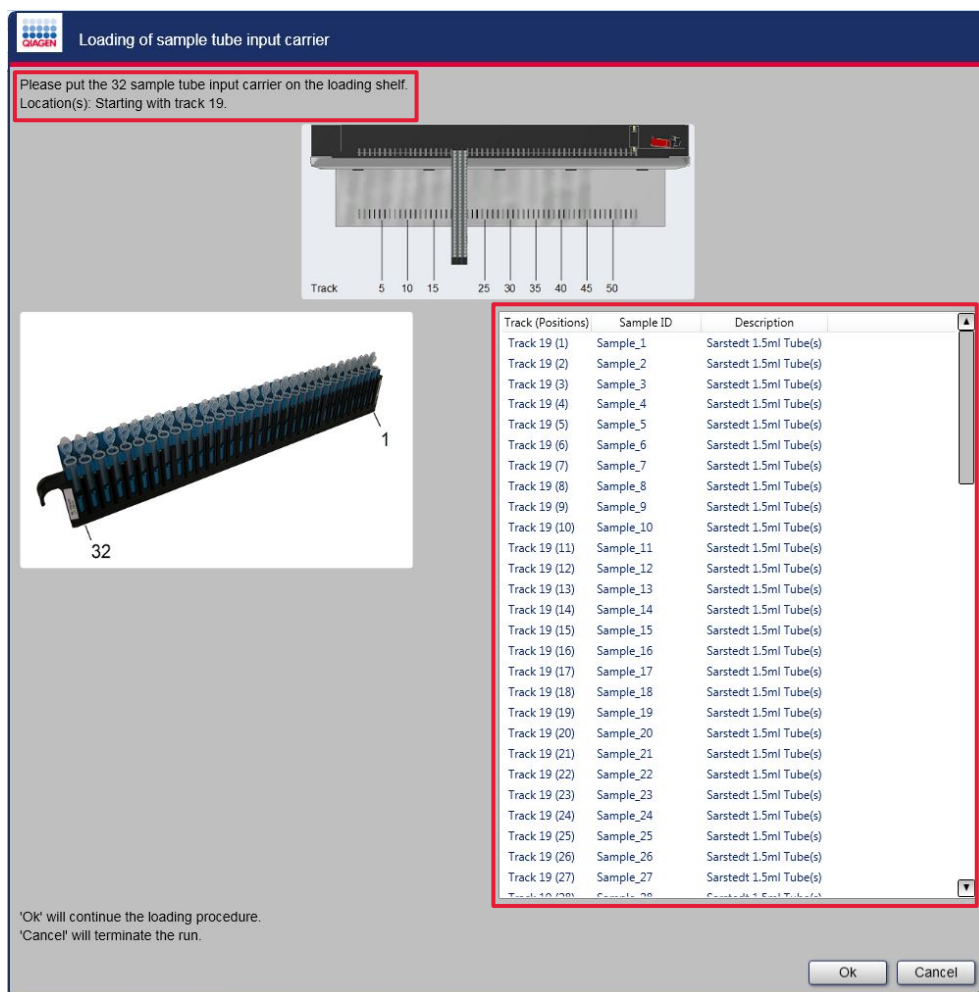
1. Click **Ok** to begin loading.

CAUTION**Loss of data and damage to the instrument**

Use only labware defined in this manual with the STAR Q SP/AS instrument.
Failure to do so may result in damage to the instrument and incorrect results.

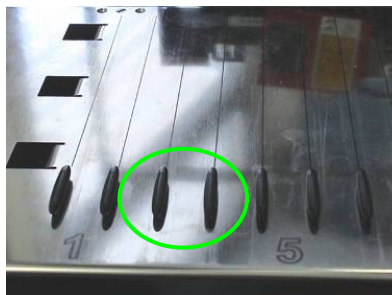
2. Load the samples in the location displayed on the **Loading of sample tube input carrier** screen. If using tubes, make sure that all lids are open and that they are loaded consecutively from position 1 onwards.

Note: Presence or absence of tubes is not checked unless barcodes are used.



3. Press **Ok** to load.

4. Insert the carriers into the tracks between the front and rear slide blocks of the Autoload tray until they touch the stop hooks on the far side of the tray.



Slide blocks for carriers.



Stop hooks for carriers.

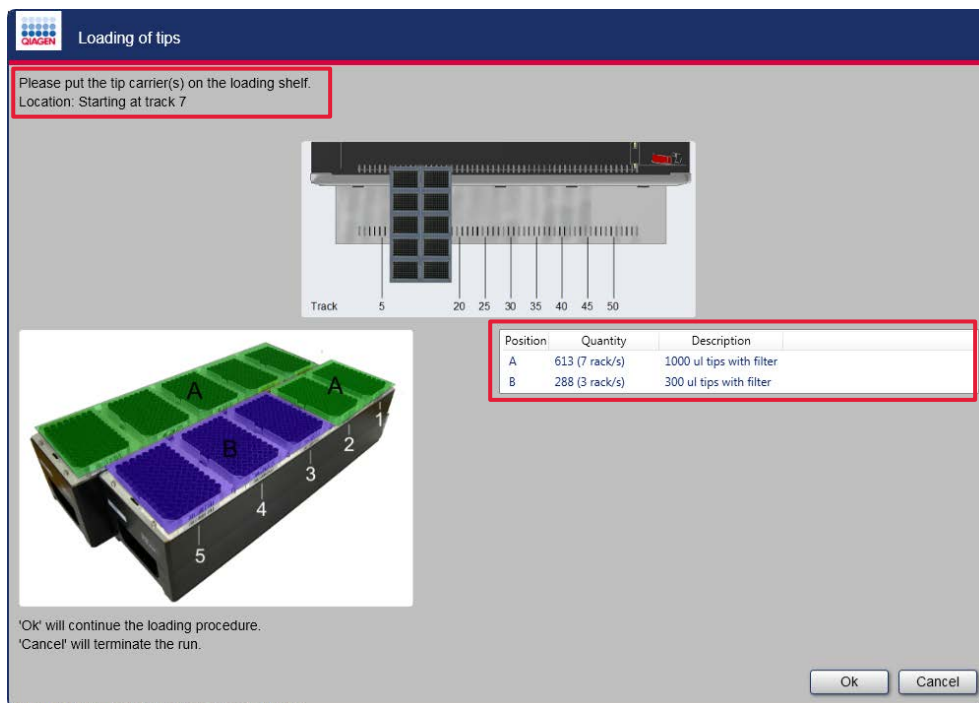
The instrument will tell you how many tips are required for the run and how many racks will need to be loaded.

Example:

Position	Quantity	Description
A	613 (7 rack/s)	1000 ul tips with filter
B	288 (3 rack/s)	300 ul tips with filter

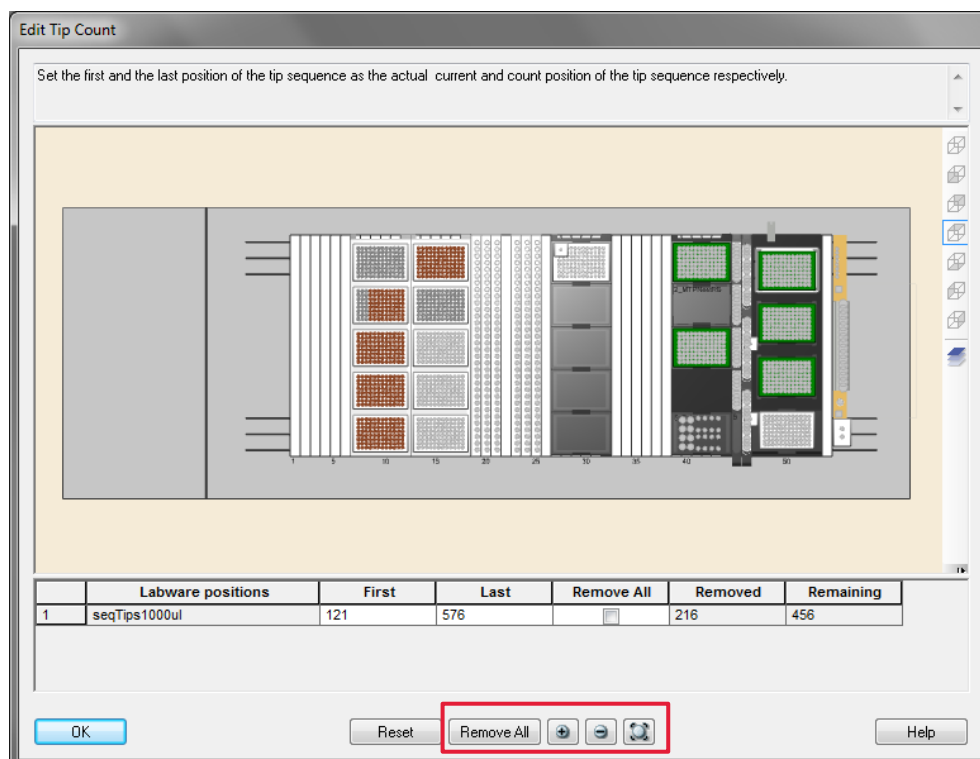
5. Load the 300 µl and 1000 µl tips in the positions highlighted in blue and green respectively on the **Loading of tips** screen.

A tip rack must be present in each location. If no tips are required in a position, load an empty tip rack in that position.



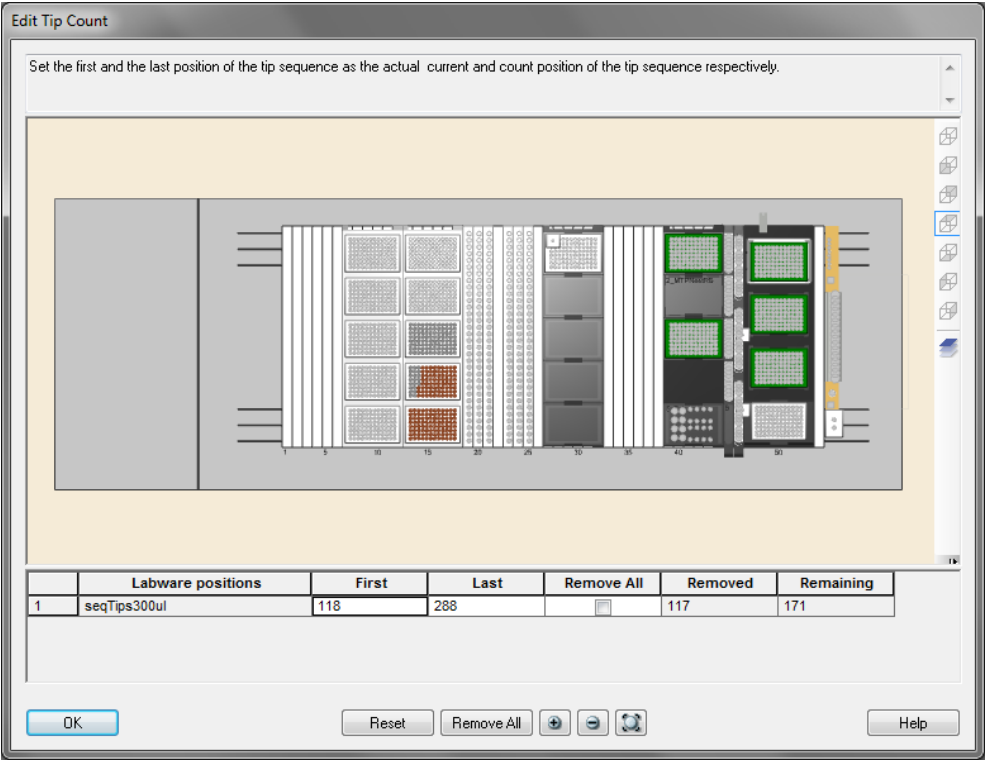
6. Press **Ok** to continue.

The first **Edit Tip Count** screen allows the user to enter the locations of 1000 µl tips being loaded. The system tracks the number of 1000 µl tips remaining after the previous run and displays the remaining 1000 µl tips in brown.

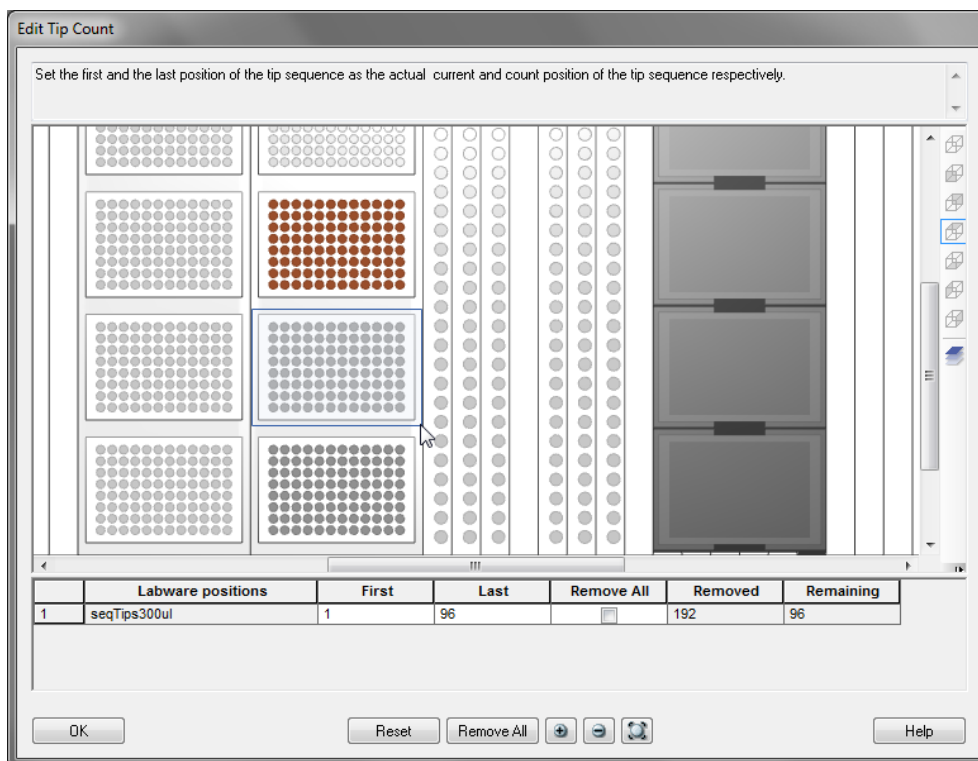


At the bottom of the window, the **Remove All** button allows the user to remove all tips from their location. Use the zoom and scaling buttons for easier viewing of the locations of the tips.

To add a new rack of tips, click-and-drag a tip box over the location then release the mouse button. The slot location is filled.



Tips can also be added individually by selecting them on the plate location.



7. Click **OK** when this is done.
8. The second **Edit Tip Count** screen allows the user to enter the locations of 300 µl tips being loaded. Follow the same steps as described above to load the correct amount of 300 µl tips.

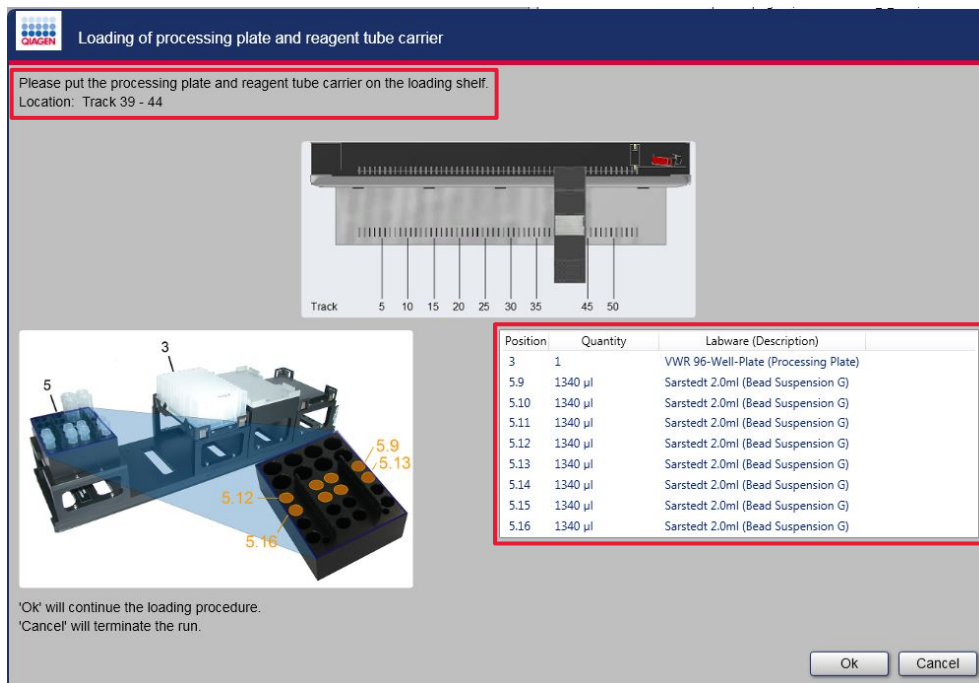
9. Click **OK** when this is done.

The instrument will load the tip carriers.

If insufficient tips are detected when all tips are loaded, a warning message will appear and the tip loading procedure can be repeated.

The processing plate and magnetic beads are loaded next. In cases where the samples are to be loaded on a plate, the sample plate is loaded at this step.

1. Follow the instructions in the **Loading of processing plate and reagent tube carrier** screen.

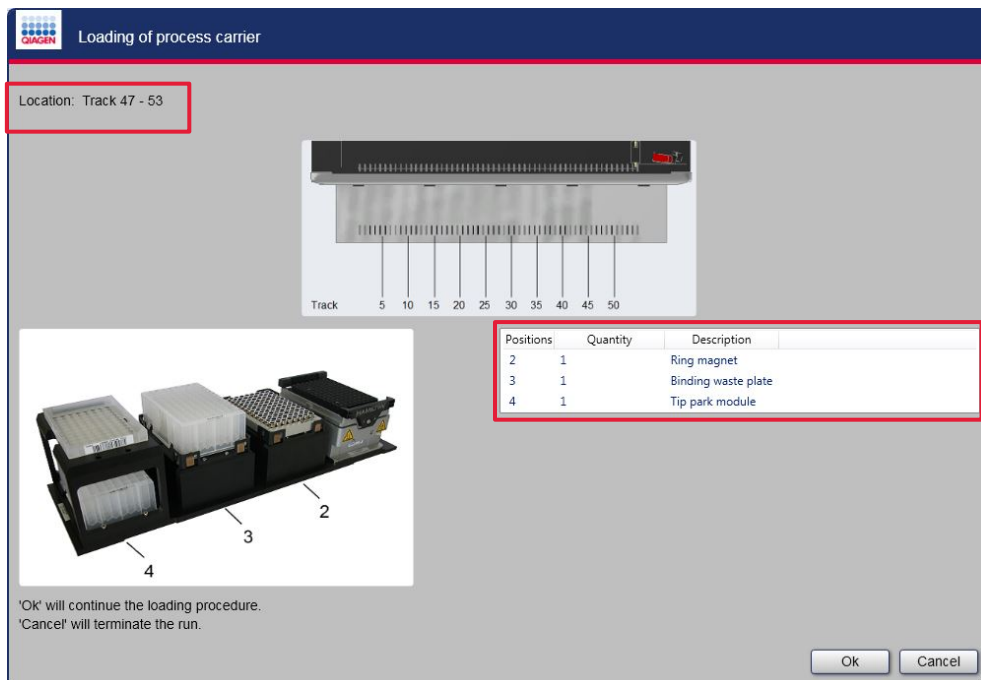


Depending on the number of samples being loaded, either 4 or 8 tubes containing magnetic beads will be required.

Note: Make sure that magnetic beads are mixed by vortexing before distributing aliquots to the tubes. Work quickly to avoid beads settling in the kit bottle.

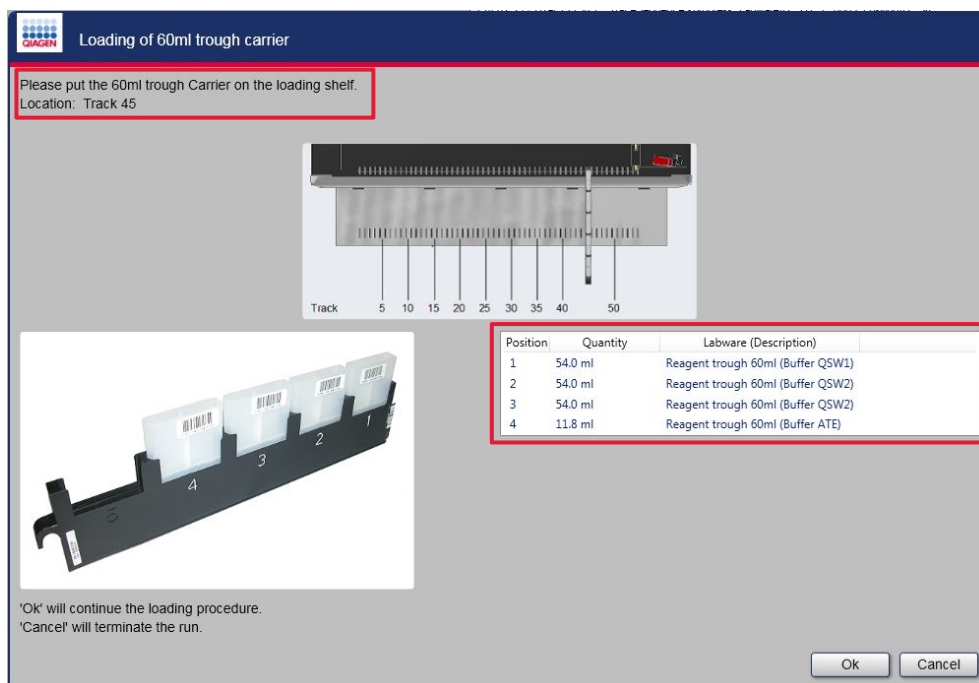
2. Press **Ok** to load. The system will perform a load check.

3. On the fixed loading position as shown in the **Loading of process carrier** screen, place a clean deep well plate in position 3 for the binding waste.
4. Place another clean deep well plate under the tip park module in position 4.
5. Place an empty tip rack into position 4 so that tips can be reused during the run. Make sure that the ring magnet is present in position 2 as this may have been removed during cleaning.



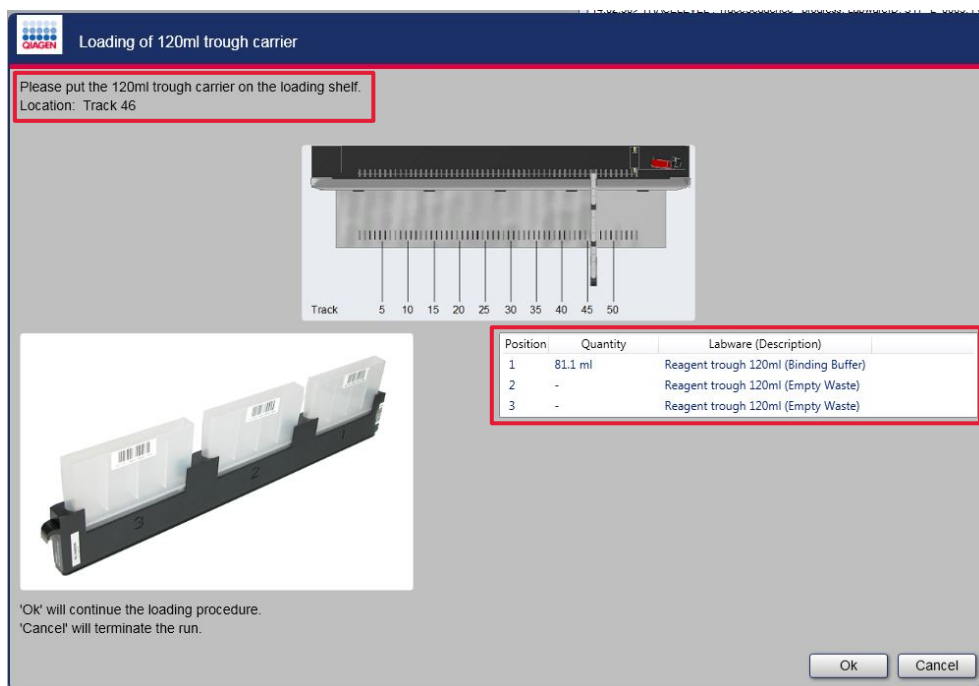
6. Press **Ok** to proceed. The system will perform a load check.

7. Load the required volume of wash and elution buffers into position as shown on the **Loading of 60ml trough carrier** screen.



8. Press **Ok** to load. The system will perform a load check.

9. Load the required volume of binding buffer into position as stated on the **Loading of 120ml trough carrier** screen. Two additional reagent troughs will be required for wash buffer removal during the run.

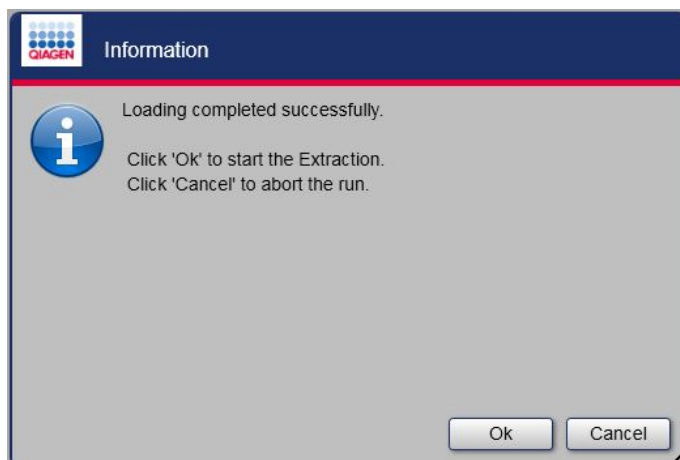


10. Press **Ok** to load. The system will perform a load check.

11. Load the output plate or tubes into the required position as shown on the **Loading of sample output plate carrier** screen.

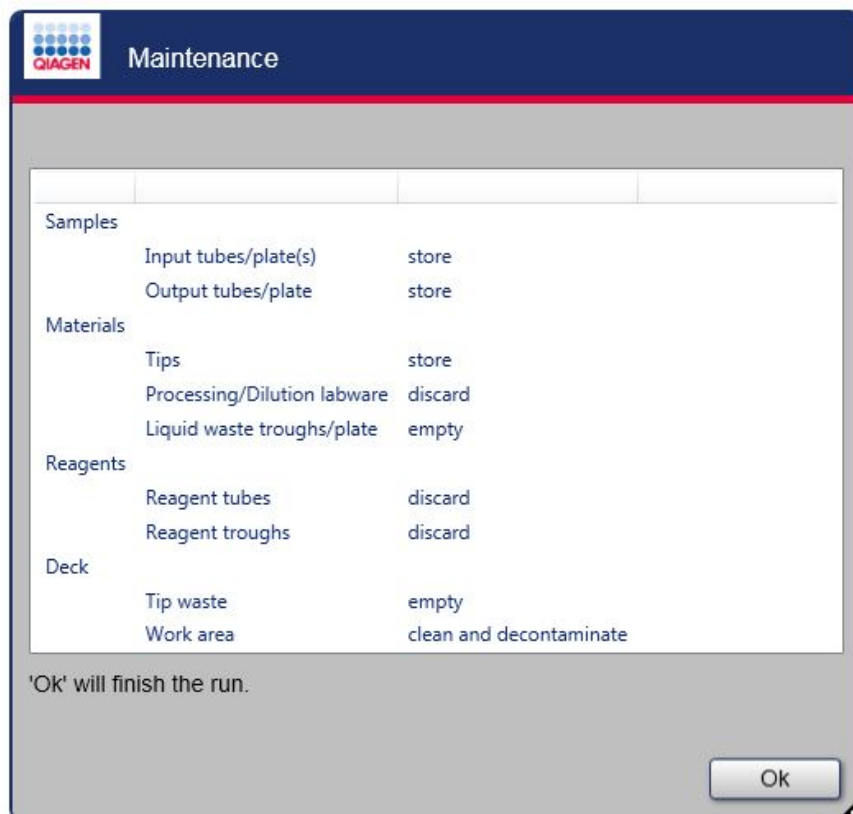


12. Press **Ok** to load. The system will perform a load check.

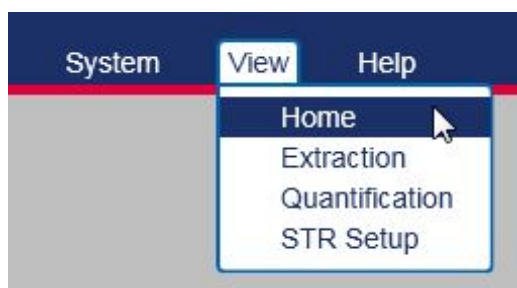


13. Loading is complete. Press **Ok** to start the purification process.

After the run, the following message is displayed explaining what to do with each of the components on the STAR Q SP/AS instrument deck.



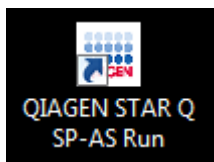
14. Press **Ok** to finish the run and close the **Run Control** environment.
15. Click **View** to return to the home screen or to begin another process.



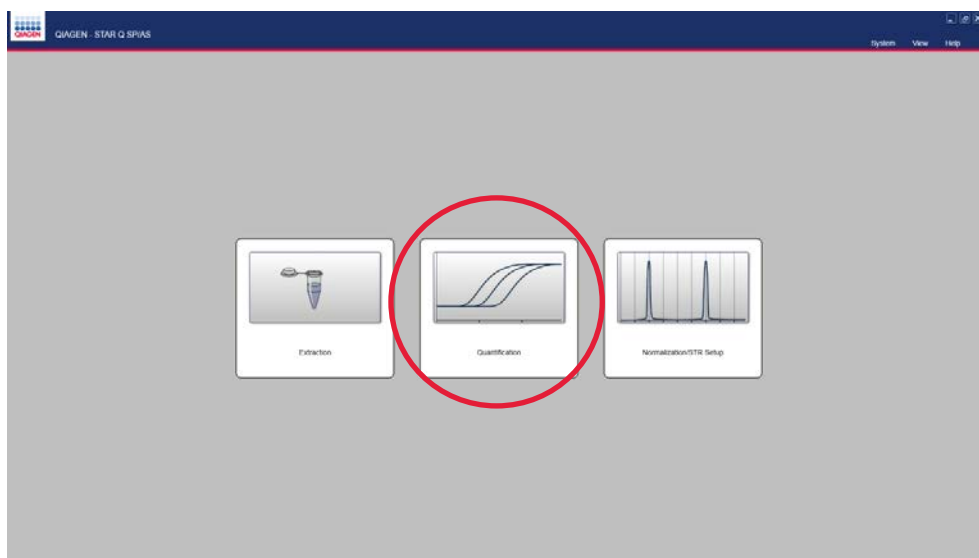
4.2 Setup for PCR quantification of DNA eluates

4.2.1 Setup of quantification run specifications

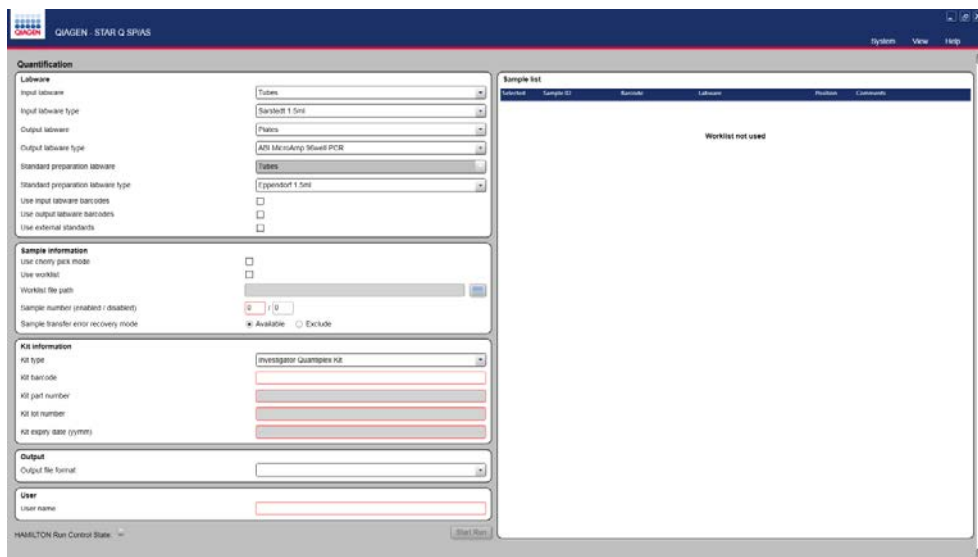
1. Launch the QIAGEN user interface from the computer desktop.



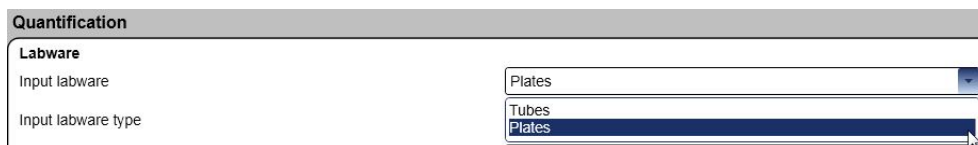
2. Select **Quantification** from the home screen.



- The **Quantification** setup screen opens.

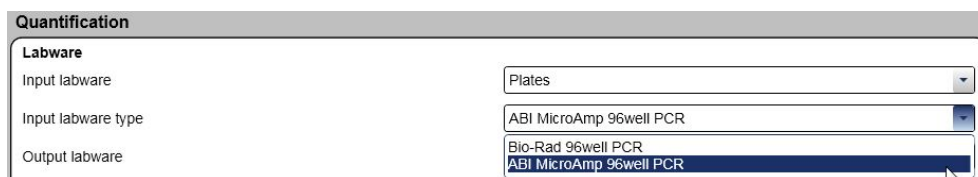


- In the **Labware** panel, select plates or tubes for input samples. For a comprehensive list of input and output labware, see “Labware for STAR Q SP/AS,” page 117.



- Select input plate/tube type.

Note: To set up carriers for Bio-Rad 96-well PCR plates, follow the procedure on page 37.



6. Repeat the above steps for **Output labware** and **Standard preparation labware** (if new standards are to be prepared by the instrument).

Quantification	
Labware	
Input labware	Plates
Input labware type	ABI MicroAmp 96well PCR
Output labware	Plates
Output labware type	ABI MicroAmp 96well PCR
Standard preparation labware	Tubes
Standard preparation labware type	Sarstedt 1.5ml
Use input labware barcodes	<input type="checkbox"/>
Use output labware barcodes	<input type="checkbox"/>
Use external standards	<input type="checkbox"/>

7. If using input and/or output barcodes, check the barcode boxes.

Quantification	
Labware	
Input labware	Plates
Input labware type	ABI MicroAmp 96well PCR
Output labware	Plates
Output labware type	ABI MicroAmp 96well PCR
Standard preparation labware	Tubes
Standard preparation labware type	Sarstedt 1.5ml
Use input labware barcodes	<input type="checkbox"/>
Use output labware barcodes	<input type="checkbox"/>
Use external standards	<input type="checkbox"/>

8. If using pre-prepared standards, check the **Use external standards** box. Do not use pre-prepared external standards for more than 1 week.

Quantification	
Labware	
Input labware	Plates
Input labware type	ABI MicroAmp 96well PCR
Output labware	Plates
Output labware type	ABI MicroAmp 96well PCR
Standard preparation labware	Tubes
Standard preparation labware type	Sarstedt 1.5ml
Use input labware barcodes	<input type="checkbox"/>
Use output labware barcodes	<input type="checkbox"/>
Use external standards	<input type="checkbox"/>

- In the **Sample information** panel, enter the number of samples to be processed or check the **Use worklist** box if a worklist is to be used. (For more information on cherry pick mode, see “Cherry pick samples mode,” page 87.)

Sample information


Use cherry pick mode

☐

Use worklist

☒

Worklist file path



Sample number (enabled / disabled)

/

Sample transfer error recovery mode

☒ Available
☐ Exclude

- When a worklist is used, click on the blue folder icon in the **Sample information** panel, browse to the worklist and import your worklist.

Sample information


Use cherry pick mode

☐

Use worklist

☒

Worklist file path



Sample number (enabled / disabled)

/

Sample transfer error recovery mode

☒ Available
☐ Exclude

The run report file from the DNA purification run is suitable to use as a worklist. Alternatively, any other *.csv file may be used.

Example of a worklist:

SampleID	EluatePlate	TubeBarcode	EluatePlate	TubeCarrier	EluateWell	TubePosition	PipettingStatus	Comments
Sample_1	Barcode01		Sarstedt1	5mlTubesSampleLysate_01		1	OK	Comment_1
Sample_2	Barcode02		Sarstedt1	5mlTubesSampleLysate_01		2	OK	Comment_2
Sample_3	Barcode03		Sarstedt1	5mlTubesSampleLysate_01		3	OK	Comment_3
Sample_4	Barcode04		Sarstedt1	5mlTubesSampleLysate_01		4	OK	Comment_4
Sample_5	Barcode05		Sarstedt1	5mlTubesSampleLysate_01		5	OK	Comment_5
Sample_6	Barcode06		Sarstedt1	5mlTubesSampleLysate_01		6	OK	Comment_6
Sample_7	Barcode07		Sarstedt1	5mlTubesSampleLysate_01		7	OK	Comment_7
Sample_8	Barcode08		Sarstedt1	5mlTubesSampleLysate_01		8	OK	Comment_8
Sample_9	Barcode09		Sarstedt1	5mlTubesSampleLysate_01		9	OK	Comment_9
Sample_10	Barcode10		Sarstedt1	5mlTubesSampleLysate_01		10	OK	Comment_10
Sample_11	Barcode11		Sarstedt1	5mlTubesSampleLysate_01		11	OK	Comment_11
Sample_12	Barcode12		Sarstedt1	5mlTubesSampleLysate_01		12	OK	Comment_12
Sample_13	Barcode13		Sarstedt1	5mlTubesSampleLysate_01		13	OK	Comment_13
Sample_14	Barcode14		Sarstedt1	5mlTubesSampleLysate_01		14	OK	Comment_14
Sample_15	Barcode15		Sarstedt1	5mlTubesSampleLysate_01		15	OK	Comment_15
Sample_16	Barcode16		Sarstedt1	5mlTubesSampleLysate_01		16	OK	Comment_16

The sample list is shown in the right-hand **Sample list** panel. All samples are automatically selected. Uncheck the **Selected** box if a particular sample is not to be quantified.

Sample list					
Selected	Sample ID	Barcode	Labware	Position	Comments
<input checked="" type="checkbox"/>	Sample_1	Barcode01	BioRad96WellPlateElate_01	A1	
<input checked="" type="checkbox"/>	Sample_2	Barcode01	BioRad96WellPlateElate_01	B1	
<input checked="" type="checkbox"/>	Sample_3	Barcode01	BioRad96WellPlateElate_01	C1	
<input checked="" type="checkbox"/>	Sample_4	Barcode01	BioRad96WellPlateElate_01	D1	
<input checked="" type="checkbox"/>	Sample_5	Barcode01	BioRad96WellPlateElate_01	E1	
<input checked="" type="checkbox"/>	Sample_6	Barcode01	BioRad96WellPlateElate_01	F1	
<input checked="" type="checkbox"/>	Sample_7	Barcode01	BioRad96WellPlateElate_01	G1	
<input checked="" type="checkbox"/>	Sample_8	Barcode01	BioRad96WellPlateElate_01	H1	
<input checked="" type="checkbox"/>	Sample_9	Barcode01	BioRad96WellPlateElate_01	A2	
<input checked="" type="checkbox"/>	Sample_10	Barcode01	BioRad96WellPlateElate_01	B2	
<input checked="" type="checkbox"/>	Sample_11	Barcode01	BioRad96WellPlateElate_01	C2	
<input checked="" type="checkbox"/>	Sample_12	Barcode01	BioRad96WellPlateElate_01	D2	
<input checked="" type="checkbox"/>	Sample_13	Barcode01	BioRad96WellPlateElate_01	E2	
<input checked="" type="checkbox"/>	Sample_14	Barcode01	BioRad96WellPlateElate_01	F2	
<input checked="" type="checkbox"/>	Sample_15	Barcode01	BioRad96WellPlateElate_01	G2	
<input checked="" type="checkbox"/>	Sample_16	Barcode01	BioRad96WellPlateElate_01	H2	
<input checked="" type="checkbox"/>	Sample_17	Barcode01	BioRad96WellPlateElate_01	A3	
<input checked="" type="checkbox"/>	Sample_18	Barcode01	BioRad96WellPlateElate_01	B3	
<input checked="" type="checkbox"/>	Sample_19	Barcode01	BioRad96WellPlateElate_01	C3	
<input checked="" type="checkbox"/>	Sample_20	Barcode01	BioRad96WellPlateElate_01	D3	
<input checked="" type="checkbox"/>	Sample_21	Barcode01	BioRad96WellPlateElate_01	E3	
<input checked="" type="checkbox"/>	Sample_22	Barcode01	BioRad96WellPlateElate_01	F3	
<input checked="" type="checkbox"/>	Sample_23	Barcode01	BioRad96WellPlateElate_01	G3	
<input checked="" type="checkbox"/>	Sample_24	Barcode01	BioRad96WellPlateElate_01	H3	
<input checked="" type="checkbox"/>	Sample_25	Barcode01	BioRad96WellPlateElate_01	A4	
<input checked="" type="checkbox"/>	Sample_26	Barcode01	BioRad96WellPlateElate_01	B4	
<input checked="" type="checkbox"/>	Sample_27	Barcode01	BioRad96WellPlateElate_01	C4	
<input checked="" type="checkbox"/>	Sample_28	Barcode01	BioRad96WellPlateElate_01	D4	
<input checked="" type="checkbox"/>	Sample_29	Barcode01	BioRad96WellPlateElate_01	E4	
<input checked="" type="checkbox"/>	Sample_30	Barcode01	BioRad96WellPlateElate_01	F4	
<input checked="" type="checkbox"/>	Sample_31	Barcode01	BioRad96WellPlateElate_01	G4	
<input checked="" type="checkbox"/>	Sample_32	Barcode01	BioRad96WellPlateElate_01	H4	
<input checked="" type="checkbox"/>	Sample_33	Barcode01	BioRad96WellPlateElate_01	A5	
<input checked="" type="checkbox"/>	Sample_34	Barcode01	BioRad96WellPlateElate_01	B5	
<input checked="" type="checkbox"/>	Sample_35	Barcode01	BioRad96WellPlateElate_01	C5	
<input checked="" type="checkbox"/>	Sample_36	Barcode01	BioRad96WellPlateElate_01	D5	
<input checked="" type="checkbox"/>	Sample_37	Barcode01	BioRad96WellPlateElate_01	E5	
<input checked="" type="checkbox"/>	Sample_38	Barcode01	BioRad96WellPlateElate_01	F5	
<input checked="" type="checkbox"/>	Sample_39	Barcode01	BioRad96WellPlateElate_01	G5	
<input checked="" type="checkbox"/>	Sample_40	Barcode01	BioRad96WellPlateElate_01	H5	
<input checked="" type="checkbox"/>	Sample_41	Barcode01	BioRad96WellPlateElate_01	A6	
<input checked="" type="checkbox"/>	Sample_42	Barcode01	BioRad96WellPlateElate_01	B6	
<input checked="" type="checkbox"/>	Sample_43	Barcode01	BioRad96WellPlateElate_01	C6	
<input checked="" type="checkbox"/>	Sample_44	Barcode01	BioRad96WellPlateElate_01	D6	

In the **Sample information** panel, the **Sample number (enabled/disabled)** fields show the number of samples selected to be processed and the number that are deselected.

If **Sample transfer error recovery mode** is set to **Available**, the available volume of a sample will be used if there is insufficient volume of sample. If this option is set to **Exclude**, then a sample with insufficient volume will be excluded from the quantification process.

Sample information

Use cherry pick mode

☐

Use worklist

☒

Worklist file path

C:\Output\Extraction\Batch0000047_Barcode01_2015-10-21_1404.cs

Sample number (enabled / disabled)

80

/

16

Sample transfer error recovery mode

☒ Available

☐ Exclude

11. In the **Kit information** panel, select the quantification kit to be used.

Kit information	
Kit type	Investigator Quantiplex Kit
Kit barcode	Investigator Quantiplex Kit Investigator Quantiplex HYres Kit
Kit part number	
Kit lot number	
Kit expiry date (yy/mm)	

12. Scan the kit barcode into the **Kit barcode** field and the remaining fields will automatically populate with the relevant kit details.

Example of a kit barcode:



Kit information	
Kit type	Investigator Quantiplex HYres Kit
Kit barcode	0387116160600151011307
Kit part number	0387116
Kit lot number	00151011307
Kit expiry date (yy/mm)	1606

Note: The instrument will identify an out-of-date kit by highlighting the **Kit expiry date** field in red and warning the user. It is possible to continue with an out-of-date kit.

The **Output file format** is shown in the **Output** panel. The output file is defined by the quantification kit used.

13. Enter a **User name** in the **User** panel.

Output	
Output file format	HID1.1/1.2_QuantiplexHyres

User	
User name	QIAGEN user

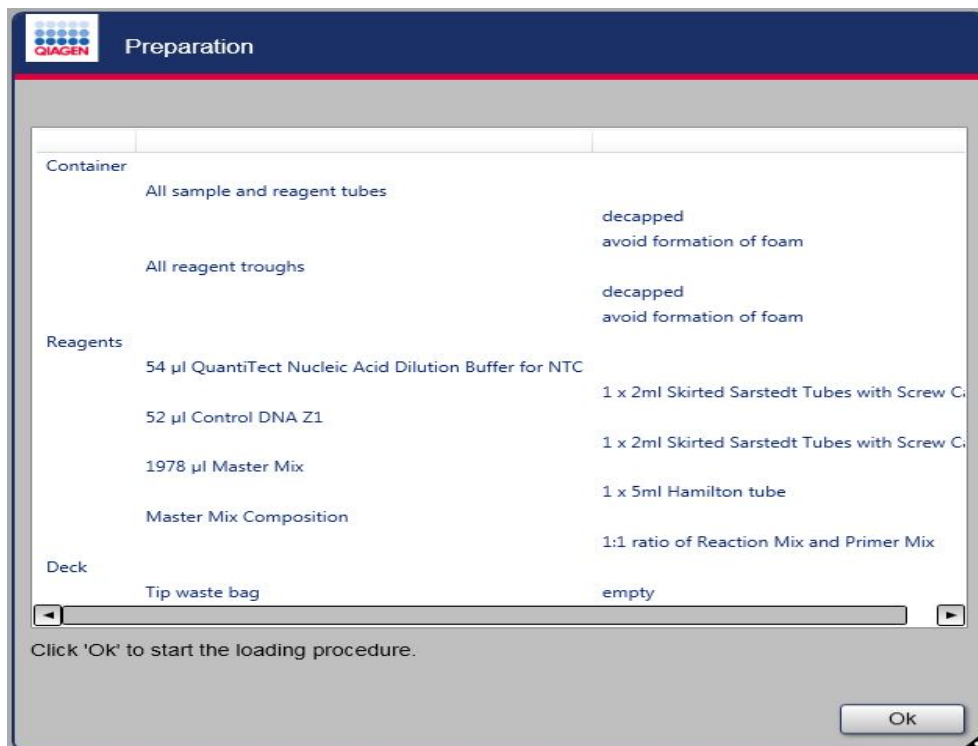
HAMILTON Run Control State: Start Run

14. When setup is completed, start the run by pressing **Start Run**.

4.2.2 Loading a quantification run

The **Preparation** window provides a list of the reagents needed as well as the tube or container type in which the reagents need to be loaded. Where a reagent must be prepared manually prior to the start of the run, the composition of the reagent is displayed.

The **Preparation** window serves as a general overview; detailed information regarding the loading of the reagents is given at a later stage in the loading process.



1. Click **Ok** to start the loading procedure for the quantification run.

CAUTION



Loss of data and damage to the instrument

Use only labware defined in this manual with the STAR Q SP/AS instrument. Failure to do so may result in damage to the instrument and incorrect results.

2. Place the tip carrier on the loading shelf in the location shown in the **Loading of tips** screen.

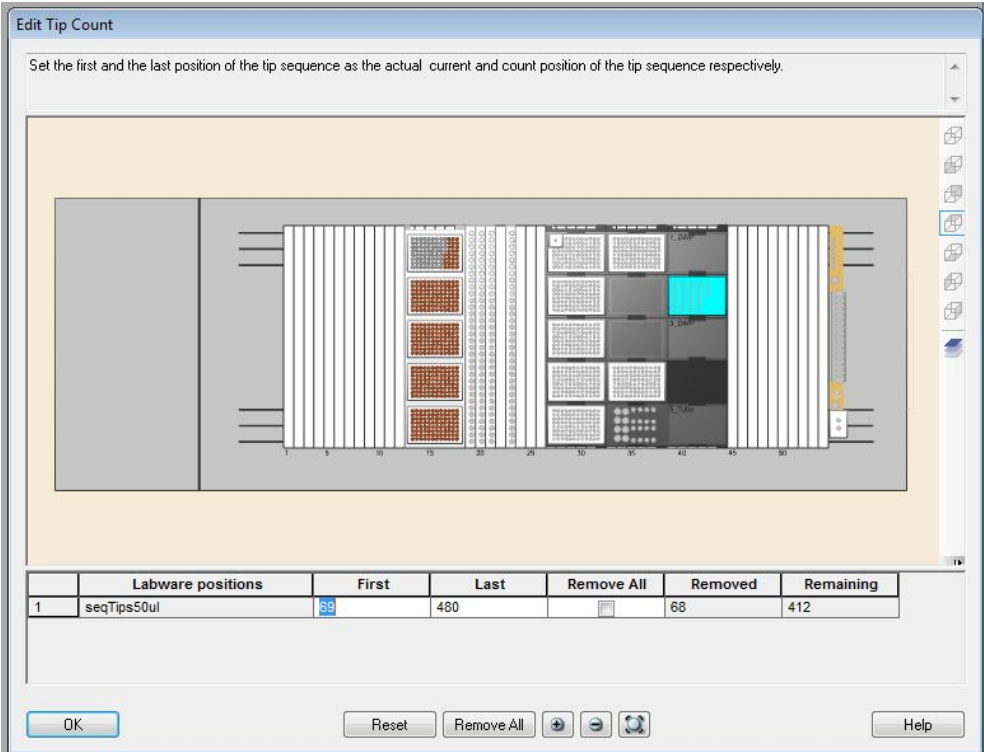
Make sure that the correct size tips and the correct number of 50 µl tips as indicated are available.

Note: Any position not requiring tips must have an empty tip rack in place



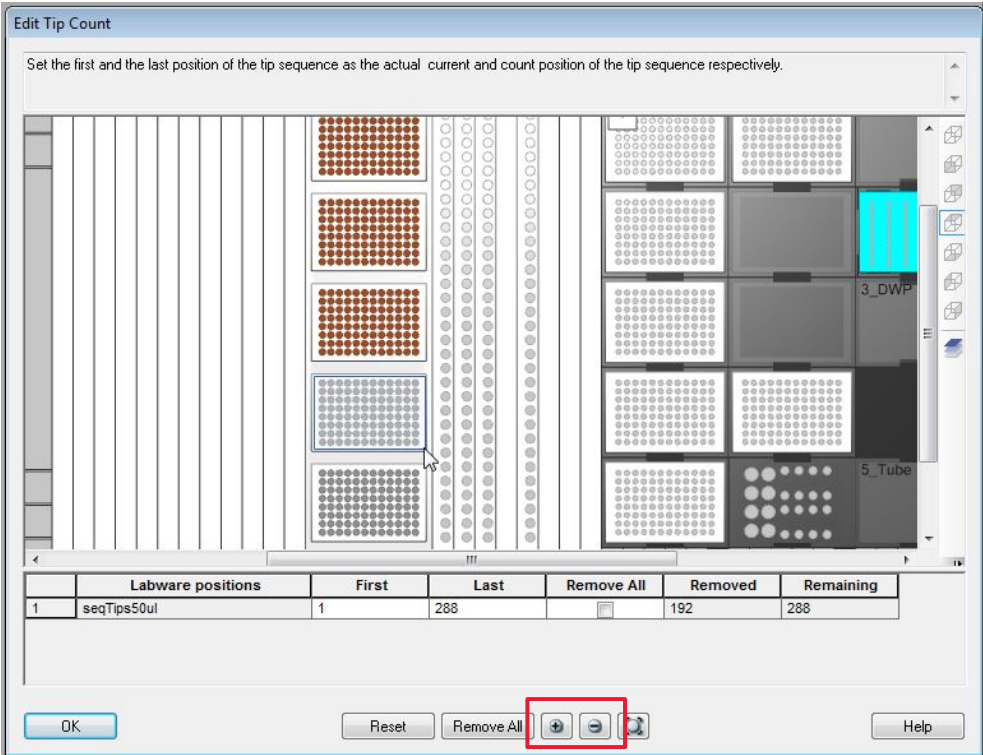
3. Press **Ok** to continue.

The **Edit Tip Count** screen allows the user to enter the locations of 50 µl tips being loaded. The system tracks the number of 50 µl tips remaining after the previous run and displays the remaining 50 µl tips in brown.

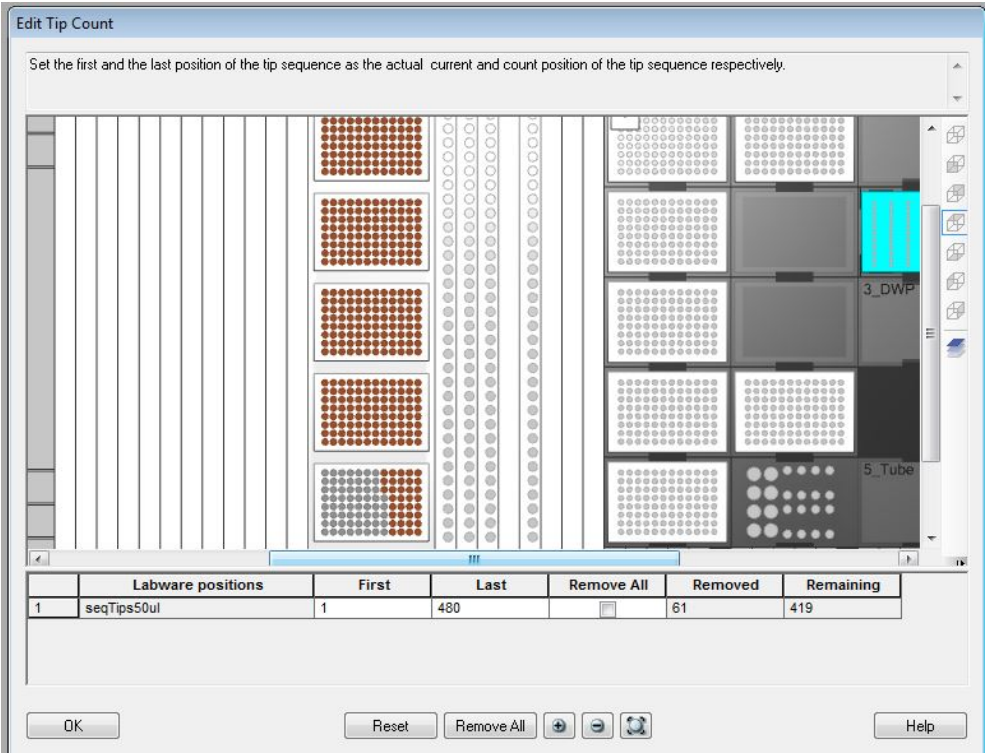


4. If no tips have been removed or replaced, press **OK** to proceed.

If any tips have been removed or replaced, update the available tips shown by the software to reflect the tips on the deck. Zoom in or out using the + and – buttons.



Highlight the tip rack on the software to amend a whole or partial rack, as well as individual tips.



5. When the software matches the available tips on the deck, press **OK** to proceed.

6. Place the sample input plate carrier on the loading shelf in the location indicated in the **Loading of sample input plate carrier** screen.

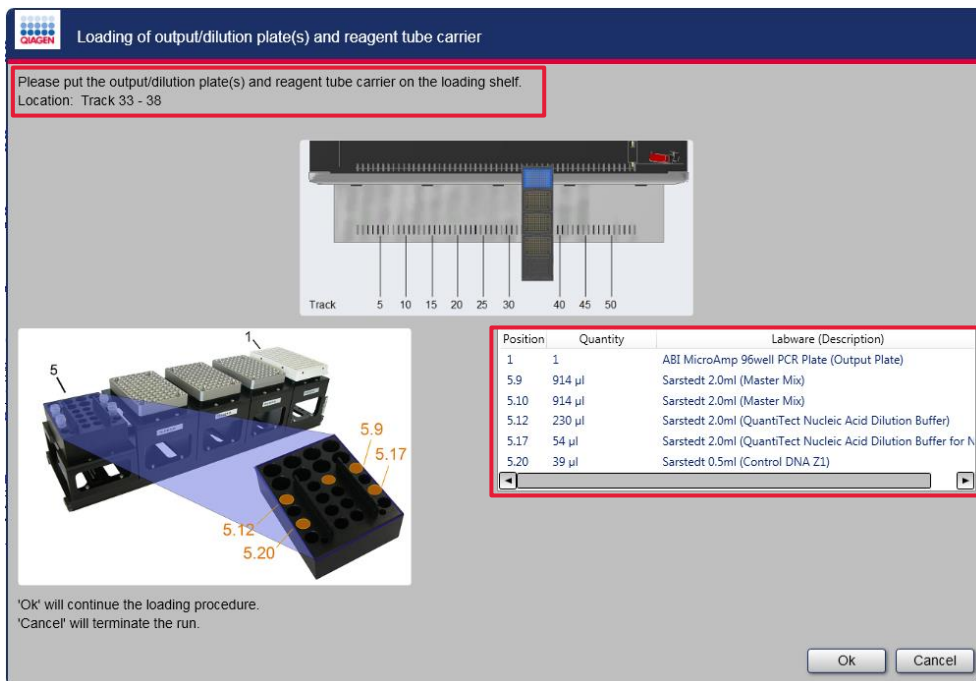
7. Place the 96-well plate in the indicated position.

Note: If using tubes as sample input, place the tube carrier in the indicated position with the tubes already loaded. Be aware that presence of the tubes is not checked unless barcodes are used.



8. Press **Ok** to continue. The system will perform a load check.

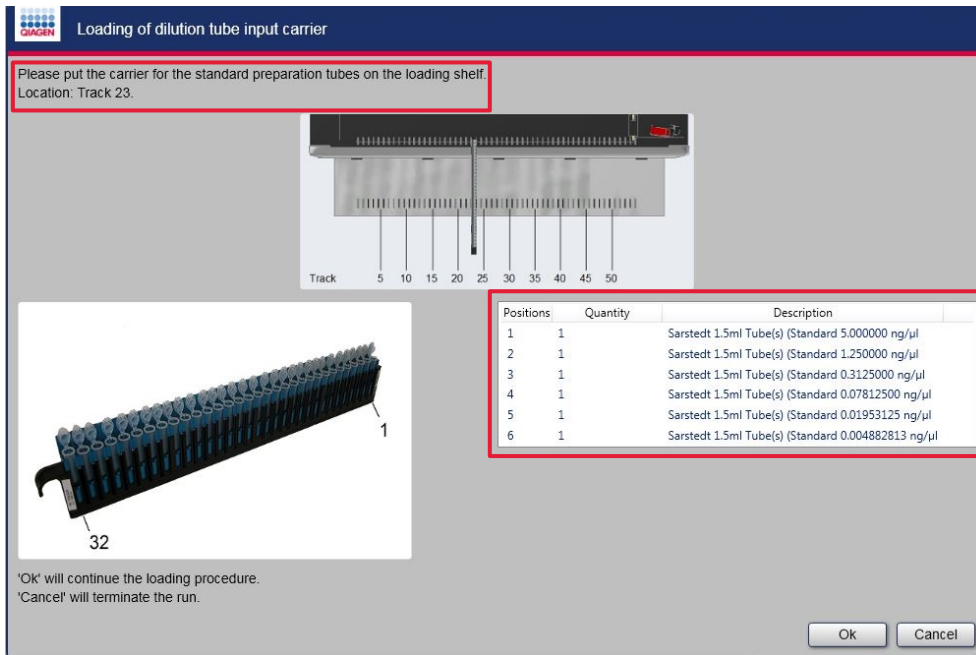
9. Load the output plate and reagent carrier on the loading shelf in the location indicated in the **Loading of output/dilution plates and reagent tube carrier** screen.
10. Load the output plate and reagents in the locations indicated.



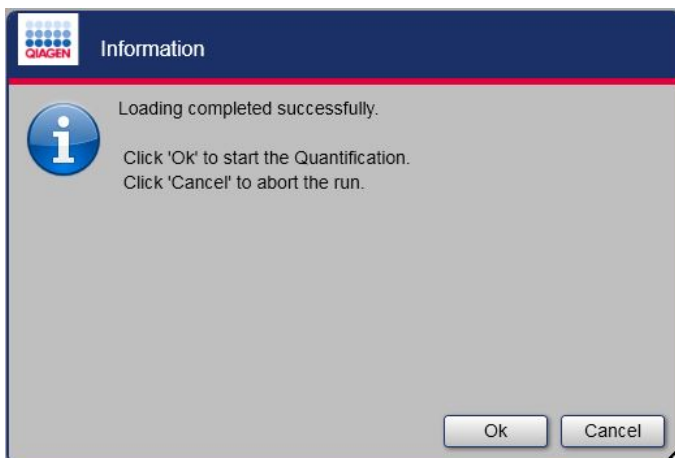
11. Click **Ok**. The system will perform a load check.

12. If new standards are to be prepared by the instrument, load the tube carrier with the required number of tubes on to the loading shelf in the location indicated in the **Loading of dilution tube input carrier** screen.

If pre-prepared standards are used, load the standard tubes in to the carrier in the order stated.



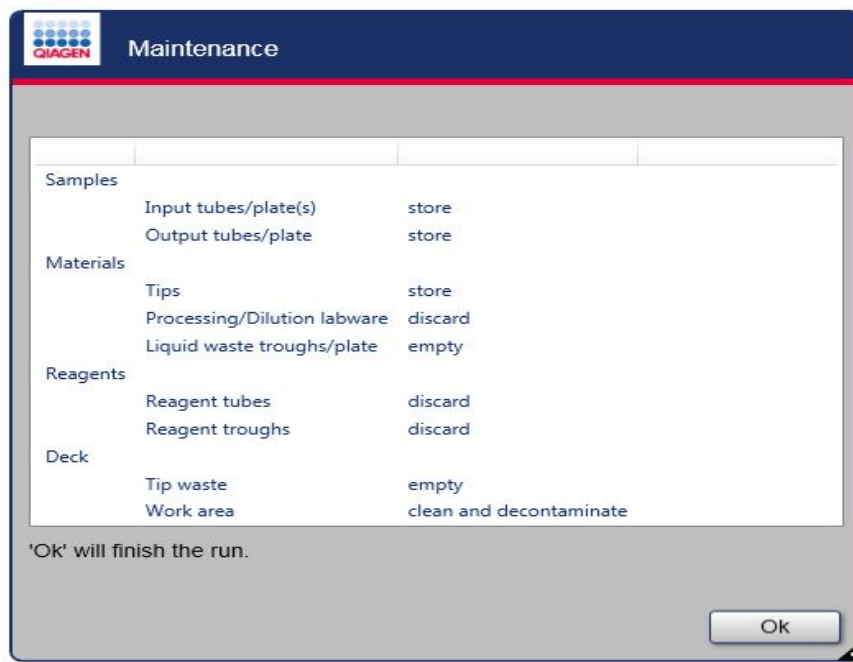
13. Click **Ok** to continue.



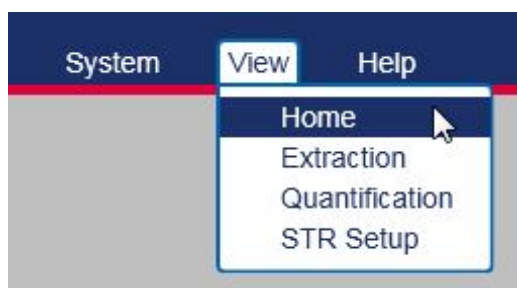
14. When loading is completed, click **Ok** to start the run.

Click **Cancel** to abort the run.

After the run, the following message will be displayed explaining what to do with each of the components on the deck.



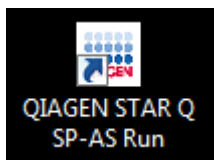
15. Press **Ok** to finish the run and close the **Run Control** environment.
16. Click **View** to return to the home screen or to begin another process.



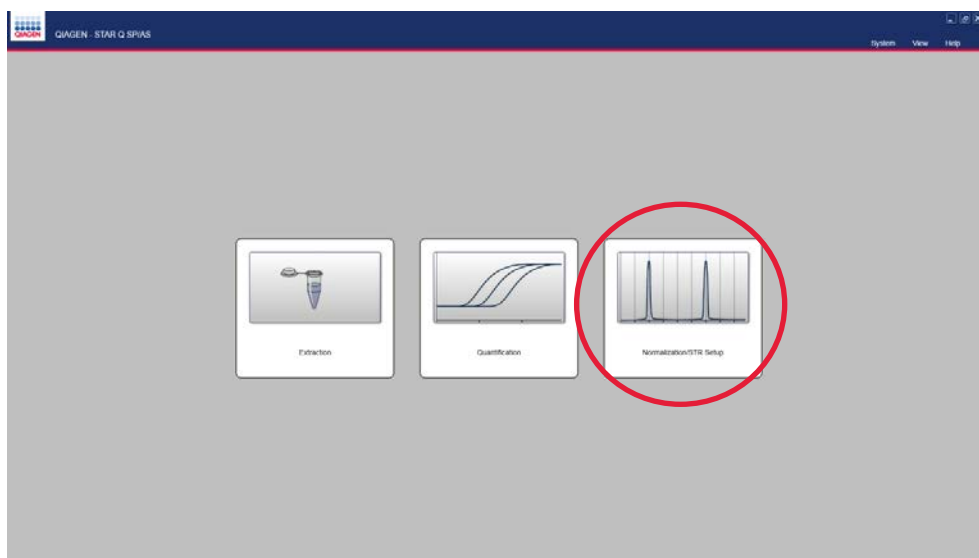
4.3 Normalization of DNA eluates and PCR reaction setup

4.3.1 Setup of normalization and STR run specifications

1. Launch the QIAGEN user interface from the computer desktop.



2. Select **Normalization/STR Setup** from the home screen.



The **Normalization** screen opens.

3. In the **Labware** panel, select if input samples are in plates or tubes. For a comprehensive list of input and output labware, see “Labware for STAR Q SP/AS,” page 117.

4. Select input plate/tube type.

Note: To set up carriers for Bio-Rad 96-well PCR plates, follow the procedure on page 37.

5. Repeat the above steps for **Output labware** and **Dilution labware**.

Normalization

Labware

Input labware: Plates

Input labware type: ABI MicroAmp 96well PCR

Output labware: Plates

Output labware type: ABI MicroAmp 96well PCR

Dilution labware: Plates

Dilution labware type: ABI MicroAmp 96well PCR

Use input labware barcodes: Bio-Rad 96well PCR

Use output labware barcodes: ABI MicroAmp 96well PCR

6. If using input and/or output barcodes, check the barcode boxes.

Normalization

Labware

Input labware: Plates

Input labware type: ABI MicroAmp 96well PCR

Output labware: Plates

Output labware type: ABI MicroAmp 96well PCR

Dilution labware: Plates

Dilution labware type: ABI MicroAmp 96well PCR

Use input labware barcodes: ☒

Use output labware barcodes: ☒

7. In the **Sample information** panel, select the input file format. (For more information on cherry pick mode, see "Cherry pick samples mode," page 87.)

Sample information

Use cherry pick mode: ☐

Input file format: HID1.1/1.2_Quantiplex

Worklist file path: HID1.1/1.2_Quantiplex
HID1.1/1.2_QuantiplexHyres_Human
HID1.1/1.2_QuantiplexHyres_Male
RotorGeneQ_Quantiplex
RotorGeneQ_QuantiplexHyres_Human
RotorGeneQ_QuantiplexHyres_Male

8. In the **Sample information** panel, check **Use worklist**, click on the blue folder icon, browse to the worklist and import your worklist.

The quantification result file from the PCR cycle is suitable to use as a worklist. Alternatively, any other *.csv file may be used.

Sample information

Use cherry pick mode: ☐

Use worklist: ☒

Worklist file path: [Empty field] [Blue folder icon]

Sample number (enabled / disabled): 0 / 0

Sample transfer error recovery mode: ☒ Available ☐ Exclude

The sample list is shown in the right-hand **Sample list** panel. All samples are automatically selected. Uncheck the **Selected** box if a particular sample is not to be quantified

Sample list

in range / out of range : 80 / 0

Selected	Sample ID	Barcode	Labware	Position	Quantity	IPC Value	Comments
<input checked="" type="checkbox"/>	1		Sarstedt1.5mlTubesEuate_01	1	80	30.9868	
<input checked="" type="checkbox"/>	13		Sarstedt1.5mlTubesEuate_01	2	80	32.28	
<input checked="" type="checkbox"/>	25		Sarstedt1.5mlTubesEuate_01	3	80	32.5492	
<input checked="" type="checkbox"/>	37		Sarstedt1.5mlTubesEuate_01	4	80	32.3647	
<input checked="" type="checkbox"/>	49		Sarstedt1.5mlTubesEuate_01	5	80	32.3647	
<input checked="" type="checkbox"/>	61		Sarstedt1.5mlTubesEuate_01	6	80	32.3647	
<input checked="" type="checkbox"/>	73		Sarstedt1.5mlTubesEuate_01	7	80	32.3647	
<input checked="" type="checkbox"/>	85		Sarstedt1.5mlTubesEuate_01	8	80	32.3647	
<input checked="" type="checkbox"/>	2		Sarstedt1.5mlTubesEuate_01	9	80	29.8391	
<input checked="" type="checkbox"/>	14		Sarstedt1.5mlTubesEuate_01	10	80	30.3325	
<input checked="" type="checkbox"/>	26		Sarstedt1.5mlTubesEuate_01	11	80	30.1268	
<input checked="" type="checkbox"/>	38		Sarstedt1.5mlTubesEuate_01	12	80	29.6207	
<input checked="" type="checkbox"/>	50		Sarstedt1.5mlTubesEuate_01	13	80	32.3647	
<input checked="" type="checkbox"/>	62		Sarstedt1.5mlTubesEuate_01	14	80	32.3647	
<input checked="" type="checkbox"/>	74		Sarstedt1.5mlTubesEuate_01	15	80	32.3647	
<input checked="" type="checkbox"/>	86		Sarstedt1.5mlTubesEuate_01	16	80	32.3647	
<input checked="" type="checkbox"/>	3		Sarstedt1.5mlTubesEuate_01	17	80	30.9868	
<input checked="" type="checkbox"/>	15		Sarstedt1.5mlTubesEuate_01	18	80	32.28	
<input checked="" type="checkbox"/>	27		Sarstedt1.5mlTubesEuate_01	19	80	32.5492	
<input checked="" type="checkbox"/>	39		Sarstedt1.5mlTubesEuate_01	20	80	32.3647	
<input checked="" type="checkbox"/>	51		Sarstedt1.5mlTubesEuate_01	21	80	32.3647	
<input checked="" type="checkbox"/>	63		Sarstedt1.5mlTubesEuate_01	22	80	32.3647	
<input checked="" type="checkbox"/>	75		Sarstedt1.5mlTubesEuate_01	23	80	32.3647	
<input checked="" type="checkbox"/>	87		Sarstedt1.5mlTubesEuate_01	24	80	32.3647	
<input checked="" type="checkbox"/>	4		Sarstedt1.5mlTubesEuate_01	25	80	30.9868	
<input checked="" type="checkbox"/>	16		Sarstedt1.5mlTubesEuate_01	26	80	32.28	
<input checked="" type="checkbox"/>	28		Sarstedt1.5mlTubesEuate_01	27	80	32.5492	
<input checked="" type="checkbox"/>	40		Sarstedt1.5mlTubesEuate_01	28	80	32.3647	
<input checked="" type="checkbox"/>	52		Sarstedt1.5mlTubesEuate_01	29	80	32.3647	
<input checked="" type="checkbox"/>	64		Sarstedt1.5mlTubesEuate_01	30	80	32.3647	
<input checked="" type="checkbox"/>	76		Sarstedt1.5mlTubesEuate_01	31	80	32.3647	
<input checked="" type="checkbox"/>	88		Sarstedt1.5mlTubesEuate_01	32	80	32.3647	
<input checked="" type="checkbox"/>	5		Sarstedt1.5mlTubesEuate_02	1	80	30.9868	
<input checked="" type="checkbox"/>	17		Sarstedt1.5mlTubesEuate_02	2	80	32.28	
<input checked="" type="checkbox"/>	29		Sarstedt1.5mlTubesEuate_02	3	80	32.5492	
<input checked="" type="checkbox"/>	41		Sarstedt1.5mlTubesEuate_02	4	80	32.5492	
<input checked="" type="checkbox"/>	53		Sarstedt1.5mlTubesEuate_02	5	80	32.5492	
<input checked="" type="checkbox"/>	65		Sarstedt1.5mlTubesEuate_02	6	80	32.5492	
<input checked="" type="checkbox"/>	77		Sarstedt1.5mlTubesEuate_02	7	80	32.5492	
<input checked="" type="checkbox"/>	89		Sarstedt1.5mlTubesEuate_02	8	80	32.5492	
<input checked="" type="checkbox"/>	6		Sarstedt1.5mlTubesEuate_02	9	80	30.9868	
<input checked="" type="checkbox"/>	18		Sarstedt1.5mlTubesEuate_02	10	80	30.3325	

In the **Sample information** panel, the **Sample number (enabled/disabled)** fields show the number of samples selected to be processed and the number that are deselected.

If **Sample transfer error recovery mode** is set to **Available**, the available volume of a sample will be used if there is insufficient volume of sample. If this option is set to **Exclude**, then a sample with insufficient volume will be excluded from the process.

Sample information

Use cherry pick mode

☐

Input file format

HID1.1/1.2_Quantiplex

Worklist file path

Sample number (enabled / disabled)

0 / 0

Sample transfer error recovery mode

Available

Exclude

- In the **Plate Setup** panel, select in the check box to **Add controls after samples**, or enter the well positions if particular wells for controls are required.
Multiple controls can be input; separate each well position by a semicolon.

Plate Setup

Add controls after samples

☐

Negative control positions

G12

Positive control positions

F12

Ladder positions

H2:H4:H6:H8:H10:H12

10. In the **Concentration** panel, input the **Target DNA concentration**. The target concentration is calculated as ng/μl in the specified template volume.
Example: A target concentration of 0.033 ng/μl and a template volume of 15 μl will result in a final PCR template input of 0.495 ng DNA per reaction.
11. Enter a **Cutoff DNA concentration** in the **Concentration** panel. If all samples regardless of their DNA concentration should be processed, enter 0.

Concentration	
Target DNA concentration	<input type="text" value="0.033"/>
Cutoff DNA concentration	<input type="text" value="0"/>
Consider IPC range	<input type="checkbox"/>

If the **Consider IPC range** box is checked in the **Concentration** panel, the samples above and below the IPC threshold will be highlighted. For example, this selection can be used to exclude samples where elevated IPC values indicate strong inhibition.

Note: These samples will still be processed unless they are manually deselected.

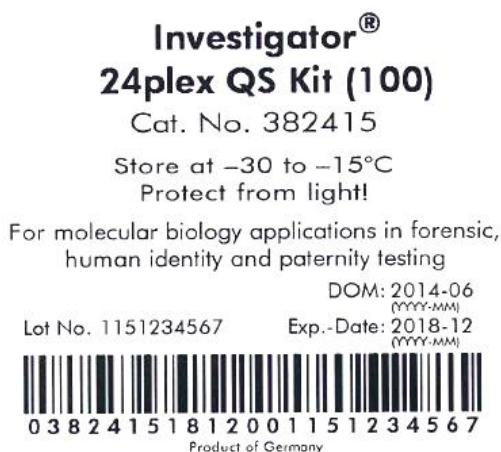
Sample list							
in range / out of range : 14 / 66							
Selected	Sample ID	Barcode	Labware	Position	Quantity	IPC Value	Comments
<input checked="" type="checkbox"/>	1		Sarstedt1_5mlTubesEluate_01	1	80	30.9868	
<input checked="" type="checkbox"/>	13		Sarstedt1_5mlTubesEluate_01	2	80	32.28	
<input checked="" type="checkbox"/>	25		Sarstedt1_5mlTubesEluate_01	3	80	32.5492	
<input checked="" type="checkbox"/>	37		Sarstedt1_5mlTubesEluate_01	4	80	32.3647	
<input checked="" type="checkbox"/>	49		Sarstedt1_5mlTubesEluate_01	5	80	32.3647	
<input checked="" type="checkbox"/>	61		Sarstedt1_5mlTubesEluate_01	6	80	32.3647	
<input checked="" type="checkbox"/>	73		Sarstedt1_5mlTubesEluate_01	7	80	32.3647	
<input checked="" type="checkbox"/>	85		Sarstedt1_5mlTubesEluate_01	8	80	32.3647	
<input checked="" type="checkbox"/>	2		Sarstedt1_5mlTubesEluate_01	9	80	29.8391	
<input checked="" type="checkbox"/>	14		Sarstedt1_5mlTubesEluate_01	10	80	30.3325	
<input checked="" type="checkbox"/>	26		Sarstedt1_5mlTubesEluate_01	11	80	30.1268	
<input checked="" type="checkbox"/>	38		Sarstedt1_5mlTubesEluate_01	12	80	29.9207	

12. In the **Kit Information** panel, select the STR **Kit type** to be used.

Kit information	
Kit type	<input type="text" value="Investigator 24plex QS Kit"/>
Kit barcode	<input type="text" value="Investigator 24plex QS Kit"/>
Kit part number	<input type="text" value="Investigator ESSplex Plus Kit"/>
Kit lot number	<input type="text" value="Investigator ESSplex SE QS Kit"/>
Kit expiry date (yy/mm)	<input type="text" value="Investigator IDplex Plus Kit"/>

13. Click into the **Kit barcode** box and use the hand scanner to scan the barcode on the kit box.

Example of a kit barcode:



The kit information will automatically update in the **Kit information** screen.

Kit information	
Kit type	Investigator 24plex QS Kit
Kit barcode	0382415170500151034030
Kit part number	0382415
Kit lot number	00151034030
Kit expiry date (yy/mm)	1705

14. Enter a **User name**.

The CE output file can be used to import sample information for capillary electrophoresis setup.

Output

Output file format

Ce File

User

User name

QIAGEN user

HAMILTON Run Control State:

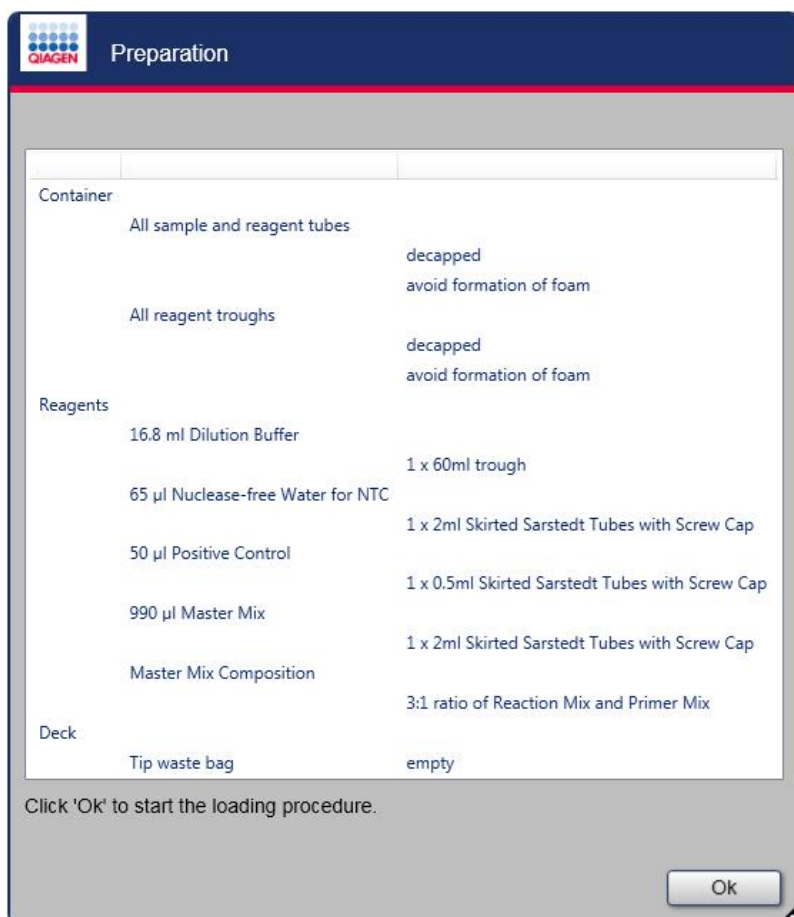
Start Run

15. When the setup is completed, start the run by pressing **Start Run**.

4.3.2 Loading a normalization and STR run

The **Preparation** window provides a list of the reagents needed as well as the tube or container type in which the reagents need to be loaded. Where a reagent must be prepared manually prior to the start of the run, the composition of the reagent is displayed.

The **Preparation** window serves as a general overview; detailed information regarding the loading of the reagents is given at a later stage in the loading process.



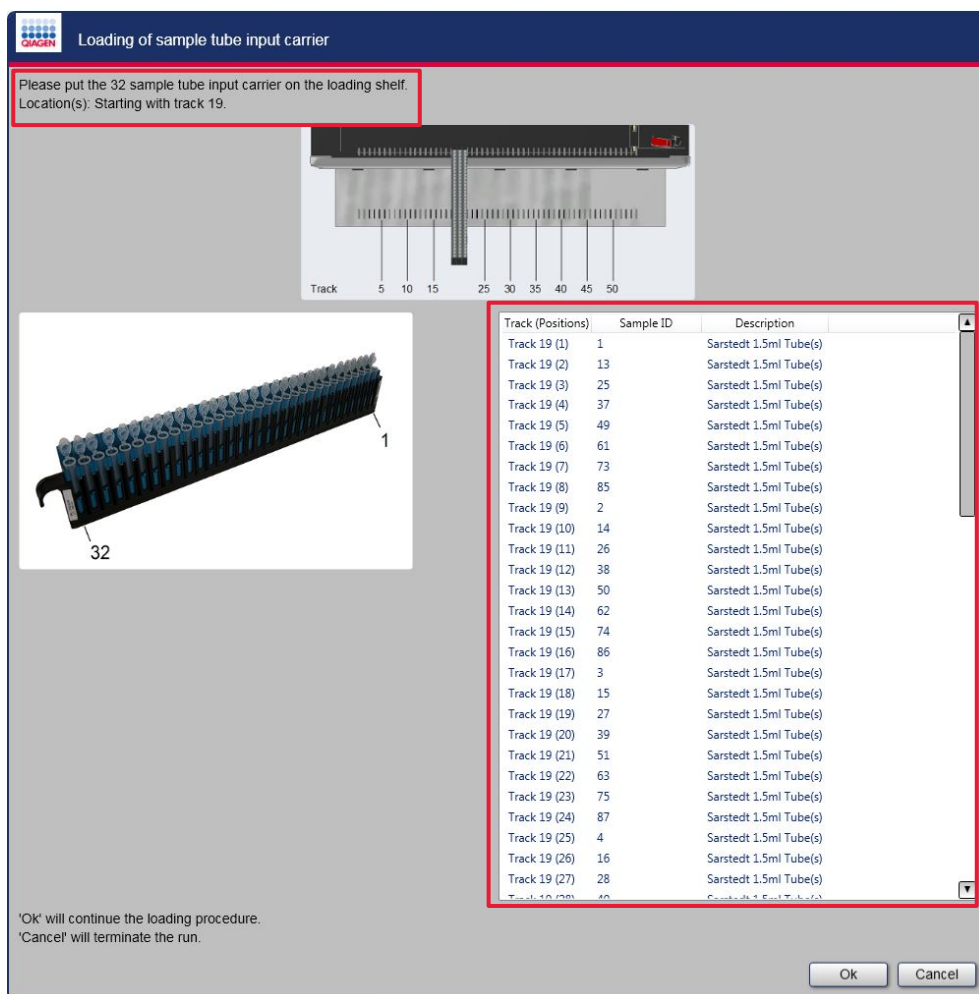
1. Click **Ok** to start the loading procedure.

CAUTION**Loss of data and damage to the instrument**

Use only labware defined in this manual with the STAR Q SP/AS instrument.
Failure to do so may result in damage to the instrument and incorrect results.

2. Load the samples in to the input sample carrier and position it in the location indicated in the **Loading of sample tube input carrier screen**.

Note: If using plates for sample input, place the plate carrier in the indicated position. Be aware that presence of the plates is not checked unless barcodes are used.

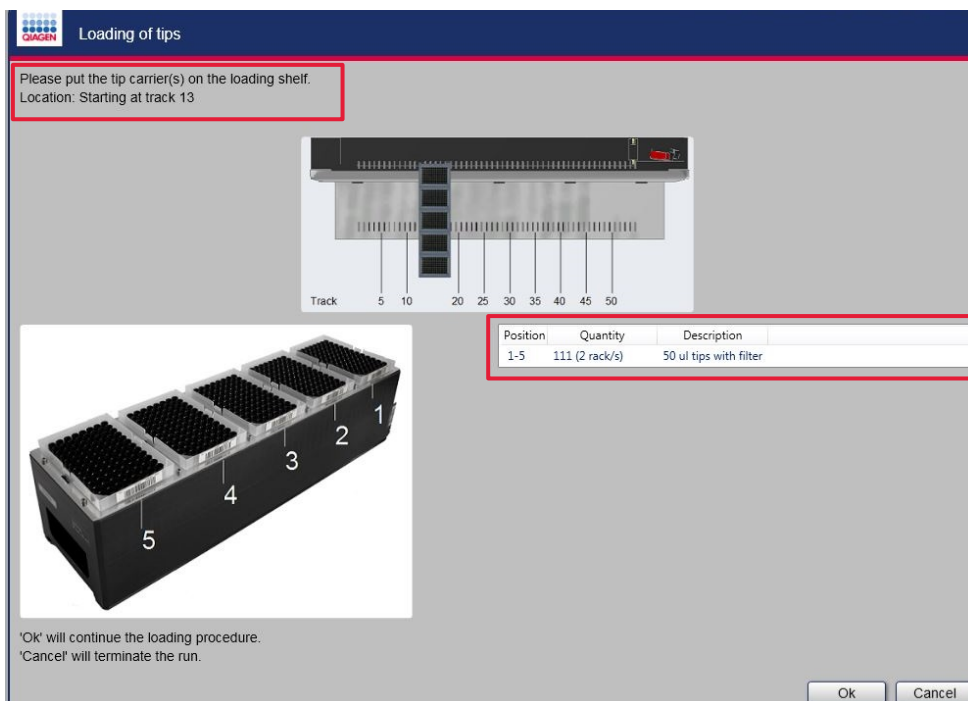


3. Click **Ok** to continue.

4. Place the tip carrier on the loading shelf in the location shown in the **Loading of tips** screen.

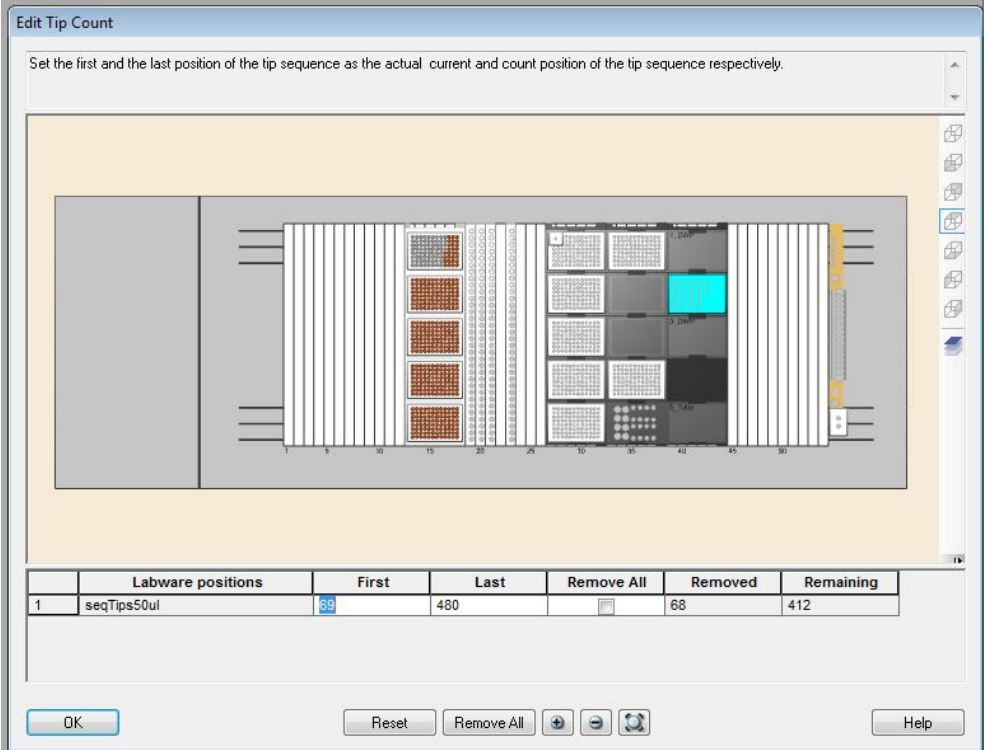
Make sure that the correct size tips and the correct number of 50 µl tips as indicated are available.

Note: Any position not requiring tips must have an empty tip rack in place.



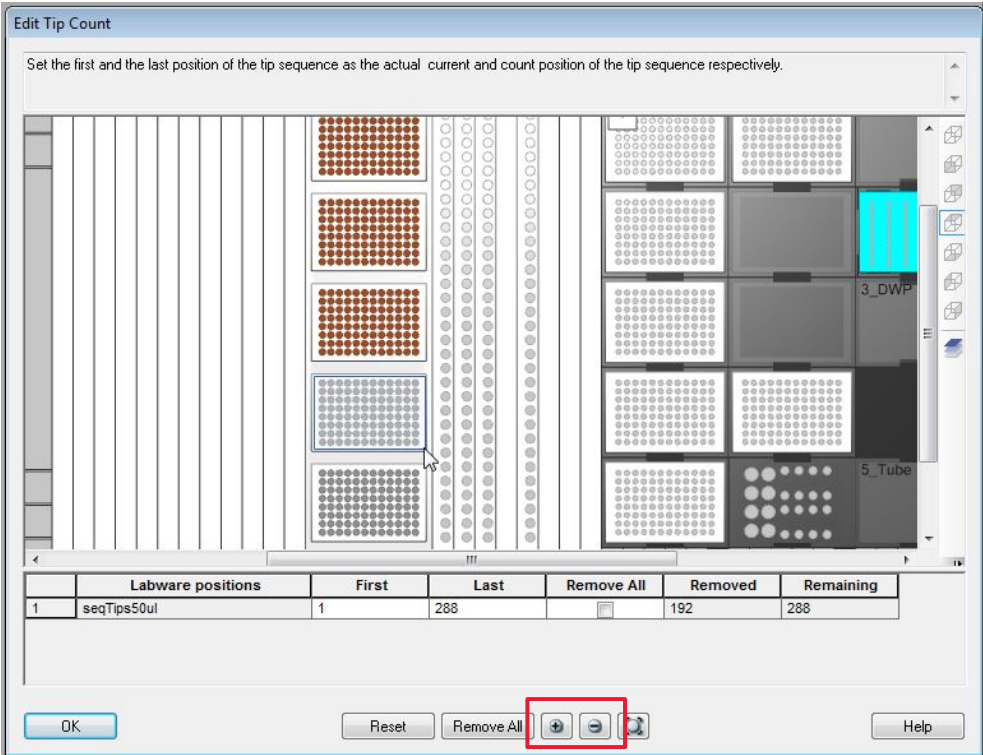
5. Click **Ok** to continue.

The **Edit Tip Count** screen allows the user to enter the locations of 50 µl tips being loaded. The system tracks the number of 50 µl tips remaining after the previous run and displays the remaining 50 µl tips in brown.

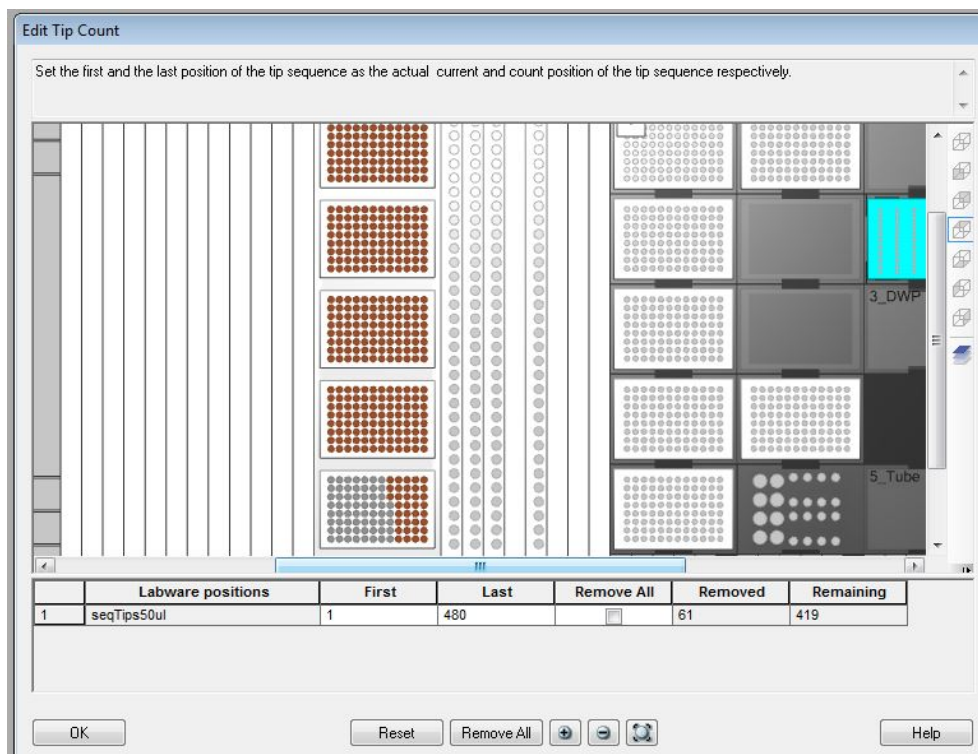


6. If no tips have been removed or replaced, press **OK** to proceed.

If any tips have been removed or replaced, update the available tips shown by the software to reflect the tips on the deck. Zoom in or out using the + and – buttons.

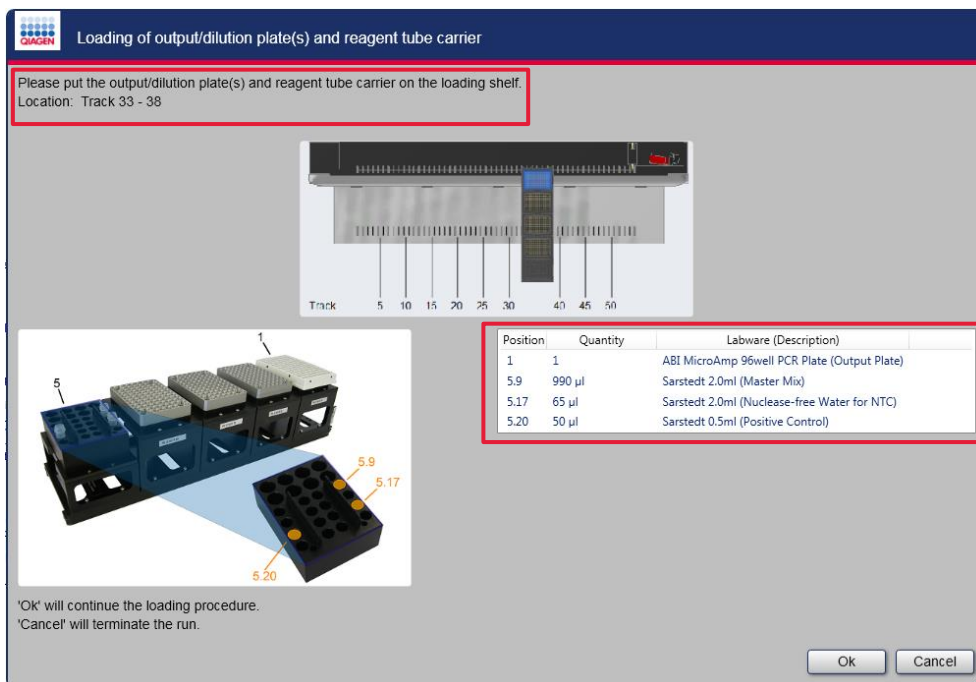


Highlight the tip rack on the software to amend a whole or partial rack, as well as individual tips.



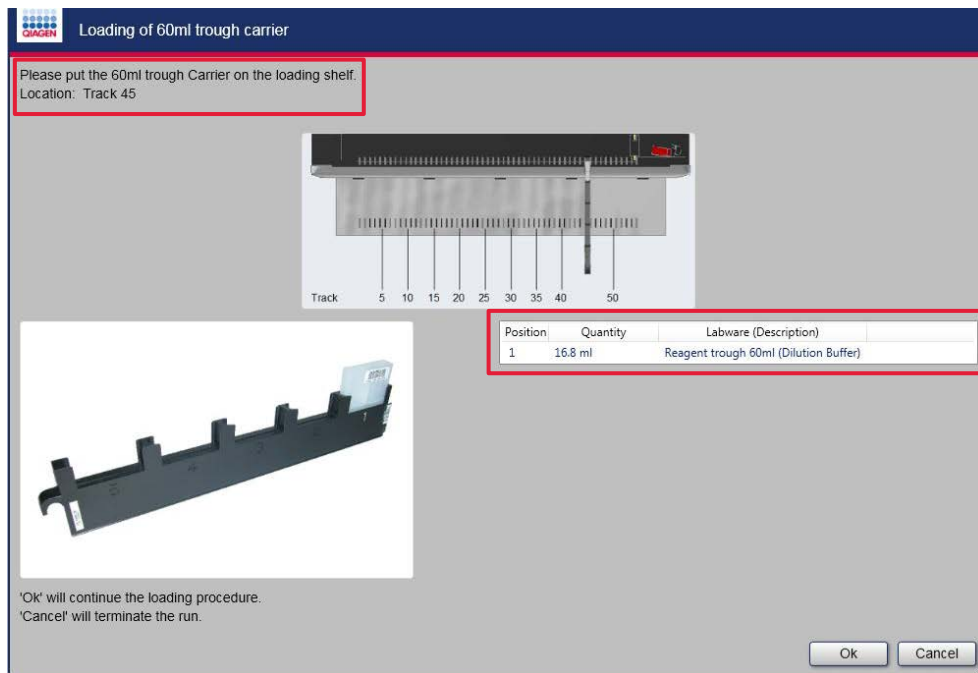
- When the software matches the available tips on the deck, press **OK** to proceed

8. Load the output/dilution plate and reagent carrier in the position on the loading shelf indicated in the **Loading of output/dilution plate(s) and reagent tube carrier** screen.
9. Load the output plate, dilution plate(s) and reagents in the locations indicated in the **Loading of output/dilution plate(s) and reagent tube carrier** screen. The maximum dilution ratio is 1:10,000.

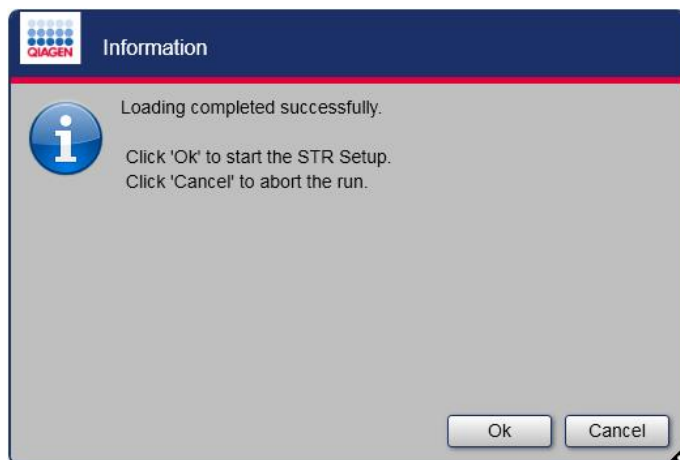


10. Click **Ok** to continue. The system will perform a load check.

11. Load the trough carrier in to the location indicated in the **Loading of 60ml trough carrier** screen. Add the required volume of dilution buffer and load it into the indicated position.

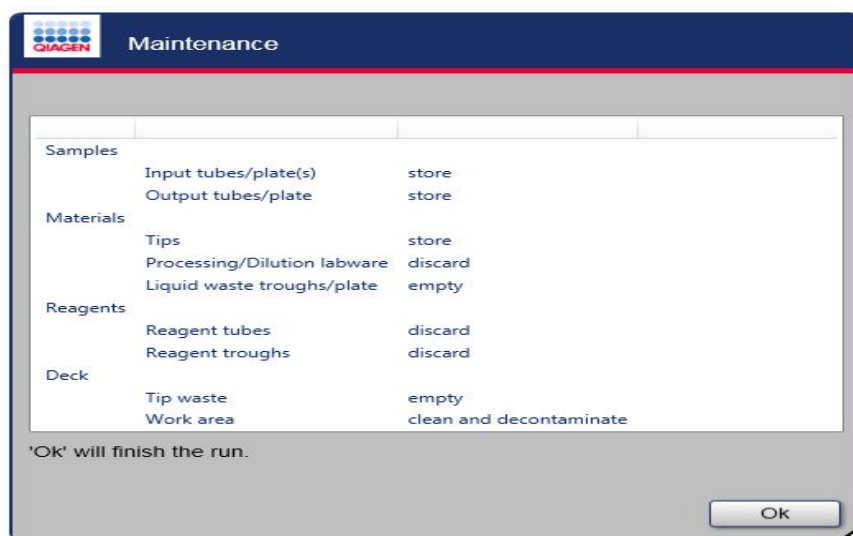


12. Click **Ok** to continue. The system will perform a load check.

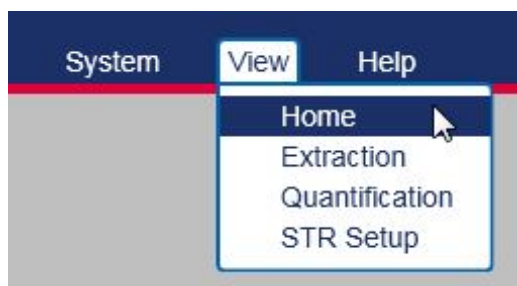


13. When loading is completed, click **Ok** to start the run.
Click **Cancel** to abort the run.

After the run, the following message will be displayed explaining what to do with each of the components on the deck.



14. Press **Ok** to finish the run and close the **Run Control** environment.
15. Click **View** to return to the home screen or to begin another process.



4.4 Cherry pick samples mode

This procedure is used in conjunction with the quantification PCR setup or the normalization STR PCR setup with the STAR Q SP/AS instrument.

When setting up quantification PCR or normalization STR PCR using the STAR Q SP/AS instrument, it is possible to cherry pick samples from up to 5 x 96-well plates.


Note: Cherry pick mode requires use of a worklist.

1. Follow the steps in the quantification PCR setup or the normalization STR PCR setup sections to the **Sample information** panel where the **Use cherry pick mode** option is available (step 9, page 60, and step 7, page 74, respectively). Continue with the following procedure.
2. Check the **Use cherry pick mode** box.

Sample information

Use cherry pick mode ☒

Input file format Hamilton Normalization Input

Worklist file path 

Sample number (enabled / disabled) 0 / 0

Sample transfer error recovery mode ☒ Available ☐ Exclude

3. In the **Sample information** panel, click on the blue folder icon, browse to the worklist and import your worklist. The worklist must be a *.csv file.

Example of a cherry pick samples worklist:

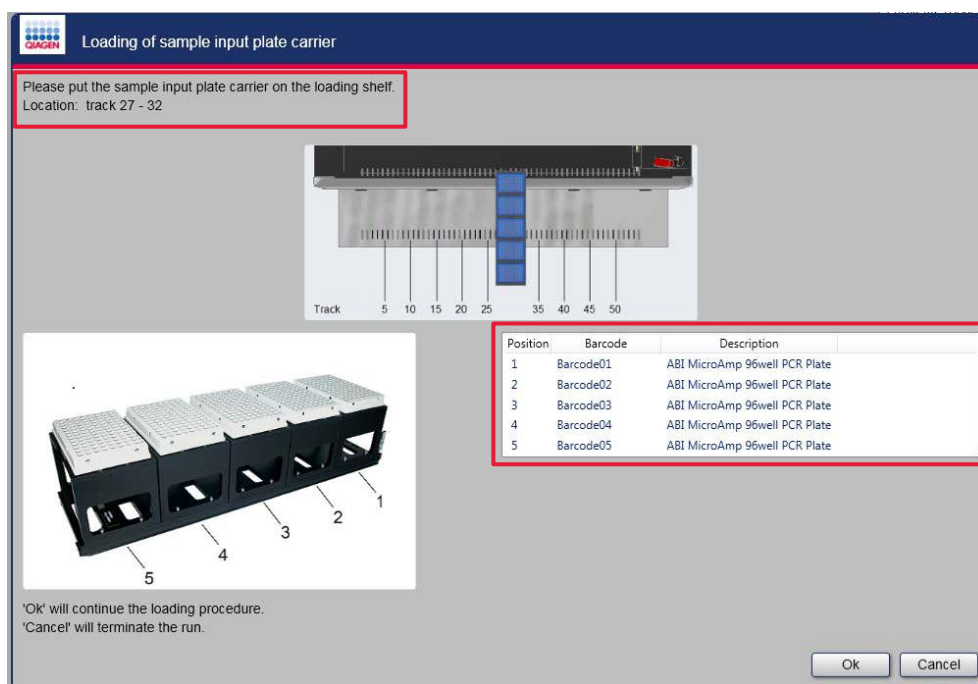
SampleID	EluatePlate	TubeBarcode	EluatePlate	TubeCarrier	EluateWell	TubePosition	PipettingStatus	Comments
Sample_1	Barcode01		Bra_96_PCR_230_0006		A1		OK	Comment_1
Sample_2	Barcode01		Bra_96_PCR_230_0006		A1		OK	Comment_2
Sample_3	Barcode01		Bra_96_PCR_230_0006		A1		OK	Comment_3
Sample_4	Barcode01		Bra_96_PCR_230_0006		A1		OK	Comment_4
Sample_5	Barcode01		Bra_96_PCR_230_0006		A1		OK	Comment_5
Sample_6	Barcode01		Bra_96_PCR_230_0006		A1		OK	Comment_6
Sample_7	Barcode01		Bra_96_PCR_230_0006		A1		OK	Comment_7
Sample_8	Barcode01		Bra_96_PCR_230_0006		A1		OK	Comment_8
Sample_9	Barcode01		Bra_96_PCR_230_0006		A1		OK	Comment_9
Sample_10	Barcode02		Bra_96_PCR_230_0006		B2		OK	Comment_10
Sample_11	Barcode02		Bra_96_PCR_230_0006		B3		OK	Comment_11
Sample_12	Barcode02		Bra_96_PCR_230_0006		B4		OK	Comment_12
Sample_13	Barcode02		Bra_96_PCR_230_0006		C12		OK	Comment_13
Sample_14	Barcode02		Bra_96_PCR_230_0006		D8		OK	Comment_14
Sample_15	Barcode02		Bra_96_PCR_230_0006		D9		OK	Comment_15
Sample_16	Barcode02		Bra_96_PCR_230_0006		E12		OK	Comment_16
Sample_17	Barcode02		Bra_96_PCR_230_0006		F3		OK	Comment_17
Sample_18	Barcode02		Bra_96_PCR_230_0006		F4		OK	Comment_18
Sample_19	Barcode02		Bra_96_PCR_230_0006		F6		OK	Comment_19
Sample_20	Barcode03		Bra_96_PCR_230_0006		A5		OK	Comment_20
Sample_21	Barcode03		Bra_96_PCR_230_0006		A9		OK	Comment_21
Sample_22	Barcode03		Bra_96_PCR_230_0006		A10		OK	Comment_22
Sample_23	Barcode03		Bra_96_PCR_230_0006		A11		OK	Comment_23
Sample_24	Barcode03		Bra_96_PCR_230_0006		A12		OK	Comment_24
Sample_25	Barcode04		Bra_96_PCR_230_0006		F3		OK	Comment_25
Sample_26	Barcode04		Bra_96_PCR_230_0006		F8		OK	Comment_26
Sample_27	Barcode04		Bra_96_PCR_230_0006		E12		OK	Comment_27
Sample_28	Barcode04		Bra_96_PCR_230_0006		G4		OK	Comment_28
Sample_29	Barcode04		Bra_96_PCR_230_0006		H8		OK	Comment_29
Sample_30	Barcode05		Bra_96_PCR_230_0006		A1		OK	Comment_30
Sample_31	Barcode05		Bra_96_PCR_230_0006		B12		OK	Comment_31
Sample_32	Barcode05		Bra_96_PCR_230_0006		C3		OK	Comment_32
Sample_33	Barcode05		Bra_96_PCR_230_0006		D4		OK	Comment_33
Sample_34	Barcode05		Bra_96_PCR_230_0006		E1		OK	Comment_34
Sample_35	Barcode05		Bra_96_PCR_230_0006		F5		OK	Comment_35
Sample_36	Barcode05		Bra_96_PCR_230_0006		G11		OK	Comment_36

When the worklist is imported, the **Sample list** is shown in the right-hand panel of the setup window.

The screenshot shows the QIAgen STAR Q SP/AS software interface. The main window is titled 'Normalization'. On the left, there are several configuration panels: 'Laboratory' (Input/Output laboratory type, Elution laboratory type, Use input/output barcodes), 'Sample information' (Use cherry pick mode, Input the format, Worksheet file path, Sample number enabled/disabled, Sample transfer error recovery mode), 'Plate Setup' (Add controls after samples, Negative control positions, Positive control positions, Ladder positions), 'Concentration' (Target DNA concentration, Cutoff DNA concentration, Consider CTC range), and 'All information' (Kit type, Kit barcode, Kit part number). On the right, the 'Sample list' panel shows a table of 36 samples. The table has columns for 'Selected', 'Sample ID', 'Barcode', 'Location', 'Quantity', 'QC Value', and 'Comments'. The 'Sample ID' column shows samples from Sample_1 to Sample_36. The 'Barcode' column shows various barcodes like Barcode01, Barcode02, etc. The 'Location' column shows various locations like A1, B2, C12, etc. The 'Quantity' column shows values like 10, 20, 30, etc. The 'QC Value' column shows values like 10, 20, 30, etc. The 'Comments' column shows various comments like 'Comment_1', 'Comment_2', etc.

4. Follow the quantification PCR setup procedure or normalization STR PCR setup procedure up to loading samples on the deck (step 6, page 68, and step 2, page 79, respectively).
5. Place the sample input plate carrier on the loading shelf in the position indicated in the appropriate **Loading of sample input plate/tube carrier** screen.
6. Load the 96-well plates on the carrier in the locations indicated in the **Loading of sample input plate/tube carrier** screen.

Note: When using the cherry pick mode, the sample input plates must be labeled with barcodes. Position plates so that barcodes are on the short side of the plate, oriented to the right.



7. Click **Ok** to continue.

The system will load the carrier.

The remaining steps in the quantification PCR or normalization STR PCR setup are followed.

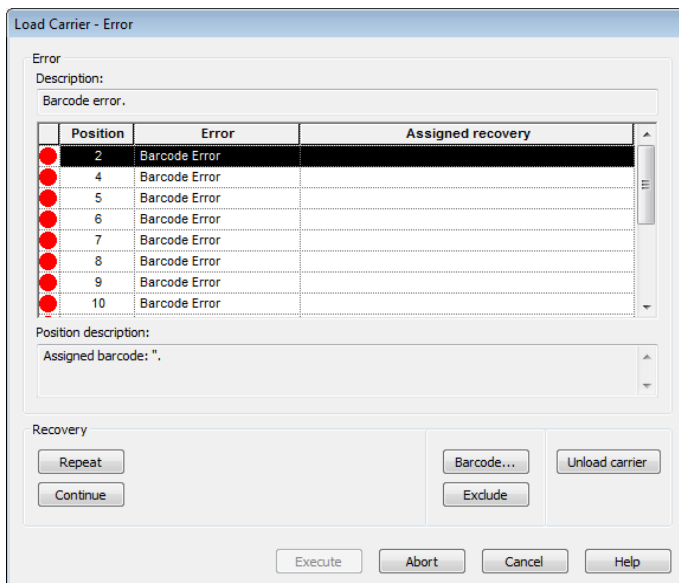
5 Troubleshooting

5.1 Error handling

If an error occurs, the process can be continued using the error handling procedure. A detailed description is available in the STAR Q SP/AS Software **Help** function. Click on **Error Settings** within the single step dialogs of the STAR Q SP/AS line-specific commands and select **Help**.

5.1.1 Barcode reading error

If, for example, a barcode of a carrier cannot be read, the **Load Carrier – Error** dialog opens:



In the **Error** panel, all positions producing an error are listed. The following table describes the columns in the table:

Column	Description
(First column)	A red dot identifies a position with an error
Position	The position number of the barcoded item
Error	Short description of the error
Assigned recovery	Selected action

Different errors can lead to the same short error description. A detailed error description is shown for the selected position in the **Description:** field of the **Error** panel.

The following table describes the buttons in the **Recovery** panel and the error recovery program selected:

Button	Error recovery program
Continue	Ignore the error message (here, failure of the barcode reading) Selecting Continue is not indicated in the case of a barcode reading error; a manual entry has to be made so that barcode data exist for further processing.
Repeat	Try again to read the barcode Often a repetition of the reading will solve the problem because the reading speed is reduced.
Barcode...	Enter the barcode manually Click Barcode... to open a dialog box where a barcode can be entered (no entry is also allowed).

1. Assign a recovery option to the selected positions.

The selected action is displayed in the **Assigned recovery** column and the **Execute** button becomes active.

2. Click **Execute**.

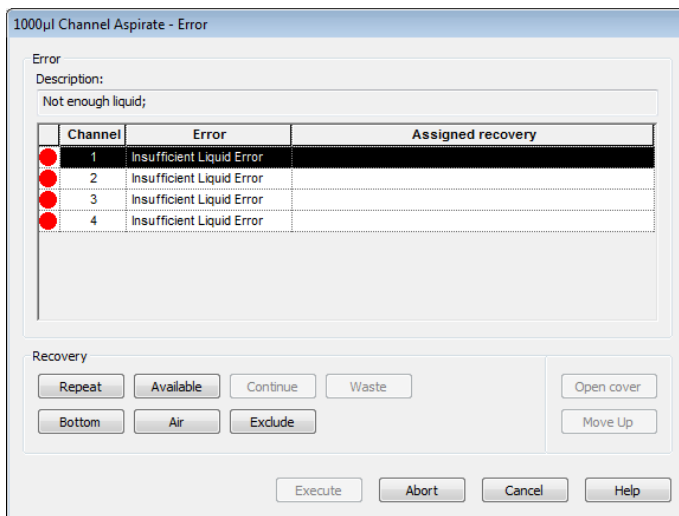
The instrument proceeds with the selected recovery option.

Click **Abort** to exit the error recovery procedure without further recovery options.

5.1.2 Pipetting error

If an error occurs with the pipetting channels, a dialog opens to show the error state and recovery options for every channel. Different channels can have different errors.

In case of an LLD error, such as no liquid in the container while aspirating, a dialog similar to the following example opens:



In the **Error** panel, all pipetting channels which produced an error are listed in a table. The following table describes the columns in the table:

Column	Description
(First column)	A red dot identifies a channel with an error
Channel	The number of the channel in the pipetting head
Error	Short description of the error
Assigned recovery	Selected action

Different errors can lead to the same short error description. A detailed error description is shown for the selected channel in the **Description:** field of the **Error** panel.

The following table describes the buttons in the **Recovery** panel and the error recovery program selected:

Button	Error recovery program
Repeat	Executes again the command that caused the error
Available	Aspirates the available volume from the source and fills up the missing volume with air
Continue	Continues as if no error was recognized
Waste	The tip with the error is ejected to the waste and the channel is excluded
Bottom	Activates the channel to move to the bottom of the container; the available volume is aspirated without LLD
Air	Air is pipetted instead of liquid and the method will continue
Exclude	Disables any further action on the selected channel
Move Up	Not an error recovery procedure, but useful e.g., to manually remove a clot. This causes the following actions (this action can be repeated): <ul style="list-style-type: none"> • Moves the barcode reader of the Autoload (if present) to the far right • Moves the selected channel up by 10 mm
Open cover/ Close cover	Not an error recovery procedure; triggers the following actions: <ul style="list-style-type: none"> • Open Cover: enables opening the front cover during error recovery • Close Cover: enables closing the front cover before executing error recovery

1. Assign a recovery option to the selected channels.

The selected action is displayed in the **Assigned recovery** column and the **Execute** button becomes active.

2. Click **Execute**.

The instrument proceeds with the selected recovery option.

Click **Abort** to exit the error recovery procedure without further recovery options.

An error recovery option must be assigned for every error. Selecting a channel followed by any possible recovery procedure assigns the selected recovery procedure to all error-affected channels with the same error.

If any recovery procedure is assigned to a channel (even one which is not desired to be assigned), the red dot in the first column (see picture above) changes color to green.

Some recovery buttons are disabled to prevent further faulty steps. For example, **Continue** cannot be selected for an error-affected aspiration step to prevent any later dispense action with insufficient volume. When a recovery procedure is assigned to the last faulty channel, the **Execute** button becomes active and the system can proceed.

Note: For all other instrument error messages, please contact QIAGEN Technical Services.

5.2 Log files

In the event of an error, please contact QIAGEN Technical Services.

QIAGEN Technical Services may need your assistance with troubleshooting. The STAR Q SP/AS instrument logs all hardware and software events. These log or trace files might be required for appropriate action to be taken. In addition, screenshots of the error message and/or photos of the problem on the instrument will assist QIAGEN to support you.

Trace files are located in the following system path:

C:\Program Files(x86)\HAMILTON\LogFiles

Two trace files are required for troubleshooting:

- System trace file

[NameMethod]_[24 characters]_Trace.trc

This trace file is generated every time a method (run) is started. Send the system trace file of the erroneous run to QIAGEN Technical Services to assist with troubleshooting.

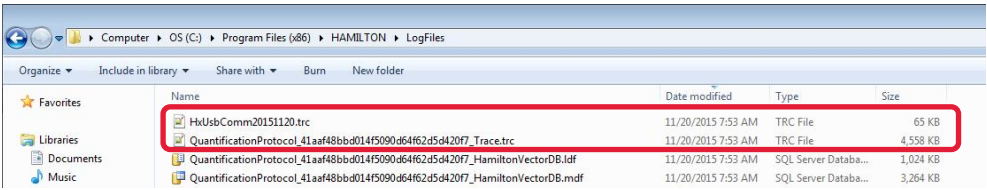
- Communication trace file

HxUsbCommYYYYMMDD.trc

(If a simulation run was performed, the file name is ComTrace_SimulatorYYYYMMDD.trc)

A communication trace file is generated every day. There is only one communication file per day. This file is also required for troubleshooting.

An example showing the communication trace file and a system trace file:



6 Maintenance

**WARNING/
CAUTION**



Risk of personal injury and material damage

Only perform maintenance that is specifically described in this user manual.

**WARNING/
CAUTION**



Risk of electric shock

Do not open any panels on the STAR Q SP/AS instrument.

Only perform maintenance that is specifically described in this user manual.

The STAR Q SP/AS instrument must be maintained on a regular basis. Regular maintenance consists primarily of surface cleaning and requires opening up the front cover of the instrument. Unscrewing of parts, removal of the deck, side covers or other fixed parts voids the warranty.

The operator is responsible for changing consumable parts including disposable tips and waste bags. QIAGEN Technical Services or service technicians of an authorized agent change spare parts (PCBs, cables, channels, etc.).

Periodic maintenance routines are run to ensure safe and reliable operation of the STAR Q SP/AS instrument and its accessories. A QIAGEN Field Service Specialist or service technician of an authorized agent performs servicing and preventive maintenance on the instrument at least twice a year.

In addition, QIAGEN Technical Services may be called to repair a damaged component of the instrument or to resolve a functional problem which the user cannot resolve such as adjusting and calibrating the channels.

If an error is encountered during a maintenance procedure, attempt to rectify the problem and restart the maintenance procedure. If this fails, contact QIAGEN Technical Services for assistance.

6.1 Maintenance intervals

We recommend the following maintenance intervals:

- Daily before the instrument is shut down
- Weekly at the end of the week before the instrument is shut down
- Six-monthly preventive service maintenance carried out by a QIAGEN Field Service Specialist or service technician of an authorized agent

The STAR Q SP/AS instrument is preconfigured to generate warning messages to perform daily and weekly maintenance procedures.

Note: If the operator does not run either daily or weekly maintenance before shutting down the instrument, these routines must be implemented when the next run is started.

Note: If any parts of the instrument, carriers or racks have become contaminated, the weekly maintenance procedure must be performed (see "Weekly maintenance," page 101).

6.1.1 Preventative maintenance

Preventive maintenance including verification should be carried out at regular intervals by QIAGEN Technical Services or service technicians of an authorized agent. A service agreement ensures regular maintenance and verification for a specified period of time. We recommend that maintenance and verification take place twice a year (see "Appendix E — Verification," page 130).

6.2 Materials required for maintenance procedures

CAUTION



Damage to the instrument

Do not use solvents, or reagents containing acids, alkalis or abrasives to clean the STAR Q SP/AS instrument. Do not use disinfecting materials which contain hypochlorite or other bleaching fluids. Use non-corrosive, neutral liquids.

When working with chemicals, always wear a suitable lab coat, disposable gloves and protective goggles. Use cleaning, disinfecting and decontaminating fluids in accordance with manufacturer's instructions.

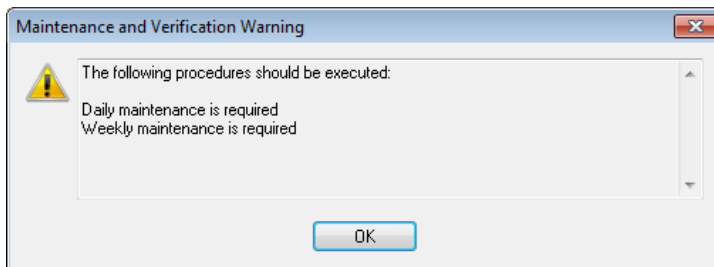
The following materials are required for maintenance procedures:

- Paper towels
- Lint-free cloths or Q-tips
- Set of 8 maintenance needles
- Ethanol (70%)
- Deionized water

6.3 Maintenance procedures

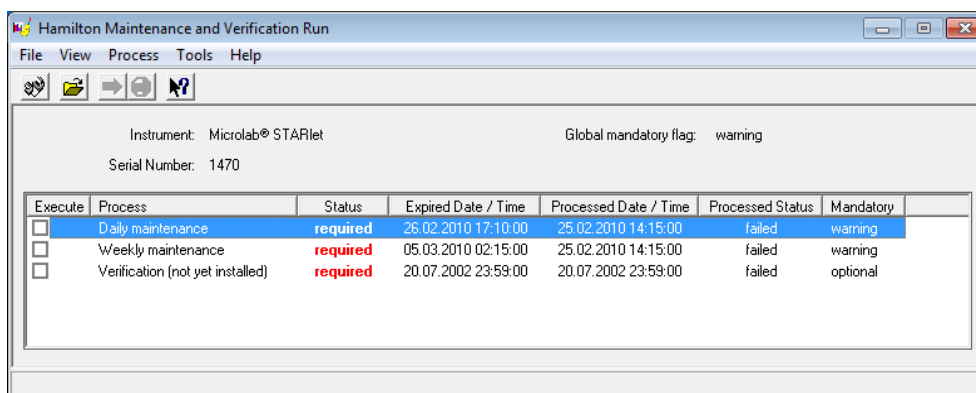
The STAR Q SP/AS Software guides the operator through the regularly scheduled maintenance procedures. The instrument will display a message at start up for optional, warning or mandatory maintenance.

Example of a maintenance warning message:



1. To initiate maintenance procedures, double-click the **Maintenance** icon on the desktop.

The **Maintenance and Verification Run** window opens. Information is listed on the process and status of all maintenance and verification procedures for the connected/selected instrument.



2. Select the desired maintenance routine by checking the box in the **Execute** column.

3. Press the **Run Process**  button.

The STAR Q SP/AS Software displays instructions detailing all procedures required to perform the selected maintenance routine.

A maintenance routine is completed when the procedure has been fully implemented and the results are within the specifications.

Aborting a maintenance procedure will lead to a failed status, and maintenance will need to be started again.

6.3.1 Daily maintenance

CAUTION



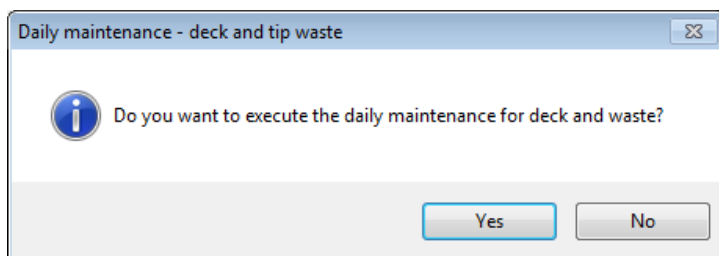
Disposal of plasticware

Used plasticware may contain hazardous chemicals, or contagious/biohazardous materials. Such wastes must be collected and disposed of properly according to local safety regulations.

The following tasks are performed during daily maintenance:

- Check if the deck is clean
- Empty the tip waste
- Check the tightness of the eight 1000 µl channels
- Verifying the functioning of the cLLD (1000 µl pipetting channel)

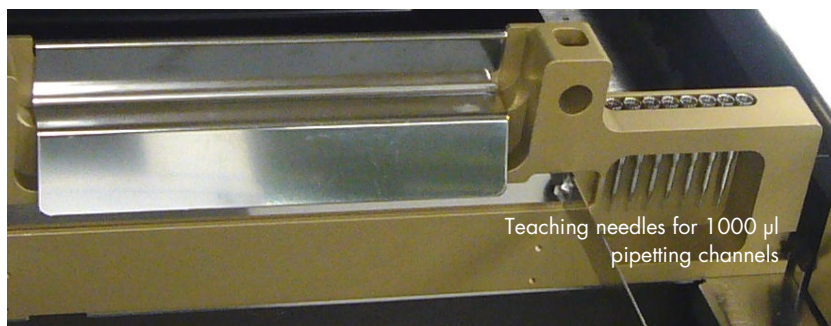
After initialization of the instrument, the operator is reminded to execute daily maintenance:



1. Click **Yes** to start the daily maintenance procedure. Click **No** to cancel the procedure.

The hinged acrylic glass window that shields the front of the instrument can be opened for user intervention. The pipetting arm moves to the left side giving the operator access to the deck to check if cleaning is needed.

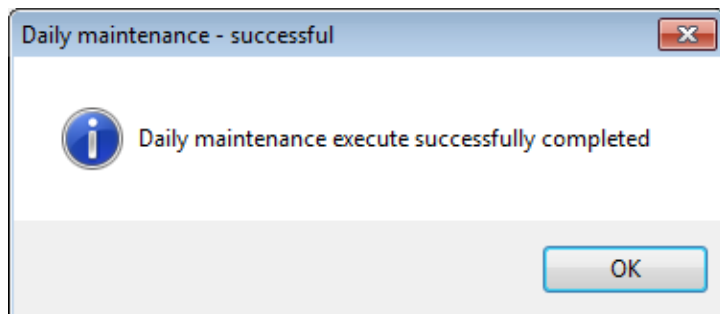
2. If the deck is clean continue with the daily maintenance.
If the deck needs to be cleaned, interrupt the daily maintenance to carry out weekly maintenance (see "Weekly maintenance," page 101).
3. Empty the tip waste. Dispose of it with the laboratory's contaminated waste.
4. Continue the procedure with the tightness check of the pipetting channels.



The pipetting arm travels to the right-hand side to pick up the teaching needles. Two checks are done with the pipetting channels, the over-pressure and the under-pressure check.

5. Check that the needles are picked-up again for cLLD.
All channels are checked for the proper functioning of the cLLD.

The following message is displayed at completion of daily maintenance:



The daily maintenance process status is saved on the instrument and a report file is created. Refer to "Printing a maintenance report," page 104.

6.3.2 Weekly maintenance

CAUTION



Disposal of plasticware

Used plasticware may contain hazardous chemicals, or contagious/biohazardous materials. Such wastes must be collected and disposed of properly according to local safety regulations.

WARNING



Electrical hazard

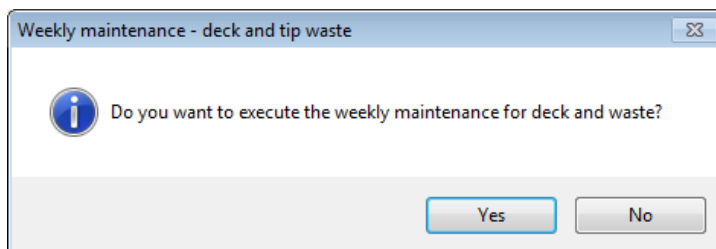
When the instrument is connected to line power, terminals may be live. Opening covers or removing parts is likely to expose live parts. Avoid spilling liquid onto or into the instrument. In case of spilling liquid over the instrument, immediately disconnect the instrument from the mains power.

Note: If any parts of the instrument, carriers or racks have become contaminated, the weekly maintenance procedure must be performed.

The following tasks are performed during weekly maintenance:

- Clean the deck and carriers
- Check the condition of the carriers
- Empty and clean the tip waste
- Check the tightness of the eight 1000 µl channels
- Verify the function of the cLLD of the eight 1000 µl 8channels
- Clean the eight 1000 µl channels: stop disk, O-ring and tip eject sleeve
- Clean the covers and Autoload protecting ribbon

After initialization of the instrument, the operator is reminded to execute weekly maintenance:



1. Unload the deck. The Autoload function carries out this step automatically.

2. Remove all carriers and clean them with disinfectant spray. Leave them to dry.
If carriers are heavily soiled, soak them in a solution of cleaning liquid (refer to the product data sheet for further information).
3. Examine each carrier for scratches on the barcode and any signs of damage. If damage is apparent, replace with new carriers.
The Autoload moves to the right-hand side of the instrument.
4. Open the front cover and wipe the deck with a cloth saturated in disinfectant. The slide blocks in particular must be checked for cleanliness.
5. Close the front cover.
The Autoload moves to the left-hand side of the instrument.
Note: The tip waste, the tip eject plate and the plastic bag are always to be regarded as contaminated.
6. Remove the tip eject plate of the tip waste station, spray disinfectant directly onto the surface and wipe.
7. Remove the frame that holds the plastic bag in place, and discard the plastic in the laboratory's contaminated waste. Pull a new plastic bag over the frame and re-attach it.
8. Put the clean tip eject plate back in place.
9. Remove the maintenance needle and spray disinfectant directly onto the surface and wipe. Replace the clean and dry maintenance needle.
10. Make sure that the reading of barcodes is reliable by checking the laser scanner window of the barcode reader and cleaning it with a lint-free cloth or Q-tips lightly soaked in ethanol (70%).
Note: The laser scanner window must be completely dry and free from dust and fibers before the instrument can be reused.
11. Continue the procedure with the tightness check of the pipetting channels.



The pipetting arm travels to the right-hand side to pick up the teaching needles. Two checks are done with the pipetting channels, the over-pressure and the under-pressure check.

12. Check that the needles are picked-up again for cLLD.

All channels are checked for the proper functioning of the cLLD.

13. Clean the tip eject sleeve on the outer part of the pipetting channels with a lint-free cloth soaked in disinfectant.



Note: Take care that no liquid gets inside the tip channel.

Whenever it is necessary to move channels on the x-arm, move them gently by pushing close to their Y-slide. Never force them as this may lead to damage. If possible, switch on the instrument as this will result in a smoother motion when channels have to be moved on the x-arm.

14. Clean the stop disk and the O-rings of the pipetting head on the outer part of the pipetting channels with a lint-free cloth soaked in disinfectant.



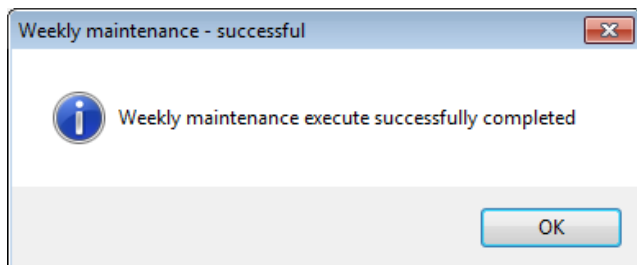
Note: Take care that no liquid gets inside the tip channel.

Whenever it is necessary to move channels on the x-arm, move them gently by pushing close to their Y-slide. Never force them as this may lead to damage. If possible, switch on the instrument as this will result in a smoother motion when channels have to be moved on the x-arm.

15. Spray the front and side cover with disinfectant and wipe dry.

16. Clean the Autoload protecting ribbon with a cloth soaked in disinfectant and wipe without exerting pressure.
17. Clean the x-guide shaft behind the upper front cover with a dry cloth at least once a month.
18. Make sure that carriers are completely clean and dry before re-using.

The following message is displayed at completion of weekly maintenance:



The weekly maintenance process status is saved on the instrument and a report file is created. Refer to "Printing a maintenance report," page 104.

6.4 Printing a maintenance report

The maintenance process status can be printed. To print such a report:

1. From the **File** menu, select **Open Report**.
All maintenance and verification processes found in the default **Report Path** are listed.
2. If necessary, change the report path using the browse button <...>.
3. Select a report and press the **Open** button. The **Report Viewer** displays the selected report file.
4. From the **File** menu, select **Print** to print the report file.

6.5 Maintenance of the heater shaker

WARNING



Risk of personal injury

Do not touch the heater shaker during run time and for 1 hour after finishing a run as it might be hot.

QIAGEN recommends cleaning the HS regularly to prolong its life span. In case of contamination or spillages, clean the HS immediately. The HS must be turned off and cooled down for the maintenance procedure. Follow the cleaning and disinfecting procedures described in this user manual. No further action is required.

6.6 Instrument decontamination

CAUTION



Damage to the instrument

Do not use solvents, or reagents containing acids, alkalis or abrasives to clean the STAR Q SP/AS instrument. Do not use disinfecting materials which contain hypochlorite or other bleaching fluids. Use non-corrosive, neutral liquids.

CAUTION



Damage to the instrument

Autoclaving cannot be used for instrument components or accessories (channels, transport tools, heaters, shakers and carriers).

In general, good laboratory practice must be observed for decontamination.

1. Spray the front and side cover of the instrument with disinfectant.
2. Open the front cover and spray the deck with disinfectant.
3. Remove the tip eject plate of the tip waste station and clean it.
4. Spray disinfectant directly onto the surface of the tip waste station.
5. Remove the frame that holds the plastic bag in place and discard the plastic bag in the laboratory's contaminated waste. Replace the tip eject plate.
6. Clean the tip eject sleeve on the outer part of the pipetting channels with a lint-free cloth soaked in disinfectant.
7. Clean all carriers with disinfectant liquid and leave them to dry.
If the carriers are heavily soiled, soak them in a disinfectant solution (see the product data sheet for further information).

Note: Autoclaving, using superheated steam under pressure, may only be used for decontamination followed by final disposal of consumables and racks; they will be destroyed by the process.

6.6.1 Surface decontamination using liquids

CAUTION



Damage to the instrument

Do not use solvents, or reagents containing acids, alkalis or abrasives to clean the STAR Q SP/AS instrument. Do not use disinfecting materials which contain hypochlorite or other bleaching fluids. Use non-corrosive, neutral liquids.

Use the disinfecting procedure described above for decontamination. Other procedures have not been tested by QIAGEN.

In some cases other decontamination procedures may be desirable, e.g., for reliably destroying infectious materials or DNA/RNA. Many of these decontamination procedures are very aggressive and can cause damage to the STAR Q SP/AS instrument.

If using other decontamination procedures not listed here, be aware that they may increase service and maintenance requirements and may make shorter maintenance intervals necessary.

If using other liquids or sprays for surface decontamination, follow the manufacturer's instructions. Pay particular attention to potential corrosiveness, e.g., acidic or alkaline solutions and oxidizing agents. Use of such agents may increase service and maintenance requirements (O-rings exchange, greasing of spindles, etc.) and may make shorter maintenance intervals necessary. .

When the instrument deck and carriers are cleaned using enzyme solutions such as DNase and RNase, make sure to thoroughly remove any remainders by wiping deck and carriers with deionized water to avoid leaving aggressive substances on the surface.

6.6.2 Decontamination using gases

CAUTION



Damage to the instrument

Ethylene oxide fumigation may increase service and maintenance requirements (O-rings exchange, greasing of spindles, etc.) and may make shorter maintenance intervals necessary.

CAUTION



Damage to the instrument

Hydrogen peroxide fumigation leads to bleaching or discoloration of many instrument materials and may increase service and maintenance requirements (O-rings exchange, greasing of spindles, etc.) and may make shorter maintenance intervals necessary.

CAUTION



Damage to the instrument

Do not use formaldehyde fumigation or chlorine oxides (chemical compounds of chlorine and oxygen such as bleach). They are not suitable for the STAR Q SP/AS instrument because of chemical reaction and corrosion.

Should decontamination by fumigation be necessary, QIAGEN recommends using ethylene oxide. QIAGEN does not carry out such fumigation procedures; use a 3rd party contractor for such service.

Fumigation using hydrogen peroxide (H_2O_2) is possible but not recommended. QIAGEN does not carry out such fumigation procedures; use a 3rd party contractor for such service.

6.6.3 Decontamination using UV light

CAUTION



Damage to the instrument

UV irradiation causes many synthetic materials to become brittle. This may increase service and maintenance requirements and may make shorter maintenance intervals necessary.

QIAGEN offers a UV option for the STAR Q SP/AS instrument. We recommend UV irradiation for 15 minutes per day. The arm will move left and right while the UV lamp is on. Make sure that the path is not blocked. If using other UV irradiation options, use wavelength, intensity and duration according to manufacturer's instructions.

The instrument cover is made of Makrolon®, not of standard acrylic glass, due to its better resistance to UV irradiation.

7 Glossary

Term	Description
Adjustments	Detailed positional setting for the hardware.
Air displacement pipetting	Air displacement means that the liquid is aspirated into and dispensed from a disposable tip by the movement of a plunger.
Aliquots	Aliquots are identical small volumes of liquid.
Autoload	Hardware assembly that enables automatic loading of the STAR Q SP/AS instrument. It consists of a loading head movable in the Y-direction, which draws the carriers into the instrument and reads the barcodes on the carriers.
Barcode reader	Device for reading sample/plate barcodes; part of the Autoload function.
Carrier	Unit for loading plates, tubes and tips on the STAR Q SP/AS instrument deck. A carrier is handled by the Autoload function.
cLLD	Capacitive liquid level detection.
Container	A container defines a tube, vessel or a single well of a plate.
Deck	The work surface of the STAR Q SP/AS instrument presents the largest possible area. The placing of the carriers on the deck is defined by the tracks (see T/track, below) providing the tracks are in the operating range of the pipetting area.
Deck layout	A collection of labware placed on a deck.
Dispense	To distribute quantities of liquid from a pipetting device.
Deep well plate	Microplate with large well volume, used when higher volumes of sample need to be stored or collected, e.g., chemistry libraries, for cell culture or filtration applications. In general, we assume it is a plate with 96 wells (8 x 12), 9 mm wide in standard SBS format.
Firmware	Lower level program code that is carried out on the processors of the STAR Q SP/AS instrument.
Front cover	Protective covering for the STAR Q SP/AS instrument featuring a hinged front window made of transparent acrylic glass. The work surface of the STAR Q SP/AS instrument is shielded from user intervention and other outside influences such as dust. It also protects the user from the movements of the STAR Q SP/AS instrument.

Term	Description
Good laboratory practices	Also written as GLP, are set of appropriate laboratory behaviors which should be observed.
HS	Heater shaker.
Labware	Movable items placed on the deck, such as carriers, containers or racks.
Liquid	Includes reagents, controls, standards and wash fluids.
LLD (liquid level detection)	Positive detection of liquid achieved either by pressure or capacitive signal detection and transfer.
Loading/unloading	The process by which plate, tube and tip carriers are brought on and off the deck either manually or automatically by the Autoload function.
MAD	Monitored air displacement: aspiration monitoring feature. During the aspiration process, the pressure within the pipetting channel is measured in real time.
Microplate	A plate with 96 wells (8 x 12) 9 mm wide, standard SBS format.
Orbit	The orbit (rotation distance) is defined as peak to peak distance in one direction, e.g., distance between extreme positions in the Y-direction of the plate measured in millimeters (mm).
Pause	Interruption of processing. The current processing steps are completed.
Pipetting	Transfer of liquids, usually a defined volume, from one container to another.
Pipetting arm	Assembly equipped with the pipetting tool and/or plate handler, as well as the common X-drive.
Pipetting channel	Hardware including the function of picking up a tip, aspirating, dispensing, tip eject, liquid level detection and the Y/Z-movements.
Pipetting module	Firmware (lower level program code) which controls a pipetting channel. Included in the category are the Y and Z pipetting movements, and LLD.
pLLD	Pressure-based liquid level detection.
Processing step	Defines what must be carried out on the STAR A SP/AS instrument, as well as the location where it must be carried out and possible interaction with other system components or labware. The action is defined in accordance with the loading and the tasks.
Rack	Grouping of containers, such as deep well plates, microplates, etc.

Term	Description
Rack identification	Barcode for rack identification.
Run	<p>Execution of the processing steps defined in the relevant method with the aim of processing one or more liquids and containers. The run is a series of timed commands to carry out processing on the instrument according to the processing plan.</p> <p>The run can be interrupted to load more elements. Then processing continues according to a newly calculated processing plan; the run starts again. Loading is not a part of the run.</p>
Sample	Refers to a liquid in an unambiguously identified container which is to be processed.
SBS format	Standard format for microplates defined by the Society for Biomolecular Screening.
T/track	The STAR Q SP/AS instrument has equal partitions of 22.5 mm, equivalent to 1-T on the deck. Labware carriers are adapted to those partitions.
TCC	Temperature controlled carrier.
Tip	Disposable tip for pipetting.
Tip rack	Frame that holds the tips.
Tip waste	Container for used and ejected tips.
Trace	Record of the status during processing.
Tube	A container for liquid usually having a circular cross-section and a cylindrical longitudinal section.
User	User of the software. Access rights for different types of users can be defined, such as operators, laboratory managers, etc.
Verification kit	Balance, liquid and disposable tips to verify the function (volume check) of the pipetting heads.
Well	The individual container of a deep well plate or microplate.
Work area	The area on the STAR Q SP/AS instrument accessed during processing. Elements to be pipetted or handled can be placed in this area.

Appendix A — Ordering Information

Product	Contents	Cat. no.
Instrument		
STAR Q SP/AS	Instrument	9002650
Investigator kits		
Investigator STAR Lyse&Prep Kit (400)	Buffer ATL, Buffer QSL3, Buffer QSW1, Buffer QSW2, Bead Suspension G, Buffer ATE, Proteinase K, Carrier RNA, Q-Card, Handbook	931447
Investigator Quantiplex® HYres Kit (200)	Reaction Mix FQ, Primer Mix IC YQ, Control DNA Z1, QuantiTect® Nucleic Acid Dilution Buffer	387116
Investigator Quantiplex Kit (200)	Primer Mix IC FQ, Reaction Mix FQ, Control DNA Z1, Dilution Buffer	387016
Investigator 24plex QS Kit (100)	Primer Mix, Fast Reaction Mix including Taq DNA Polymerase, Control DNA, Allelic Ladder 24plex QS, DNA size standard 550 (BTO) and Nuclease-Free Water	382415
Investigator 24plex QS Kit (400)	Primer Mix, Fast Reaction Mix including Taq DNA Polymerase, Control DNA, Allelic Ladder 24plex QS, DNA size standard 550 (BTO) and Nuclease-Free Water	382417
Investigator ESSplex SE QS Kit (100)	Primer Mix, Fast Reaction Mix including Taq DNA Polymerase, Control DNA, Allelic Ladder ESSplex SE QS, DNA size standard 550 (BTO) and Nuclease-Free Water	381575
Investigator ESSplex SE QS Kit (400)	Primer Mix, Fast Reaction Mix including Taq DNA Polymerase, Control DNA, Allelic Ladder ESSplex SE QS, DNA size standard 550 (BTO) and Nuclease-Free Water	381577

Investigator IDplex Plus Kit (100)	Primer mix, Fast Reaction Mix including HotStarTaq® <i>Plus</i> DNA Polymerase, Control DNA, allelic ladder IDplex Plus, DNA size standard 550 (BTO), and nuclease-free water	381625
Investigator IDplex Plus Kit (400)	Primer mix, Fast Reaction Mix including HotStarTaq <i>Plus</i> DNA Polymerase, Control DNA, allelic ladder IDplex Plus, DNA size standard 550 (BTO), and nuclease-free water	381627
Investigator Lyse&Spin Basket Kit (250)	10 pouches containing 5 x 50 baskets and 5 x 50 collection tubes	19598
Consumables		
CO-RE Filter-Tips, 50 µl (5760)	50 µl CO-RE Filter Tip, sterile, black, for STAR Q Instruments	990065
CO-RE Filter-Tips, 300 µl (5760)	300 µl Standard volume CO-RE Filter Tip, sterile, black, for STAR Q Instruments	990075
CO-RE Filter-Tips, 1000 µl (3850)	1000 µl High volume CO-RE Filter Tip, sterile, black, for STAR Q Instruments	990084
Reagent Container, 60 ml (28)	60 ml Reagent container 1T, self-standing, without lid; volume markings at 50 ml and 60 ml; one wave breaker to avoid splashing during movements	990103
Reagent Container, 120 ml (12)	120 ml Reagent container 1T, self-standing, without lid; use with 8-/12-channel liquid handling arm; 3 wave breakers to avoid splashing during movements	990112
Biohazard Waste Bags (25)	25 biohazard waste bags	990123

Appendix B — Technical Specifications

STAR Q SP/AS instrument specifications

Dimensions (w x d x h)	166.4 x 79.5 x 90.3 cm (65 x 31.3 x 35.6 inches) [Autoload: 100.6 cm (39.6 inches)]
Work area dimensions	Width (x): 121.5 cm (47.8 inches) Depth (y): 49.7 cm (19.6 inches) Height (z): 14.5 cm (5.7 inches) The maximum height for labware used on the deck is 14.0 cm (5.5 inches)
Weight	145 kg (320 lbs.)
Deck capacity	54 tracks (T) allow combinations of: maximum of 9 carriers (6 T) holding 5 tip racks or 5 plate positions per carrier
Modal precision	x-y-z positional accuracy of 0.1 mm
Tip sizes	Low and intermediate volume: 50 µl Standard volume: 300 µl High volume: 1000 µl
Power consumption	Standby power consumption: 100 VA

Operating data

Maximum power consumption	600 VA or 1000 VA (depending on configuration)
Voltage	100 VAC/115 VAC/230 VAC
Frequency	50/60 Hz \pm 3 Hz
Delayed action fuse 600 VA 1000 VA	115V: 6.3A (T6.3AL250) 230V: 3.15A (T3.15A250) 115V: 10A (T10AL250) 230V: 5A (T5AL250)
Installation category	II
Pollution degree	2
Temperature range	15–35°C
Relative humidity	30 % – 85 % (non-condensing, indoors)
Noise level	<65 dBA (according to EN27779) <46 dBA in standby mode
Altitude	Maximum 2000 m above sea level
Heat: the power consumed will be transferred to head	Example: 600 or 1000 Watts of Heat = 600 or 1000 Joules/second
Recommended computer	Intel Core 2 Duo, \geq 4 GB RAM, 500 GB Hard Drive, 16x DVD +/-RW, DirectX 250 MB graphic card, MS Windows 7 Professional. (not included in shipment)
Communication	USB or RS232 with dual processor board Ethernet or USB with LAN dual processor board
Location	Indoor use only

Storage and transportation

Temperature range	–25°C to 60°C
Relative humidity	10–90 % (non-condensing, indoors)

QIAGEN standard computer specifications

Configuration (overview)	<p>OptiPlex® XE DT: N Series Base Desktop</p> <p>Intel® Core™ 2 Duo E8400 (3GHz, 1333 MHz, 6MB)</p> <p>4096 MB (2x 2048 MB) 1333MHz DDR3 Dual Channel RAM</p> <p>16x DVD+/-RW</p> <p>2x 250 GB, RAID1, HDD</p> <ul style="list-style-type: none">• 2x RS232, 6x USB, 2x Ethernet, 1x Digital Video Port <p>Flat Screen 21.5 inches (1920 x 1080)</p> <p>Webcam</p> <p>Mouse and Dell® Soundbar</p> <p>Country specific keyboard</p> <p>Microsoft Windows 7 Ultimate 64 Bit</p> <p>MS Office 2013 for Home and Business</p> <p>Recovery DVD</p> <p>2 year Dell warranty (next business day support)</p>
-----------------------------	---

Labware for STAR Q SP/AS

Manufacturer	Catalog no.	Description
Bio-Rad	HSP9901	96-well PCR Plate, fully-skirted
ABI	N8010560	Applied Biosystems MicroAmp Optical 96-well Reaction Plate
VWR®	742-0585	96-well DWP, PP, 2.2 ml
ABgene®	AB1100	PCR Plate, 96-well, semi-skirted, raised deck
QIAGEN	981103	Rotor-Gene Q Strip Tubes and Caps, 0.1 ml
QIAGEN	9018917	Loading Block
Treff*	96.09329.9.01	2.0 ml
Eppendorf®	0017 010.417-03/1109	1.5 ml with Safe-Lock
Eppendorf	0017 010.425-03/1109	2.0 ml with Safe-Lock
Sarstedt®	72.706	1.5 ml with SafeSeal
Sarstedt	72.695	2.0 ml with SafeSeal
Sarstedt	72.690	1.5 ml without SafeSeal
Sarstedt	72.691	2.0 ml without SafeSeal
Sarstedt	72.694	2.0 ml skirted tube
Sarstedt	72.730	0.5 ml skirted tube

* Treff 2.0 ml tube is the Lyse&Spin collection tube and is included in the Investigator Lyse&Spin Basket Kit (QIAGEN cat. no. 19598).

Pipetting specifications for disposable tips (individual 1000 µl channels)

Disposable tip size	Volume	Trueness R (%)	Precision CV (%)
50 µl	0.5 µl	10.0 %	6.0 %
50 µl	1 µl	5.0 %	4.0 %
50 µl	5 µl	2.5 %	1.5 %
50 µl	50 µl	2.0 %	0.75 %
300 µl	10 µl	5.0 %	2.0 %
300 µl	50 µl	2.0 %	0.75 %
300 µl	200 µl	1.0 %	0.75 %
1000 µl	10 µl	7.5 %	3.5 %
1000 µl	100 µl	2.0 %	0.75 %
1000 µl	1000 µl	1.0 %	0.75 %

Operating data for tips

Temperature range	15–25°C
-------------------	---------

Storage data for tips

Temperature	Maximum 55°C
-------------	--------------

Liquid level detection

Individual channels	Capacitive Liquid Level Detection (cLLD) and pressure (pLLD) on aspiration, cLLD on dispense, minimum volume 10 µl, depending on container type
---------------------	---

Throughput

8 channels	To fill one 96-well microplate with 100 µl samples (new tip for each sample): 320 s. Aliquot reagent to a 96-well microplate (<90 µl per well): 60s
------------	--

CO-RE gripper 1000 µl specifications

Labware format

Microtiter footprint	plate height ≤ 43 mm
----------------------	---------------------------

Absolute positioning

Accuracy	x, y, z = 0.5 mm
Reproducibility	x, y, z = 0.25

Movement range

x	Track 1 – n (depending on instrument type)
y	Depending on number of channels and used front channel
z	Lowest position = 15 mm over metal deck sheet

Gripper opening

Arm	Modular pipetting arm
Minimum opening	9 mm
Maximum opening	Dependent upon travel range on arm

Gripping force	5 N – 16 N (default 9 N)
----------------	--------------------------

Transport mass	300 g filled deep well plate
----------------	------------------------------

Autoload: barcode and reader specifications

Carriers, containers, racks and tip racks can be identified by a barcode. A reader mounted on the Autoload slide scans the barcode. The system must allow specification of ranges (barcode mask) for plausibility checking of barcode information.

Barcode symbologies

The following barcode symbologies can be detected by the system:

- ISBT standard
- Code 128 (subset B and C)
- Code 39
- Codabar
- Code 2 of 5 Interleaved
- UPC A

QIAGEN recommends using barcode type Code128 (subset B and C)

Reading accuracy

The rate of inaccurate readings of sample plates and container barcodes is less than 1 ppm.

The above-mentioned specification is valid under the following conditions:

- Barcode symbology module: ISBT standard
- Code density: 0.0065 inch (0.1651 mm)
- Print Quality: see "Barcode specifications," page 121
- Recognized errors are defined as an accurate reading

Barcode specifications

Type	Modular pipetting arm
Length of string	9 mm
Maximum opening	Dependent upon travel range on arm
Code density	Minimum module width (x dimension) including a print tolerance: ≥ 0.0065 inch (0.1651 mm)
Tolerance	Maximum module width (x dimension) including a print tolerance: ≤ 0.02 inch (0.508 mm) Best reading performance with x dimension: ≥ 0.01 inch (0.254 mm)
Check character:	
ISBT standard	One character
Code 128	One character
Code 39	None
Codabar	None
Code 2 of 5 interleaved	None
UPC A	One character
Quiet zone	≥ 10 times the x dimension, but at least 3 mm
Print quality	The barcode print must be of a high quality. A printed barcode with an ANSI/CEN/ISO grade A or B is required. Offset, typographic, intaglio and flexographic printing are suitable. Mechanical dot matrix and thermo matrix printing are not suitable. The surface may be treated, sealed or plastic-coated.

Tube barcodes

Specifications



	Dimension	Minimum	Maximum
A	Label length	–	80 mm
B	Code length	–	74 mm
C	Quiet zone	3 mm	–
D	Label width	12 mm	–
E	Code width	12 mm	–
F	Distance from code to label edge	–	1 mm

Positioning tube labels

The label must be glued within a range of between 20 mm to 100 mm from the bottom of the tube. The label must fit tightly at an angle of approximately 90° to the tube. The label must fit tightly over its whole length.

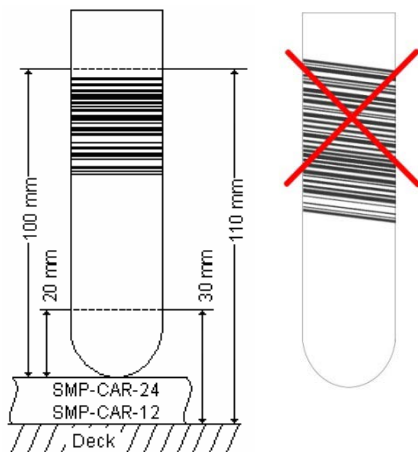
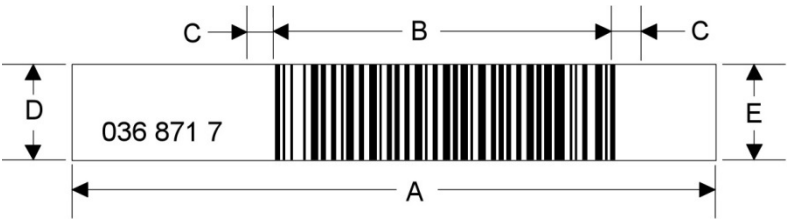


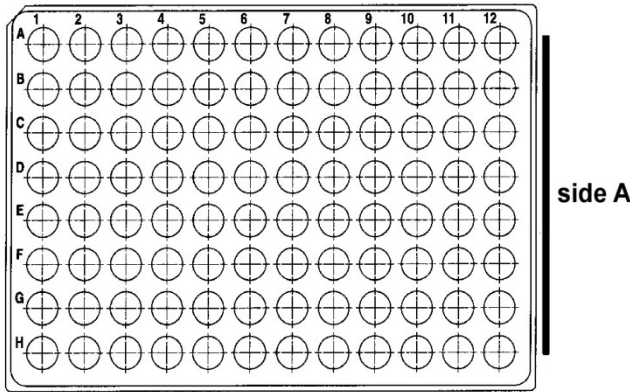
Plate barcodes

Specifications

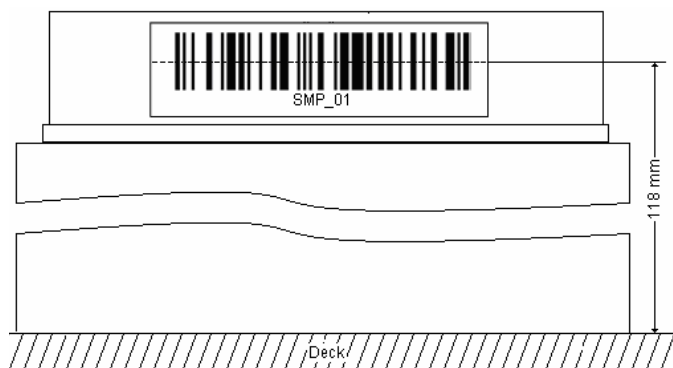


	Dimension	Minimum	Maximum
A	Label length	–	66 mm
B	Code length	–	30 mm
C	Quiet zone	3 mm	–
D	Label width	10 mm	–
E	Code width	7 mm	–
	Distance from code to label edge (if necessary)	–	1 mm

Positioning plate labels



The plate barcode must fit on side A of the plate.



The barcode label must be centered and parallel to the edge of the plate.

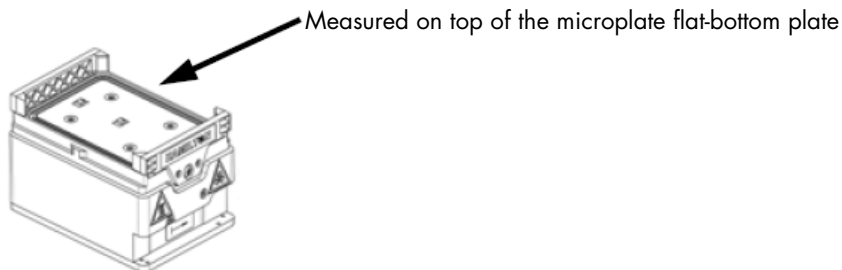


The barcode label must not protrude above or below the edge of the plate.

Heater shaker specifications

Dimensions (w x d x h)	15.0 x 10.5 x 9.0 cm (5.9 x 4.1 x 3.5 inches)
Weight	2.5 kg (5.5 lbs)
Labware	Standard microplates with adapter Standard deep well plates with adapter Maximum weight (incl. adapter): 500 g (1 lb)
Communication	CAN via TCC connector or via USB

Temperature specifications



Temperature	Ramp from 25°C	Deviation from target	Tolerance band for measurement and control: Deviation on plate (middle to edge position)
37°C	3 minutes	36.0–38.0°C	35.0–39.0°C
60°C	10 minutes	58.5–61.5°C	57.0–63.0°C
90°C	20 minutes	88.0–92.0°C	86.0–94.0°C
100°C	30 minutes	97.5–102.5°C	95.0–105.0°C
105°C	35 minutes	102.5–107.5°C	100–110°C

Features of the heater shaker

Temperature control	From 5°C above ambient temperature to 105°C Controlled by two sensors located in the middle and at the edge of the adapter plate
Shaking directions	clockwise and counterclockwise
Acceleration	2.0 s from 0 to maximum rpm
Deceleration	2.0 s from maximum rpm to 0
Shaking orbit (peak to peak)	2.0 mm
Shaking speed	100 to 2500 rpm

Shaking speed

Orbit	Microplate	Deep well plate	Sarstedt	Custom
2.0 mm	2500 rpm	2000 rpm	Not available	2000 rpm

Operating data of the heater shaker

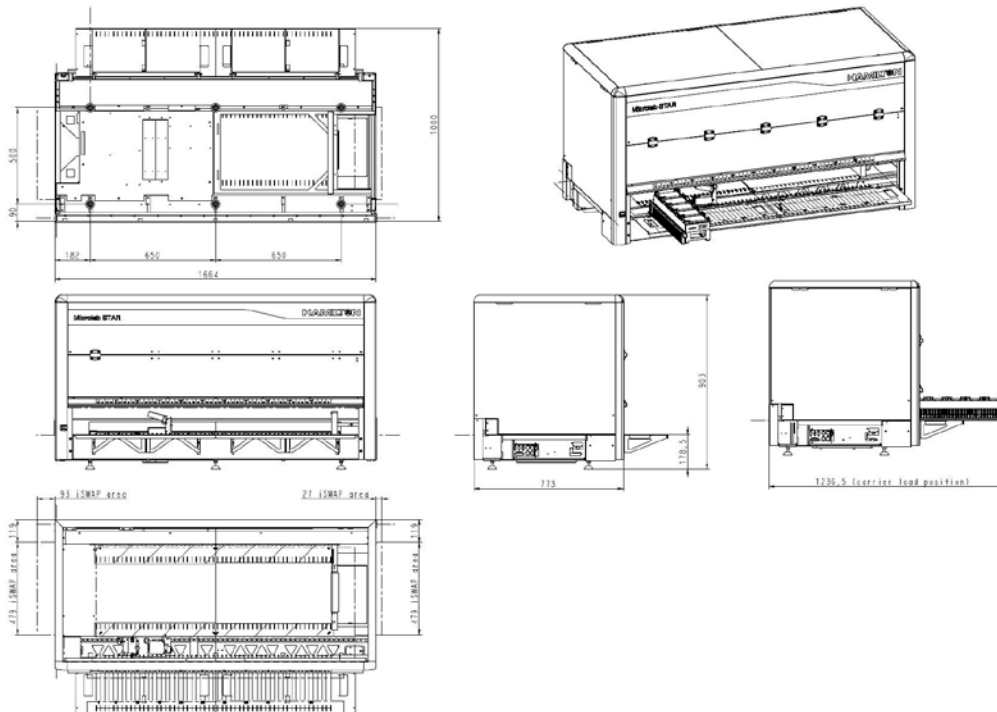
Power consumption	41 V/140 W (max.) supplied by the STAR Q SP/AS instrument
Installation category	II
Pollution degree	2
Temperature range	15–35°C
Relative humidity	15– 85%
Noise level	< 65 dBA at maximum speed
Altitude	Maximum 2000 m above sea level
Lifespan	6 years
Communication	CAN via TCC connector or via USB
Location	Indoor use only

Storage and transportation

Temperature range	–15°C to 60°C
Relative humidity	15– 90% (non-condensing)

Appendix C — Instrument Dimensions

STAR Q SP/AS with Autoload function



Appendix D — Chemical Compatibility

The table for chemical compatibility is based on information from different manufacturers. The results refer to laboratory tests with raw materials. The outcomes with these materials are liable to effects which cannot be observed under laboratory conditions (e.g., temperature, pressure, tension, chemical influences of substances, design features, etc.). The results listed should be considered only as a guideline. In case of doubt we recommend significant tests. The chemical resistance is not sufficient for an evaluation of a particular material for a product. Particular regulations, e.g., explosion prevention in the case of flammable liquids, have to be taken into account.

Key:

1.4034	X46Cr13 steel	FFKM	Kalrez®
1.4301	X2CrNi19-11 steel	FKM	Viton®
1.4305	X8CrNiS18-9 steel	PE	Polyethylene
1.4404	X2CrNiMo17-12-2 steel	PEEK	Polyetheretherketone
1.4435	X2CrNiMo18-14-3 steel	PP	Polypropylene
EPDM	Ethylene-propylene elastomer	PTFE	Polytetrafluorethylene
EPT	Ethylene-propylene terpolymer	ZrO ₂	Zirconium oxide

CO-RE head consists of 1.4305, EPDM, PEEK, ZrO₂ and PTFE

- 1 = No effect, little or no noticeable change
- 2 = Slight corrosion or discoloration
- 3 = Moderate corrosion or other change in physical properties or dimensions;
not recommended for continuous contact
- 4 = Severe corrosion or physical change; prolonged contact not recommended
- 0 = No data
- L = Danger of pitting corrosion (a localized form of corrosion that leads to the creation of small holes in the metal)

Chemical compatibility of materials and level of resistance to corrosion

Chemical	Material													
	1.4034	1.4301	1.4305	1.4404	1.4435	PE	PP	PTFE	PEEK	FKM	FFKM	EPT	ZrO ₂	CO-RE head
Acetic acid, 20%	2	1	1	1	1	1	1	1	1	2	1	1	0	1
Acetic acid, glacial	2	1	1	1	1	1	1	1	1	4	1	1	0	1
Acetone	1	1	1	1	1	2	1	1	1	4	1	1	0	1
Acetonitrile	1	1	1	1	1	1	3	1	0	2	0	3	0	3
Ammonium hydroxide, 5%	1	1	1	1	1	1	1	1	1	1	1	1	0	1
Chloroform	1	1	1	1	1	3	3	1	1	1	1	4	0	4
Deionized water	1	1	1	1	1	1	1	1	1	1	1	1	0	1
Dimethyl formamide	1	1	1	1	1	1	1	1	1	3	1	1	0	1
Dimethyl sulfoxide	1	1	1	1	1	1	1	1	0	0	0	1	0	1
Ethanol	1	1	1	1	1	1	1	1	1	1	1	1	0	1
Ethyl acetate	1	1	1	1	1	2	1	1	1	4	1	1	0	1
Hexane	1	1	1	1	1	3	2	1	1	1	1	4	0	4
Hydrochloric acid, 5%	4L	2L	3L	2L	2L	1	1	1	1	1	1	1	1	1
Hydrochloric acid, 20%	4L	3L	3L	2L	2L	1	1	1	1	1	1	1	1	1
Hydrogen peroxide, 10%	1	1	1	1	1	2	2	1	1	2	2	2	1	2
Isopropyl alcohol	1	1	1	1	1	1	1	1	1	1	1	1	0	1
Methanol	1	1	1	1	1	1	1	1	1	2	1	1	0	1
Methylene chloride	1	1	1	1	1	4	3	1	2	2	1	4	0	4
Nitric acid, 5–10%	1	1	1	1	1	1	1	1	1	1	1	3	1	3
Nitric acid, 70%	1	1	1	1	1	3	4	1	1	2	1	3	1	3
Phosphate buffer	1	1	1	1	1	1	1	1	0	1	1	1	0	1
Phosphoric acid, 85%	3	2	3	2	2	1	1	1	0	1	1	1	1	3
Potassium hydroxide conc.	3	1	2	1	1	1	1	1	1	3	1	1	1	2
Sodium acetate	1	1	1	1	1	1	1	1	0	4	1	1	0	1
Sodium borate	1	1	1	1	1	1	1	1	0	1	1	1	0	1
Sulfuric acid, 1–75%	4	2	3	2	2	1	1	1	2	1	1	1	1	3
Urine	1	1	1	1	1	1	1	1	1	1	1	1	0	1
Triethylamine	1	1	1	1	1	0	4	1	0	4	0	4	0	4
Toluene	1	1	1	1	1	3	3	1	1	1	1	4	0	4
Sodium hydroxide 5%	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Formic acid 5%	3	1	2	1	1	1	1	1	1	2	1	1	0	2
Sodium hypochlorite 10%	3L	2L	2L	1L	1L	1	1	1	0	1	1	1	0	1

Appendix E — Verification

To perform the verification of the STAR Q SP/AS instrument, Field Verification 2 is used. Field Verification 2 can only be performed by trained personnel.

Verification specifications are different from the specifications given in the technical specifications of this user manual.

The volume verification specifications are different from the pipetting specifications for disposable tips given in the technical specifications of this user manual. The field verification contains validated procedures and equipment defined by QIAGEN to demonstrate and to verify the correct function of the instrument according to specifications given by QIAGEN suitable for the field. The field verification is therefore a reference defined by QIAGEN to compare the instrument's performance according to given procedures valid for a broad operating range.

Based on that, specifications as applicable in the technical specifications will be achieved by maintaining defined environmental conditions in the laboratory, by keeping the operating range as small as possible, by optimizing the methods such as adapting the liquid classes, knowing the sample liquids and the characteristics of used labware, etc. See also "Appendix B — Technical Specifications," page 114.

For the eight 1000 µl channels, a dye-pipetting procedure followed by gravimetric and photometric analysis is used to verify the trueness and precision.

Devices and accessories such as the heater shaker, barcode reader and cover safety can also be verified with Field Verification 2.

Note: This is an additional feature of the STAR Q SP/AS instrument not included in the STAR Q SP/AS Software.

Appendix F — Waste Electrical and Electronic Equipment (WEEE)

This section provides information about disposal of waste electrical and electronic equipment by users.

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 laws and regulations.

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.



Recycling can be provided by QIAGEN upon request at additional cost. In the European Union, in accordance with the specific WEEE recycling requirements and where a replacement product is being supplied by QIAGEN, free recycling of its WEEE-marked electronic equipment is provided.

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.

Appendix G – Warranty Statement

Thank you for your purchase of QIAGEN instrumentation. Your instrument has been carefully tested to ensure optimum operating efficiency and reproducibility of results. QIAGEN warrants that all new instrumentation manufactured by QIAGEN will correspond to the product specifications and be free from defects in workmanship and materials for a period of twelve (12) months from the original date of shipment. Repair or replacement of defective parts will be provided to the purchaser during this time period provided the QIAGEN instrumentation is operated under conditions of normal and proper use, but not for damage caused by the customer. If any part or subassembly proves to be defective, it will be repaired or replaced at QIAGEN's sole option, subsequent to inspection at the factory, or in the field by an authorized factory representative, provided that such defect manifested under normal and proper use.

Limitation of warranties and remedies

THE FOREGOING WARRANTY IS QIAGEN'S SOLE AND EXCLUSIVE WARRANTY, AND REPAIR OR REPLACEMENT OF DEFECTIVE PARTS IS THE SOLE AND EXCLUSIVE REMEDY. THERE ARE NO OTHER WARRANTIES OR GUARANTEES, EXPRESS OR IMPLIED. THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE EXPRESSLY EXCLUDED, TO THE FULLEST EXTENT PERMITTED BY LAW. (NOTE: SOME STATES DO NOT PERMIT DISCLAIMERS OF IMPLIED WARRANTIES SO THIS LIMITATION MAY NOT APPLY TO YOU). WITH THE EXCEPTION OF THE ABOVE-REFERENCED REPAIR OR REPLACEMENT REMEDY, QIAGEN SHALL HAVE NO OBLIGATION OR LIABILITY OF ANY NATURE WHATSOEVER WITH RESPECT TO THE QIAGEN INSTRUMENTATION, WHETHER ARISING IN CONTRACT, TORT, STRICT LIABILITY, OR OTHERWISE, INCLUDING BUT NOT LIMITED TO, LIABILITY FOR INDIRECT, CONSEQUENTIAL, INCIDENTAL AND/OR SPECIAL, PUNITIVE, MULTIPLE AND/OR EXEMPLARY DAMAGES AND/OR OTHER LOSSES (INCLUDING LOSS OF USE, LOST REVENUES, LOST PROFITS AND DAMAGE TO REPUTATION), EVEN IF SUCH DAMAGES WERE FORESEEN OR FORSEEABLE, OR WERE BROUGHT TO QIAGEN'S ATTENTION. IN NO EVENT SHALL QIAGEN'S LIABILITY TO YOU EXCEED THE PURCHASE PRICE OF THE PRODUCT.

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.

Appendix H — Declaration of Conformity

Name and address of the legal manufacturer:

Hamilton Bonaduz AG
Via Crusch 8
7402 Bonaduz
Switzerland

An up-to-date Declaration of Conformity can be requested from QIAGEN Technical Support.

Appendix I — FCC Declaration

The United States Federal Communications Commission (FCC) in 47 CFR 15.105 declares that the users of this equipment must be informed of the following facts and circumstances:

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.

The following text appears on the right inside front corner of the “Output” drawer of the instrument:

This device complies with Part 15 of the FCC Rules. 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.

QIAGEN is not responsible for any radio or television interference caused by unauthorized modifications of this instrument or the substitution or attachment of connection cables and equipment other than those specified by QIAGEN. The correction of interference caused by such unauthorized modification, substitution or attachment will be the responsibility of the user.

Appendix J – Safety Information (French, FR)

Avant d'utiliser le STAR Q SP/AS il est impératif de lire attentivement ce manuel et de porter une attention particulière aux consignes de sécurité. Afin de garantir un fonctionnement de l'appareil en toute sécurité et de maintenir l'appareil en bon état de marche, il est impératif de suivre les instructions et consignes de sécurité fournies dans le présent manuel d'utilisation.

Les types d'informations de sécurité suivants sont fournis tout u long du manuel.

AVERTISSEMENT



Le terme AVERTISSEMENT signale des situations risquant d'entraîner des accidents corporels dont l'utilisateur, ou d'autres personnes, pourraient être victime.

Les détails concernant ces circonstances sont donnés dans un encadré identique à celui-ci.

ATTENTION



Le terme ATTENTION signale des situations risquant d'entraîner des détériorations de l'appareil ou de tout autre matériel.

Les détails concernant ces circonstances sont donnés dans un encadré identique à celui-ci.

Les conseils donnés dans ce manuel ont pour but de venir compléter les exigences de sécurité habituelles en vigueur dans le pays de l'utilisateur, et non de s'y substituer.

Utilisation appropriée

ATTENTION



Perte de données

Ne pas ouvrir le capot avant pendant un cycle. Un cycle interrompu suite à l'ouverture du capot avant ne peut pas être redémarré. Pour ouvrir la fenêtre pendant un cycle, cliquer sur **Pause** (interrompre) à l'écran dédié au cycle, attendre l'arrêt de l'appareil, puis ouvrir la fenêtre.

ATTENTION**Perte de données et détérioration de l'appareil**

Utilisez uniquement les consommables définis dans ce manuel avec l'instrument STAR Q SP/AS. L'utilisation d'autres consommables peut affecter les performances de l'instrument.

**AVERTISSEMENT/
ATTENTION****Risque d'accident corporel et de détérioration du matériel**

L'utilisation inappropriée du STAR Q SP/AS peut entraîner des accidents corporels ou une détérioration de l'appareil.

L'utilisation du STAR Q SP/AS est exclusivement réservée au personnel qualifié ayant été convenablement formé.

La maintenance du STAR Q SP/AS doit uniquement être effectuée par des spécialistes du Service Après-Vente QIAGEN.

ATTENTION**Détérioration de l'appareil**

La lumière directe du soleil peut décolorer les pièces de l'appareil et abîmer les éléments en plastique.

Le STAR Q SP/AS ne doit pas être exposé à la lumière directe du soleil et doit être éloigné des sources de chaleur, des sources de vibration et des interférences électriques.

ATTENTION**Détérioration de l'appareil**

Éviter de renverser de l'eau ou des produits chimiques sur le STAR Q SP/AS.

La détérioration de l'appareil dû au déversement de liquides annule la garantie.

**AVERTISSEMENT/
ATTENTION****Risque d'accident corporel et de détérioration du matériel**

Ne pas essayer de déplacer le STAR Q SP/AS pendant qu'il est en marche.

Ne jamais soulever un appareil totalement installé pour le transporter d'un endroit à un autre. Seul un technicien de maintenance agréé est autorisé à réinstaller l'appareil dans son nouvel emplacement.

**AVERTISSEMENT/
ATTENTION**



Risque d'accident corporel et de détérioration du matériel

Le STAR Q SP/AS pèse environ 150 kg. Il convient de prendre les précautions de sécurité nécessaires lors du transport de l'appareil.

**AVERTISSEMENT/
ATTENTION**



Atmosphère explosive

Le STAR Q SP/AS n'est pas conçu pour être utilisé dans une atmosphère explosive.

AVERTISSEMENT



Risque d'explosion

Le STAR Q SP/AS a été conçu pour l'utilisation des réactifs et substances fournis par les kits QIAGEN.

L'utilisation de réactifs et de substances autres que celles indiquées peut entraîner un risque d'incendie ou d'explosion.

En cas d'urgence, éteindre le STAR Q SP/AS à l'aide de l'interrupteur d'alimentation situé à l'arrière de l'appareil et débrancher le cordon d'alimentation de la prise de courant.

L'appareil doit être installé dans le laboratoire de manière à permettre au personnel d'accéder aux parties avant et latérales de l'appareil pour pouvoir le manipuler, l'entretenir et ouvrir et fermer les capots de protection. Tenir compte des dimensions de l'appareil (voir "Appendix B — Technical Specifications," page 114) et prévoir un espace suffisant permettant à une personne de se déplacer et de travailler confortablement.

Sécurité électrique

Remarque: Avant l'entretien, débrancher le cordon d'alimentation de la prise de courant.

AVERTISSEMENT



Danger électrique

Toute interruption du conducteur de protection (conducteur de terre/de masse) à l'intérieur ou à l'extérieur de l'appareil ou toute déconnexion de la borne du conducteur de protection est susceptible de rendre l'appareil dangereux. toute interruption intentionnelle est interdite.

Tensions mortelles à l'intérieur de l'appareil

Lorsque l'appareil est relié à l'alimentation, les bornes peuvent être sous tension et l'ouverture de capots de l'appareil ou le retrait de pièces risque d'exposer des éléments sous tension.

Éviter de renverser de l'eau ou des produits chimiques sur le STAR Q SP/AS. En cas de déversement de liquides à l'intérieur de l'appareil, débrancher celui-ci de la prise d'alimentation et contacter les Services techniques de QIAGEN.

Afin que le STAR Q SP/AS fonctionne de manière satisfaisante et en toute sécurité, suivre les conseils suivants:

- Le cordon d'alimentation doit être relié à une prise d'alimentation disposant d'un conducteur de protection (terre/masse).
- Les fiches d'alimentation reliées au secteur doivent être facilement accessibles s'il est nécessaire de débrancher rapidement l'équipement du secteur.
- Utiliser uniquement les fiches et cordons d'alimentation fournis avec le système.
- Si l'appareil présente un danger électrique, empêcher le reste du personnel de s'en servir et contacter les Services Techniques de QIAGEN. L'appareil peut présenter un danger électrique dans les cas suivants:
 - Le cordon d'alimentation présente des signes de détérioration.
 - L'appareil a été stocké pendant une longue période dans des conditions non conformes à celles énoncées dans "Appendix B — Technical Specifications," page 114.
 - L'appareil a subi des chocs sévères durant le transport.
 - Du liquide est entré dans l'appareil.

Sécurité biologique et chimique

Lors de la manipulation de substances biologiques, employer des procédures de laboratoire sûres comme décrit dans des publications telles que Biosafety in Microbiological and Biomedical Laboratories, HHS (<http://www.cdc.gov/biosafety/publications/bmbl5/index.htm>).

AVERTISSEMENT



Substances biologiques

Manipuler les substances biologiques avec la plus grande précaution et conformément aux réglementations de sécurité en vigueur. Portez toujours des lunettes de protection, 2 paires de gants et une blouse de laboratoire.

La personne responsable (par exemple, le directeur du laboratoire) doit prendre les précautions nécessaires afin de garantir que l'environnement de travail est sûr, que les opérateurs de l'appareil sont convenablement formés et ne sont pas exposés à des niveaux dangereux d'agents infectieux comme cela est défini dans les fiches techniques santé-sécurité (SDS) ou dans les documents de l'OSHA,* de l'ACGIH† ou du COSHH‡ applicables.

Pour plus d'informations, visitez le site www.qiagen.com/safety.

L'évacuation des vapeurs et la mise au rebut des déchets doivent s'effectuer conformément à toutes les réglementations et lois nationales, régionales et locales relatives à la santé et à la sécurité.

AVERTISSEMENT



Produits chimiques

Toujours porter des lunettes de protection, des gants et une blouse de laboratoire.

La personne responsable (par exemple, le directeur du laboratoire) doit prendre les précautions nécessaires afin de garantir que l'environnement de travail est sûr, que les opérateurs de l'appareil sont convenablement formés et ne sont pas exposés à des niveaux dangereux d'agents infectieux comme cela est défini dans les fiches techniques santé-sécurité (SDS) ou dans les documents de l'OSHA,* de l'ACGIH† ou du COSHH‡ applicables.

Pour plus d'informations, visitez le site www.qiagen.com/safety.

L'évacuation des vapeurs et la mise au rebut des déchets doivent s'effectuer conformément à toutes les réglementations et lois nationales, régionales et locales relatives à la santé et à la sécurité.

* OSHA : Occupational Safety and Health Administration (États-Unis d'Amérique) (Administration pour la santé et la sécurité du travail).

† ACGIH : American Conference of Government Industrial Hygienists (États-Unis d'Amérique) (Conférence américaine des hygiénistes industriels gouvernementaux).

‡ COSHH : Control of Substances Hazardous to Health (Royaume-Uni) (Contrôle des substances dangereuses pour la santé).

Dangers mécaniques

AVERTISSEMENT



Pièces mobiles

Pour éviter tout contact avec des pièces en mouvement pendant le fonctionnement du STAR Q SP/AS, l'appareil doit être utilisé avec le couvercle fermé.

Ne pas démonter les panneaux du capot. Ils ne renferment aucune pièce réparable par l'utilisateur. En cas de problème avec le STAR Q SP/AS, contacter immédiatement les Services techniques de QIAGEN.

AVERTISSEMENT



Risque d'accident corporel

Ne pas toucher l'agitateur chauffant sur toute la durée du cycle et pendant 1 heure après la fin d'un cycle, car il peut être brûlant.

Traitement des déchets

ATTENTION



Élimination du matériel en plastique

Le matériel en plastique usagé peut contenir des produits chimiques dangereux. Ces déchets doivent être convenablement collectés et mis au rebut conformément aux réglementations de sécurité locales.

Sécurité relative à la maintenance

Procéder à la maintenance comme décrit à la Maintenance procédures. QIAGEN facture les réparations rendues nécessaires suite à une maintenance inappropriée.

AVERTISSEMENT/ ATTENTION



Risque d'accident corporel et de détérioration du matériel

Effectuer uniquement la maintenance spécifiquement décrite dans ce manuel.

AVERTISSEMENT/ ATTENTION



Risque de décharge électrique

Ne pas ouvrir les panneaux du STAR Q SP/AS.

Effectuer uniquement la maintenance spécifiquement décrite dans ce manuel.

ATTENTION**Détérioration de l'appareil**

Ne pas utiliser de solvants ni de réactifs contenant des acides, des bases ou des composés abrasifs pour nettoyer le STAR Q SP/AS.

Ne pas utiliser de produits désinfectants contenant de l'hypochlorite et autres produits à base de Javel.

ATTENTION**Détérioration de l'appareil**

L'autoclavage ne peut être utilisé pour les composants ou accessoires de l'instrument.

ATTENTION**Détérioration de l'appareil**

La fumigation d'oxyde d'éthylène peut accroître les besoins en matière d'entretien et de maintenance (remplacement des joints toriques, graissage des axes, etc.) et nécessiter la réduction des intervalles de maintenance.

ATTENTION**Détérioration de l'appareil**

La fumigation de peroxyde d'hydrogène entraîne le blanchiment ou la décoloration de nombreux matériaux de l'instrument et peut accroître les besoins en matière d'entretien et de maintenance (remplacement des joints toriques, graissage des axes, etc.) et nécessiter la réduction des intervalles de maintenance.

ATTENTION**Détérioration de l'appareil**





N'utilisez pas de fumigation de formaldéhyde ou d'oxydes de chlore (composés chimiques de chlore et d'oxygène tels que l'eau de Javel). Ils ne sont pas adaptés à l'instrument STAR Q SP/AS car ils provoquent des réactions chimiques et de la corrosion.

ATTENTION**Détérioration de l'appareil**

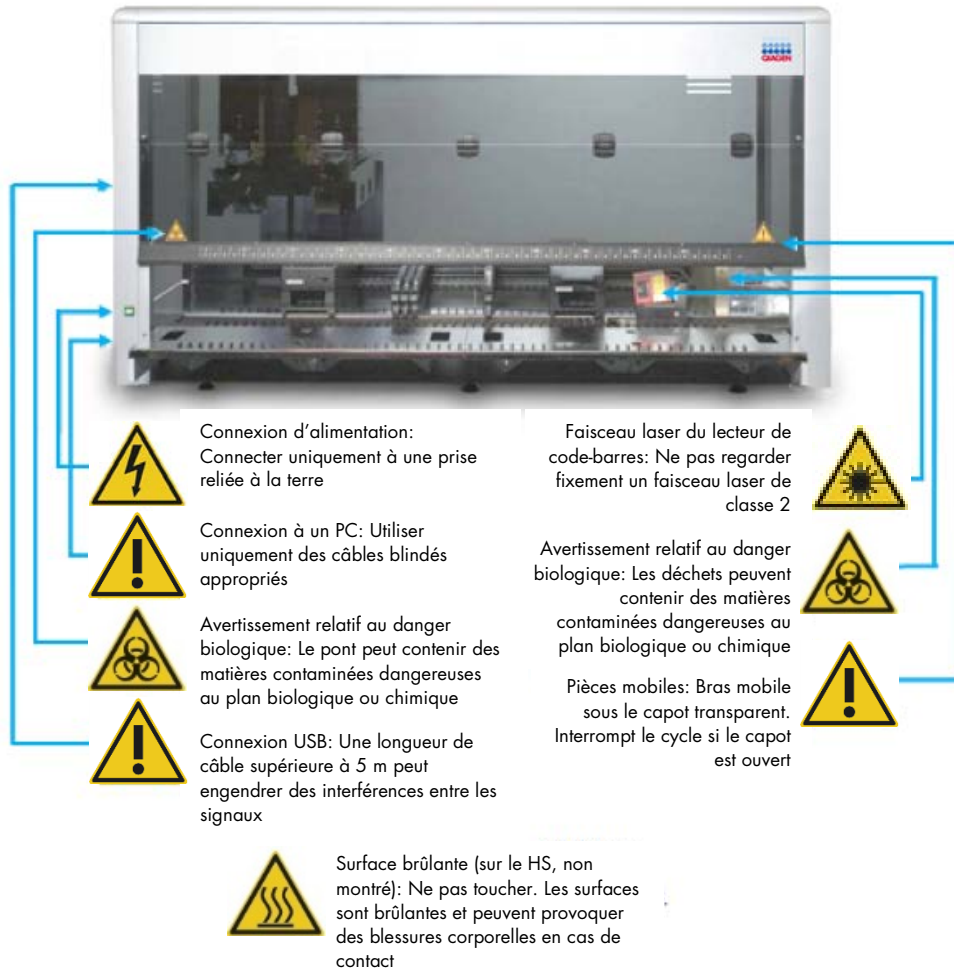
L'exposition aux rayons ultraviolets fragilise de nombreux matériels synthétiques. Cela peut accroître les besoins en matière d'entretien et de maintenance et nécessiter la réduction des intervalles de maintenance.

Symboles sur le STAR Q SP/AS

Symbole	Position	Description
	Plaque signalétique sur l'appareil	Fabricant légal
	Plaque signalétique sur l'appareil	Symbole WEEE
	Plaque signalétique sur l'appareil	Label FCC de la Fédéral Communications Commission des États-Unis
	Plaque signalétique sur l'appareil	Label RoHS pour la Chine (restriction de l'utilisation de certaines substances dangereuses dans l'équipement électrique et électronique)
	Plaque signalétique sur l'appareil	Marque RCM (antérieurement marque C-Tick) pour l'Australie
	Plaque signalétique sur l'appareil	Numéro de série
	Plaque signalétique sur l'appareil	Code d'article international
	Sur l'appareil	Signe d'avertissement général

Symbole	Position	Description
	Sur l'appareil	Avertissement, tension dangereuse
	Sur l'agitateur chauffant	Avertissement, surface brûlante
	Sur le lecteur de code-barres	Avertissement, laser
	Sur l'appareil	Avertissement, danger biologique

Emplacement et explication des étiquettes d'avertissement et de mise en garde:



Appendix K – Safety Information (German, DE)

Lesen Sie dieses Handbuch sorgfältig durch, bevor Sie den STAR Q SP/AS benutzen. Beachten Sie dabei insbesondere die Sicherheitshinweise. Die Gebrauchsanweisungen und Sicherheitshinweise im Handbuch müssen befolgt werden, um einen sicheren Betrieb des Geräts zu gewährleisten und das Gerät in einem sicheren Zustand zu erhalten.

In diesem Handbuch werden die folgenden Kategorien von Sicherheitshinweisen verwendet.

WARNUNG



Der Begriff „WARNUNG“ weist Sie auf Situationen hin, in denen eine Verletzungsgefahr für Sie selbst oder andere Personen besteht. Nähere Einzelheiten über diese Situationen werden in einem Textfeld wie diesem beschrieben.

ACHTUNG



Der Begriff „ACHTUNG“ weist Sie auf Situationen hin, in denen das Gerät oder andere Geräte beschädigt werden könnten. Nähere Einzelheiten über diese Situationen werden in einem Textfeld wie diesem beschrieben.

Die in diesem Handbuch enthaltenen Hinweise stellen eine Ergänzung und keinen Ersatz der üblichen Sicherheitsanforderungen dar, die im jeweiligen Land gelten.

Sachgemäße Handhabung

ACHTUNG



Datenverlust

Öffnen Sie niemals die vordere Abdeckung während eines Laufs. Ein abgebrochener Lauf, d. h. einer der durch Öffnen der vorderen Abdeckung angehalten wurde, kann nicht wieder gestartet werden. Zum Öffnen der Abdeckung während eines Laufs klicken Sie auf die Schaltfläche **Pause** in der Betriebsanzeige, warten Sie bis das Gerät anhält und öffnen Sie dann die Abdeckung.

ACHTUNG



Datenverlust und Beschädigung des Geräts

Mit dem STAR Q SP/AS dürfen nur die in diesem Handbuch genannten Laborutensilien verwendet werden. Die Verwendung anderer Laborutensilien kann die Leistung beeinträchtigen.

**WARNUNG/
ACHTUNG**



Verletzungsgefahr und Beschädigung des Geräts

Die unsachgemäße Bedienung des STAR Q SP/AS kann zu einer Verletzung des Benutzers oder zur Beschädigung des Geräts führen.

Der STAR Q SP/AS darf nur durch qualifiziertes Personal, das entsprechend geschult wurde, bedient werden.

Die Instandhaltung des STAR Q SP/AS darf nur durch einen Außendienst-Mitarbeiter des QIAGEN Service durchgeführt werden.

ACHTUNG



Geräteschäden

Direktes Sonnenlicht kann zum Ausbleichen von Geräteteilen führen und Schäden an Kunststoffteilen verursachen.

STAR Q SP/AS darf nicht in direktem Sonnenlicht oder in unmittelbarer Nähe von Wärme- und Vibrationsquellen oder elektrischen Störfeldern platziert werden.

ACHTUNG



Beschädigung des Geräts

Vermeiden Sie es, Wasser oder Chemikalien auf der Oberfläche des STAR Q SP/AS zu verschütten.

Durch verschüttete Chemikalien oder verschüttetes Wasser verursachte Geräteschäden sind nicht durch die Garantie abgedeckt.

**WARNUNG/
ACHTUNG**



Verletzungsgefahr und Beschädigung des Geräts

Bewegen Sie STAR Q SP/AS auf keinen Fall während des Betriebs.

Heben Sie niemals ein voll installiertes Gerät zum Transport von einem Ort zu einem anderen. Es muss an dem neuen Ort von einem autorisierten Service Techniker neu installiert werden

**WARNUNG/
ACHTUNG**



Verletzungsgefahr und Beschädigung des Geräts

STAR Q SP/AS wiegt ungefähr 150 kg. Beim Transport des Geräts sollten nötige Sicherheitsvorkehrungen getroffen werden.

**WARNUNG/
ACHTUNG**



Explosionsfähige Atmosphären

Der STAR Q SP/AS ist nicht für den Gebrauch in explosionsfähigen Atmosphären vorgesehen.

WARNUNG



Explosionsgefahr

Der STAR Q SP/AS ist ausschließlich mit Reagenzien und Substanzen aus den QIAGEN Kits zu benutzen.

Die Benutzung von anderen Reagenzien oder Substanzen kann Feuer oder eine Explosion auslösen.

Schalten Sie im Notfall den STAR Q SP/AS aus und ziehen Sie den Netzstecker aus der Steckdose.

Das Gerät sollte im Labor so aufgestellt werden, dass Personal die Vorderseite und die Seitenwände des Geräts zum Betrieb, zur Wartung, zum Öffnen und zum Schließen der Schutzabdeckungen erreichen kann. Beachten Sie die Abmessungen des Geräts (siehe "Appendix B — Technical Specifications," Seite 114) und kalkulieren Sie ausreichend Bewegungsraum zum bequemen Arbeiten für eine Person.

Elektrische Sicherheit

Hinweis: Ziehen Sie das Netzanschlusskabel aus der Steckdose, bevor Sie Wartungsarbeiten am Gerät vornehmen..

WARNUNG



Gefahr durch Stromschlag

Jede Unterbrechung des Schutzleiters (Erdungs- bzw. Masseleiter) im Gerät oder außerhalb des Geräts und jede Abtrennung des Schutzleiters am Anschluss der Netzleitung erhöht die Gefahr eines Stromschlags.

Eine absichtliche Unterbrechung der Schutzleiterverbindung ist verboten.

Gefährliche Spannung im Gerät

Wenn das Gerät an die Stromversorgung angeschlossen ist, sind die Anschlussstellen spannungsführend. Durch das Öffnen der Abdeckungen oder das Entfernen von Gehäuseteilen können spannungsführende Komponenten freigelegt werden.

Vermeiden Sie es, Wasser oder Chemikalien auf der Oberfläche des STAR Q SP/AS zu verschütten. Falls Flüssigkeit auf dem Gerät verschüttet wird und in das Gerät läuft, dann schalten Sie es sofort aus, trennen Sie es von der Netzspannung (Stecker ziehen!) und setzen Sie sich mit dem Technischen Service von QIAGEN in Verbindung.

Um einen zufriedenstellenden und sicheren Betrieb des STAR Q SP/AS zu gewährleisten, befolgen Sie bitte die nachstehenden Richtlinien:

- Das Netzkabel muss an eine Steckdose mit Schutzleiter (Erdung/ Masse) angeschlossen werden.
- Sorgen Sie dafür, dass der Netzstecker jederzeit frei zugänglich ist, für den Fall, dass das Gerät schnell vom Stromnetz getrennt werden muss.
- Verwenden Sie nur Netzgeräte und Netzkabel, die mit dem Gerät geliefert werden.
- Falls die elektrische Sicherheit bei der Bedienung des Geräts nicht mehr gewährleistet werden kann, muss das Gerät gegen unbefugte oder unabsichtliche Benutzung gesichert werden. Kontaktieren Sie anschließend den Technischen Service von QIAGEN. Die elektrische Sicherheit des Geräts ist nicht mehr gegeben, wenn:
 - das Netzkabel beschädigt ist;
 - das Gerät längere Zeit unter ungünstigen Bedingungen, d. h. unter anderen Bedingungen als in Anhang STAR Q SP/AS angegeben, gelagert wurde;
 - das Gerät unsachgemäß transportiert worden ist.
 - Flüssigkeit in das Gerät eingedrungen ist.

Biologische und chemische Sicherheit

Wenden Sie beim Umgang mit biologischen Materialien nur sichere Laborverfahren an, wie sie z. B. in Veröffentlichungen wie Biosafety in Microbiological and Biomedical Laboratories, HHS (<http://www.cdc.gov/biosafety/publications/bmbl5/index.htm>).

WARNUNG



Biologische Materialien

Gehen Sie beim Umgang mit biologischen Materialien mit der größtmöglichen Vorsicht und gemäß den erforderlichen Sicherheitsbestimmungen vor. Tragen Sie stets eine Schutzbrille, zwei Paar Laborhandschuhe und einen Laborkittel.

Die verantwortliche Person (z. B. der Laborleiter) muss alle erforderlichen Vorsichtsmaßnahmen treffen, um sicherzustellen, dass die unmittelbare Umgebung des Arbeitsplatzes sicher ist und die Bediener des Geräts ausreichend geschult sind. Außerdem dürfen die Grenzwerte in Bezug auf infektiöse Erreger, die in den entsprechenden Sicherheitsdatenblättern (SDS) oder den Vorschriften der OSHA, * ACGIH[†] oder COSHH[‡] festgelegt sind, nicht überschritten werden.

Weitere Informationen finden Sie im Internet unter www.qiagen.com/safety. Beim Betrieb des Abzugs und bei der Entsorgung von Abfallstoffen müssen alle Bestimmungen und Gesetze zu Gesundheitsschutz und Sicherheit am Arbeitsplatz auf übernationaler, nationaler und regionaler Ebene eingehalten werden.

WARNUNG



Gefährliche Chemikalien

Tragen Sie immer eine Schutzbrille, Laborhandschuhe und einen Laborkittel. Die verantwortliche Person (z. B. der Laborleiter) muss alle erforderlichen Vorsichtsmaßnahmen treffen, um sicherzustellen, dass die unmittelbare Umgebung des Arbeitsplatzes sicher ist und die Bediener des Geräts ausreichend geschult sind. Außerdem dürfen die Grenzwerte in Bezug auf infektiöse Erreger, die in den entsprechenden Sicherheitsdatenblättern (SDS) oder den Vorschriften der OSHA, * ACGIH[†] oder COSHH[‡] festgelegt sind, nicht überschritten werden.

Weitere Informationen finden Sie im Internet unter www.qiagen.com/safety. Beim Betrieb des Abzugs und bei der Entsorgung von Abfallstoffen müssen alle Bestimmungen und Gesetze zu Gesundheitsschutz und Sicherheit am Arbeitsplatz auf übernationaler, nationaler und regionaler Ebene eingehalten werden.

* OSHA: Occupational Safety and Health Administration (Vereinigte Staaten von Amerika).

[†] ACGIH: American Conference of Government Industrial Hygienists (Vereinigte Staaten von Amerika).

[‡] COSHH: Control of Substances Hazardous to Health (Vereinigtes Königreich).

Gefahren durch mechanische Teile

WARNUNG



Sich bewegende Geräteteile

Um einen Kontakt mit sich bewegenden Teilen beim Betrieb des STAR Q SP/AS zu vermeiden, darf das Gerät nur mit geschlossenem Deckel betrieben werden.

Entfernen Sie nicht die Abdeckplatten; im Geräteinneren befinden sich keine Bauteile, die vom Anwender gewartet werden müssen. Setzen Sie sich umgehend mit dem Technischen Service von QIAGEN in Verbindung, wenn einmal ein Problem mit STAR Q SP/AS auftreten sollte.

WARNUNG



Verletzungsgefahr

Berühren Sie den Heizschüttler nicht während des Laufs und für 1 Stunde nach Beenden des Laufs, da das Gerät heiß sein könnte.

Abfallentsorgung

ACHTUNG



Entsorgung von Kunststoffverbrauchsmaterial

Benutzte Kunststoff-Laborartikel können gefährliche Chemikalien enthalten. Derartige Abfälle müssen gemäß den geltenden regionalen Sicherheitsbestimmungen gesammelt und entsorgt werden.

Sicherheitshinweise – Wartungsarbeiten

Führen Sie alle Wartungsarbeiten gemäß den Anweisungen in Abschnitt "Maintenance" durch. QIAGEN stellt alle Reparaturen in Rechnung, die nachweislich auf eine inkorrekte Wartung zurückzuführen sind.

WARNUNG/ ACHTUNG



Verletzungsgefahr und Beschädigung des Geräts

Führen Sie nur Wartungsarbeiten durch, die ausdrücklich in dieser Gebrauchsanweisung beschrieben sind.

**WARNUNG/
ACHTUNG**



Gefahr durch Stromschlag

Öffnen Sie keine Gehäuseteile des STAR Q SP/AS.
Führen Sie nur Wartungsarbeiten durch, die ausdrücklich in dieser Gebrauchsanweisung beschrieben sind.

ACHTUNG



Beschädigung des Geräts

Verwenden Sie weder Lösungsmittel noch Reagenzien, die Säuren, Laugen oder Abrasivstoffe enthalten, um das STAR Q SP/AS zu reinigen.
Verwenden Sie keine Desinfektionsmittel, die Hypochlorit oder andere flüssige Bleichmittel enthalten.
Use non-corrosive, neutral liquids.

ACHTUNG



Beschädigung des Geräts

Gerätekomponenten und Zubehörteile (Pipettierkanäle, Transportwerkzeuge, Heizvorrichtungen, Schüttler und Carrier) dürfen nicht im Autoklaven sterilisiert werden.

ACHTUNG



Beschädigung des Geräts

Eine Desinfektion mit Ethylenoxid kann zu erhöhtem Wartungsaufwand führen (Austausch von O-Ringen, Einfetten von Spindeln usw.) und die Intervalle zwischen den Wartungen verkürzen.

ACHTUNG



Beschädigung des Geräts

Eine Desinfektion mit Wasserstoffperoxid kann zum Ausbleichen oder zu Verfärbungen vieler Gerätematerialien und zu erhöhtem Wartungsaufwand führen (Austausch von O-Ringen, Einfetten von Spindeln usw.) und die Intervalle zwischen den Wartungen verkürzen.







ACHTUNG**Beschädigung des Geräts**

Führen Sie keine Desinfektion mit Formaldehyd durch und verwenden Sie keine Chloroxide (chemische Verbindungen zwischen Chlor und Sauerstoff, beispielsweise Bleiche). Diese Chemikalien sind aufgrund ihrer Reaktionsfähigkeit und ätzenden Eigenschaften für den STAR Q SP/AS ungeeignet.

ACHTUNG**Beschädigung des Geräts**

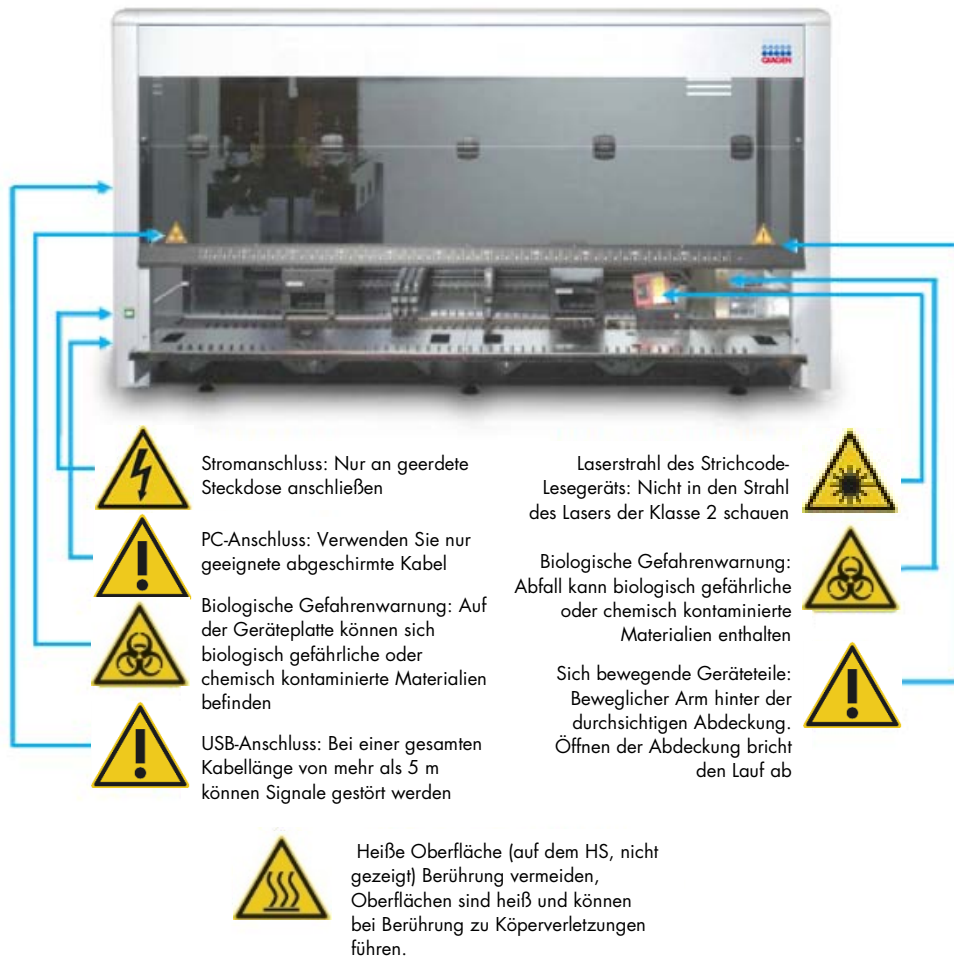
Viele synthetische Materialien werden durch UV-Einstrahlung brüchig. Dies kann zu erhöhtem Wartungsaufwand führen und die Intervalle zwischen den Wartungen verkürzen.

Symbole auf dem STAR Q SP/AS

Symbol	Position	Beschreibung
	Typenschild auf dem Gerät	Hersteller i. S. d. Gesetzes
	Typenschild auf dem Gerät	WEEE-Kennzeichnung (gemäß europäischer Richtlinien bzw. Elektround Elektronik- Altgeräte-Verordnung)
	Typenschild auf dem Gerät	FCC-Kennzeichen der Federal Communications Commission der Vereinigten Staaten
	Typenschild auf dem Gerät	Markierung gemäß RoHS Richtlinie für China (Beschränkung der Verwendung bestimmter gefährlicher Stoffe in Elektro- und Elektronikgeräten)
	Typenschild auf dem Gerät	RCM-Kennung (ehemals C-Tick-Kennzeichen) für Australien
	Typenschild auf dem Gerät	Seriennummer

Symbol	Position	Beschreibung
	Typenschild auf dem Gerät	Internationale Artikelnummer
	Auf dem Gerät	Allgemeines Warnsymbol
	Auf dem Gerät	Warnung, gefährliche Spannung
	Auf dem Heizschüttler	Warnung, heiße Oberfläche
	Auf dem Strichcode-Lesegeräts	Warnung, Laser
	Auf dem Gerät	Warnung, biologische Gefahr

Ort und Erläuterung der Warn- und Hinweisbeschriftungen:



Index

- About this user manual, 6
- Achtung, 146
- Attention, 136
- Autoload, 24
 - specifications, 120
- Avertissement, 136
- Barcode
 - Autoload, 24
 - error, 90
 - kit, 62, 77
 - Q-Card, 42
 - specifications, 120
 - tip recognition, 22
- Bio-Rad plate, 37
- Carrier, 25
 - Bio-Rad plate, 37
 - slide blocks, 46
 - stop hooks, 46
- Cautions, 9
- Cherry pick samples mode, 87
- Computer, 30
 - specifications, 116
- Deck, 18
- Decontamination, 105
- DNA purification, 35
 - loading, 44
 - setup, 35
- Error
 - Help function, 90
 - pipetting, 92
- Error recovery
 - barcode, 91
 - pipetting, 93
- Extraction run, 35
 - loading, 44
- Glossary, 109
- Gripper, 21
 - specifications, 119
- Heater shaker, 26
 - maintenance, 104
 - specifications, 124
- Intended use, 7
- Interfaces, 32
- Labware, 117
- Liquid level detection, 23
- Maintenance
 - daily, 99
 - intervals, 97
 - materials, 97
 - preventative, 97
 - report, 104
 - warning, 98
 - warning messages, 97
 - weekly, 101
- Normalization, 72
 - loading, 78
 - setup, 72
- Ordering information, 112
- Pipetting, 22
 - liquid level detection, 23
 - MAD, 23
- Pipetting arm, 19
- Policy statement, 7
- Q-Card, 42
- Quantification, 57
 - loading, 63
 - setup, 57
 - specifications, 57
- Safety information
 - biological, 12
 - chemicals, 12
 - electrical, 12
 - labels, 17
 - maintenance safety, 14
 - mechanical hazards, 13
 - proper use, 10
 - symbols, 16
 - waste disposal, 14
- Safety Information (French, FR), 136
- Safety Information (German, DE), 146
- Slide blocks, 46
- Software, 30
- Specifications
 - Autoload, 120
 - barcode, 120
 - chemical compatibility, 128
 - computer, 116
 - gripper, 119
 - heater shaker, 124
 - instrument, 114, 127
 - labware, 117
 - operating, 115
 - storage and transport, 116
 - tips, 118

- Stop hooks, 46
- STR run
 - loading, 78
 - setup, 72
- Symbols, 16
- Teaching needles, 100, 102
- Technical assistance, 7
- Tip recognition, 22
- Tips, 20, 27
 - liquid level detection, 28
 - specifications, 118
- Trace files, 94
- User
 - requirements, 8
- Verification, 130
- Version management, 7
- Voltage, 33
- Warnings, 9
- Warnung, 146
- Waste Electrical and Electronic Equipment (WEEE), 131
- Worklist, 40, 60
 - cherry pick samples mode, 88

This page intentionally left blank

Trademarks: QIAGEN®, Sample to Insight®, HotStarTaq®, Investigator®, Quantiplex®, QuantiTect®, Rotor-Gene® (QIAGEN Group); ABgene® (Thermo Fisher Scientific); Applied Biosystems®, MicroAmp® (Life Technologies Corporation); Bio-Rad®, Microseal® (Bio-Rad Laboratories, Inc.); Core™, Intel® (Intel Corporation); Dell®, OptiPlex® (Dell, Inc.); Eppendorf® (Eppendorf AG); Excel®, Microsoft®, Windows® (Microsoft Corporation); Kalrez®, Viton® (DuPont Performance Elastomers L.L.C.); Makrolon® (Bayer Aktiengesellschaft); Sarstedt® (Sarstedt AG and Co.); VWR® (VWR International). Registered names, trademarks, etc. used in this document, even when not specifically marked as such, are not to be considered unprotected by law.

HB-2079-002 1099422 05-2016 © 2016 QIAGEN, all rights reserved.

Ordering www.qiagen.com/shop | Technical Support support.qiagen.com | Website www.qiagen.com