ÄKTA™ go

Operating Instructions

Original instructions

Table of Contents

1 Introduction

About this chapter

This chapter contains important information that must be read before operating the ÄKTA go system.

In this chapter

1.1 Important user information

Read this before operating the product

All users must read the entire *Operating Instructions* before installing, operating or maintaining the product.

Always keep the *Operating Instructions* at hand when operating the product.

Do not operate the product in any other way than described in the user documentation. If you do, you may be exposed to hazards that can lead to personal injury and you may cause damage to the equipment.

Intended use of the product

The ÄKTA go instrument is intended for the purification of bio-molecules, in particular proteins, for research purposes. It is intended to be used by trained laboratory staff members in research laboratories within academia and industry.

The ÄKTA go instrument must not be used in any clinical procedures, or for diagnostic purposes.

The ÄKTA go is not intended for Reversed Phase Chromatography (RPC), since the EPDM membranes in the **K9** Inlet valve are not compatible with buffers normally used in RPC.

Prerequisites

In order to operate ÄKTA go in the way it is intended:

- The user must know how to use a computer with Microsoft® Windows®.
- The user must understand the concepts of liquid chromatography.
- The user must read and understand the *Safety instructions* chapter in the *Operating Instructions*.
- The ÄKTA go instrument must be installed in accordance with the site requirements and instructions in the *Operating Instructions*.

1.2 About this manual

Purpose of this manual

The *Operating Instructions* give the information needed to install, operate, and maintain the product in a safe way. Translations of the original instructions are given in several languages and are contained in the CD provided with this manual, or can be found online at www.gelifesciences.com/aktago.

Scope of this manual

The *Operating Instructions* cover the ÄKTA go system.

Typographical conventions

Software items are identified in the text by ***bold italic*** text. A colon separates menu levels, thus ***File:Open*** refers to the ***Open*** command in the ***File*** menu.

Hardware items are identified in the text by **bold** text (for example, **Power**).

Notes and tips

Note: *A note is used to indicate information that is important for trouble-free and optimal use of the product.*

Tip: *A tip contains useful information that can improve or optimize your procedures.*

1.3 Associated documentation

Introduction

This section describes the user documentation that is delivered with the product, and how to find related documentation that can be downloaded from the GE Healthcare website.

ÄKTA go user documentation

The user documentation listed in the table below is available in printed or in PDF format at www.gelifesciences.com/aktago.

Documentation	Main contents
ÄKTA go Unpacking Instructions	Information needed to handle the delivery package and unpack the ÄKTA go instrument.
ÄKTA go Operating Instructions	Information needed to install, operate, and maintain the ÄKTA go system in a safe way. Translations of the original instructions are given in several languages.
ÄKTA go Cue Cards	Essential information to be kept near the ÄKTA go system.
ÄKTA go User Manual	Additional detailed information on the system, component functions, and maintenance. Tips on how to get the most out of the system when running it.
ÄKTA go Product Documentation	General specifications and list of materials in the flow path.
ÄKTA go Site Preparation Guide	Instructions on how to prepare the installation site for the ÄKTA go system.

Access from the web

Follow the steps below to access ÄKTA go user documentation that is available on the web.

Step	Action
1	To access the product page for ÄKTA go, scan the code below using your mobile device, or go to www.gelifesciences.com/aktago.
2	Click ***RELATED DOCUMENTS***.
3	Select the document you require.

UNICORN™ user documentation

The UNICORN user documentation is listed in the following table and is available from the UNICORN software. Use the ***Help*** menu or press the **F1** key on your keyboard. The documents are available in the ***UNICORN Online Help and Documentation*** section.

Documentation	Main contents
UNICORN Quick Installation Guide [1]	Detailed instructions on how to install UNICORN.
UNICORN Administration and Technical Manual [2]	• Overview and detailed description of network setup and complete software installation. • Administration of UNICORN and the UNICORN database.
UNICORN Method Manual [2]	• Overview and detailed descriptions of the method creation features in UNICORN. • Workflow descriptions for common operations.

Documentation	Main contents
UNICORN System Control Manual [2]	• Overview and detailed description of the system control features in UNICORN. • Includes general operation, system settings and instructions on how to perform a run.
UNICORN Evaluation Manual [2]	• Overview and detailed descriptions of the Evaluation Classic [3] module in UNICORN. • Description of the evaluation algorithms used in UNICORN.
Getting started with Evaluation (accessed through help in the UNICORN Evaluation module)	• Video clips showing common workflows in the Evaluation module. • Overview of features of the Evaluation module.
UNICORN Help	Descriptions are displayed for the currently active pane or dialog box.

1 The UNICORN Quick Installation Guide can be downloaded from www.gelifesciences.com/aktago.

2 The current UNICORN version is also added to the title of the manual.

3 Evaluation Classic is an advanced evaluation module that requires an extra license to run.

2 Safety instructions

About this chapter

This chapter contains important information for your personal safety.

In this chapter

2.1 Safety precautions

Introduction

ÄKTA go is powered by mains voltage and handles materials that can be considered hazardous. Before installing, operating or maintaining the system, you must be aware of the hazards described in this manual.

Definitions

This user documentation contains safety notices (WARNING, CAUTION, and NOTICE) concerning the safe use of the product. See definitions below.

WARNING

WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury. It is important not to proceed until all stated conditions are met and clearly understood.

CAUTION

CAUTION indicates a hazardous situation which, if not avoided, could result in minor or moderate injury. It is important not to proceed until all stated conditions are met and clearly understood.

NOTICE

NOTICE indicates instructions that must be followed to avoid damage to the product or other equipment.

General precautions

The following general precautions must be considered at all times. There are also context related precautions, which are written in their respective chapters.

WARNING

Do not operate the product in any other way than described in the ÄKTA go user documentation.

WARNING

Only properly trained personnel may operate and maintain the product.

WARNING

Do not use any accessories not supplied or recommended by GE Healthcare.

WARNING

Do not use ÄKTA go if it is not working properly, or if it has suffered any damage, for example:

- damage to the power cord or its plug
- damage caused by dropping the equipment
- damage caused by splashing liquid onto it

WARNING

Access to power plug. Do not block access to the power outlet and power plug. The power cord with plug must always be easy to disconnect.

WARNING

In the event of a large spillage, disconnect the power cord from the wall socket.

WARNING

Always use appropriate Personal Protective Equipment (PPE) during operation and maintenance of this product.

WARNING

Hazardous substances and biological agents. When using hazardous chemical and biological agents, take all suitable protective measures, such as wearing protective clothing, glasses and gloves resistant to the substances used. Follow local and/or national regulations for safe operation and maintenance of this product.

WARNING

Spread of biological agents. The operator must take all necessary actions to avoid spreading hazardous biological agents. The facility must comply with the national code of practice for biosafety.

WARNING

High pressure. The product operates under high pressure. Wear protective glasses and other required Personal Protective Equipment (PPE) at all times.

WARNING

Explosive environment. The product is **not approved** for work in a potentially explosive atmosphere. The product does not fulfill the requirements of the ATEX Directive.

2.2 Labels

Description of information on the system label

The following safety symbols and information may be present on the system label.

Label	Meaning
	**Warning!** Read the user documentation before using the system. Do not open any covers or replace parts unless specifically stated in the user documentation.
Voltage	Electrical rating: Voltage (VAC ⁓)
Frequency	Electrical rating: Frequency (Hz)
Max. Power	Electrical rating: Maximum power consumption (VA)
Protection Class	Degree of protection provided by the enclosure
Mfg. Date	Year (YYYY) and month (MM) of manufacture

2.3 Emergency procedures

Introduction

This section describes how to shut down the ÄKTA go instrument in an emergency situation, and the procedure for restarting the system.

The section also describes the result in the event of power failure.

Emergency shutdown

To shut down the instrument in an emergency, disconnect the instrument power cord from its power source. The power source can be an ordinary power outlet, or an UPS (Uninterruptible Power Supply) unit.

Any ongoing activity will be terminated immediately. Run data up to the time of the interruption will be saved.

NOTICE

Do not leave the instrument in an emergency stop condition. Flush the flow path with water or buffer when the emergency has been dealt with.

Power failure

The result of a power failure depends on whether the system is equipped with a Real-Time Unit and whether the instrument or the computer is affected.

If power is lost to the ÄKTA go instrument, with or without a Real-Time Unit, the run is interrupted immediately. Run data collected up to the time of the power failure is saved in the UNICORN software.

If power is lost to the computer and the system is not equipped with a Real-Time Unit, the run is interrupted immediately. Run data collected up to the time of the power failure is saved in the UNICORN software.

If power is lost to the computer and the system is equipped with a Real-Time Unit, the run continues to completion and the run data is stored in the Real-Time Unit and uploaded to the computer once it is reconnected.

Note: *Connecting the instrument and computer to an uninterruptible power supply (UPS) can help to prevent loss of data and material during a power failure.*

Restart after emergency shutdown or power failure

Follow the steps below to restart the system after an emergency shutdown or power failure.

Step	Action
1	Reconnect the power cord.
2	Start the instrument by pressing the On/Off button on the instrument control panel.
3	Start the computer and the UNICORN software.
4	Re-establish connection between UNICORN and the instrument.
5	If the run has been aborted, recover or discard remaining sample and flush the flow path as appropriate.

3 System description

About this chapter

This chapter gives an overview of the ÄKTA go instrument and the UNICORN software.

In this chapter

3.1 ÄKTA go

Introduction

This section gives an overview of the ÄKTA go instrument.

Illustration of the ÄKTA go system

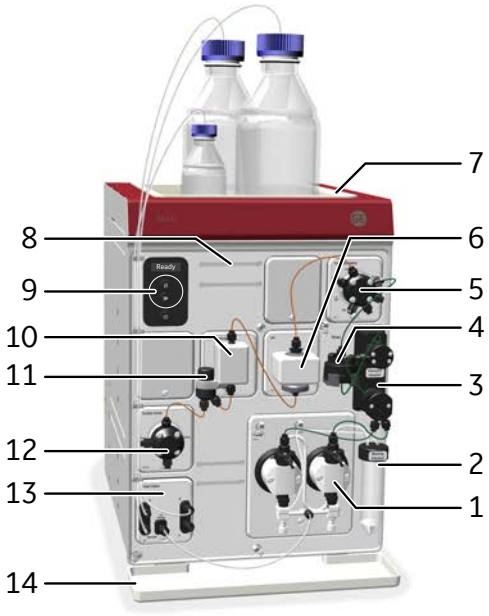
The illustration below shows the ÄKTA go system. The computer with the UNICORN software is located on the right hand side of the instrument to make room for accessories on the left hand side of the instrument.

Exterior design

The liquid handling modules are placed on the front of the instrument. The instrument is equipped with trays to collect spillage, and adjustable feet to level the instrument. Buffer vessels can be placed on top of the instrument. Air ventilation, power cables, and data cables are located at the rear of the instrument.

Illustration of the ÄKTA go instrument

The illustration below shows the ÄKTA go instrument after installation.

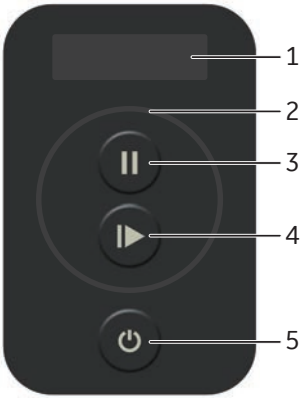


Part	Function
1	Pump
2	Pump rinsing solution tube
3	Pressure monitor
4	Mixer
5	Injection valve
6	UV monitor
7	Top tray
8	Holder rails
9	Instrument control panel
10	Conductivity monitor
11	Flow restrictor
12	Outlet valve
13	Inlet valve
14	Bottom tray

Illustration of the instrument control panel

The instrument control panel is located to the upper left on the front of the instrument. It shows the current status of the system using LED light and status text. The pause and continue buttons can be used to control an ongoing run.

Note: *Control panel buttons can be locked using the UNICORN software.*

Illustration	Part	Function
	1	Display
	2	Status indicator
	3	Pause button
	4	Run/Continue button
	5	On/Off button

Status indicators

The display and status indicators on the instrument control panel indicate the current status of ÄKTA go.

The table below describes the different states that can be displayed.

State	Display	Description
Off		The instrument is turned off.

State	Display	Description
Turning on/off		The On/Off button is pressed and the instrument is turning on or off.
Offline	 The display toggles between ***Offline***, the instrument IP address, and the Instrument serial number.	Power is on, but the instrument has no communication with the UNICORN instrument server.
Connecting	 The status indicator flashes a white light.	The instrument is connecting to the UNICORN instrument server.
Ready		The instrument is ready to use.

State	Display	Description
Run		A run is ongoing.
Pause		A run has been paused (pump is stopped).
Hold		A run has been put on hold (pump is still pumping at an unchanged flow rate).
Wash		A system wash or a pump wash instruction is ongoing.
Alarms and errors	 The status indicator flashes a red light.	The instrument has been paused due to an alarm or an instrument error. After examining the cause of the error, acknowledge the alarm and continue the run in UNICORN.

State	Display	Description
Power-save	 The status indicator is half-lit with a white light, flashing slowly.	The instrument is in power-saving mode.
Re-program-ming		A module is being re-programmed during an instrument configuration installation.

3.2 Available modules

Introduction

The ÄKTA go instrument is delivered with standard modules installed. Six additional modules can be installed in the system, two inside the chassis and four connected via cables at the rear of the instrument. This section describes the standard and optional modules.

Standard modules

The following modules are delivered installed in the instrument.

Module	Description
Inlet valve **K9**	An inlet valve for buffers, sample, and cleaning solution. Creates a gradient by switching between inlets **A** and **B**.
Pump **P9-S**	A high precision pump that delivers buffer or sample.
Pressure monitor **R9**	A pressure monitor that measures the pressure directly after the pump.
Mixer	A 1 mL static mixer that mixes the buffers delivered by the pump.
Injection valve **V9-J**	An injection valve that injects sample onto the column.
UV monitor **U9-L**	A LED UV monitor that measures the UV absorbance at 280 nm of buffers and eluted proteins. Includes a UV cell with a path length of 2 mm. An optional UV cell with a path length of 5 mm is available. The LED lamp does not require warming before use and does not heat the sample.
Conductivity monitor **C9**	A conductivity monitor that measures the conductivity of buffers and eluted proteins.
Outlet valve **V9-Os**	An outlet valve that directs the flow from the instrument to a fraction collector, outlet 1, or to waste.

Optional modules

The following modules can be added to the system. A maximum of six optional modules can be connected to the system.

Module	Description
External air sensor **L9-1.5**	An air sensor used to either complete sample loading via the pump, or to detect if the system has run out of buffer, depending on placement.
Inlet valve **V9-ImA**	An inlet valve that enables six buffer inlets.
Inlet valve **V9-ImB**	An inlet valve that enables six buffer inlets.
Inlet valve **V9-ImS**	An inlet valve that enables five sample inlets and one buffer inlet.
Column valve **V9-Cm**	A column valve that can connect up to three columns to the instrument. Directs the flow onto one column at a time and allows for flow in two directions (upflow and downflow).
Column valve **V9-C**	An advanced column valve that can connect up to five columns to the instrument. Directs the flow onto one column at a time and allows for flow in two directions (upflow and downflow). This module contains two pressure sensors that enable pre-column pressure and delta-column pressure signals.
pH valve **V9-pH**	A pH valve that enables in-line monitoring of pH during the run.
Fraction collector **F9-R**	A fraction collector with up to 175 fractions.
I/O-box **E9**	An I/O box that sends and receives analog or digital signals to and from external equipment.

Note: *You must create new methods if you add or remove modules from the system, since the available software instructions are updated when modules are added or removed.*

Real-Time Unit

The system can be equipped with a Real-Time Unit, which must be installed by a GE Healthcare service representative. The Real-Time Unit can be used in certain network environments to make sure the run continues if the computer is rebooted or otherwise locked due to, for example, software updates. The method is automatically downloaded to the Real-Time Unit when the method is started. Instructions are sent from the Real-Time Unit to the instrument and data are collected in the Real-Time Unit during the run. The result is uploaded from the Real-Time Unit to the computer when the connection is restored.

3.3 UNICORN

Introduction

ÄKTA go systems are controlled by UNICORN software running on an external computer. This section gives a brief overview of the UNICORN modules and the ***System control*** user interface. Refer to UNICORN user documentation for more information.

The examples given in this manual are from UNICORN 7.4.

UNICORN modules overview

UNICORN consists of four modules: ***Administration***, ***Method Editor***, ***System Control***, and ***Evaluation***. The main functions of each software module are described in the following table.

Software module	Main functions
Administration	Perform user and system setup, system log, and database administration.
Method Editor	Create and edit methods using one or a combination of: • Predefined methods with built-in application support • Drag-and-drop function to build methods with relevant steps • Method text editing
System Control	Start, monitor, and control runs. The current flow path is illustrated in the ***Process Picture***, which allows manual interactions with the system and provides feedback on run parameters.
Evaluation	Open results and evaluate runs. The ***Evaluation*** module includes a user interface optimized for workflows such as quick evaluation, comparing results, and working with peaks and fractions. Advanced features requires ***Evaluation Classic***, available from GE Healthcare.

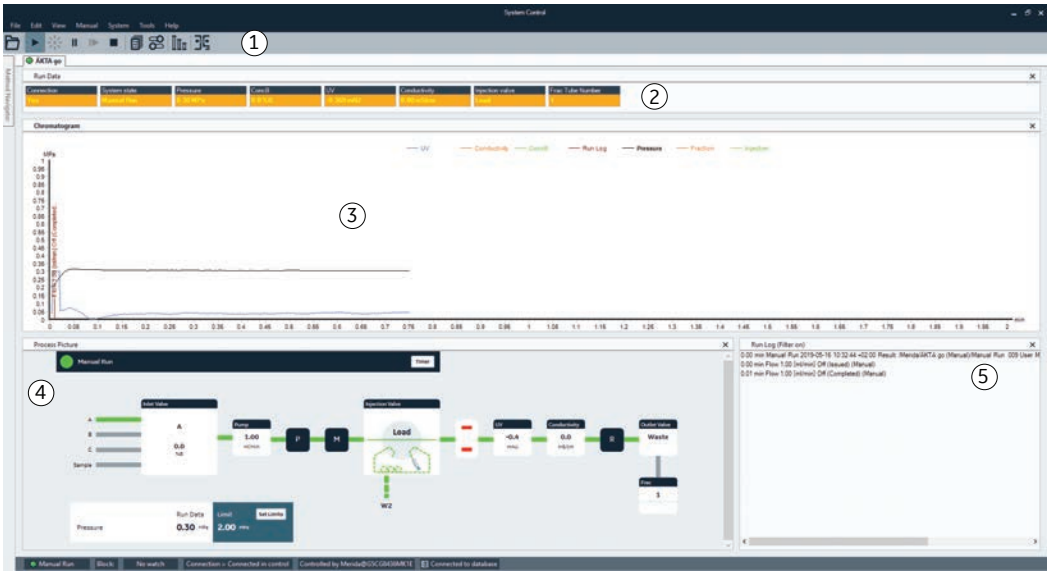
When working with the software modules ***Administration***, ***Method Editor***, ***System Control***, and ***Evaluation*** it is possible to access descriptions of the active window or software instruction by pressing the **F1** key.

Opening a UNICORN module

Modules to open are selected at log in, but can also be opened from another module when the software is already open. In the ***Administration***, ***Method Editor***, or ***System Control*** modules, to open a software module, click ***Tools*** and select the desired module. When in the ***Evaluation*** module, to open a software module, click ***File:Applications*** and select the desired module.

Illustration of the System Control user interface

The illustration below shows the ***System Control*** module.



Part	Description
1	The toolbar buttons are used for quick access to instrument controls. For descriptions, see *System Control toolbar buttons* below.
2	The run data field shows the value of run data in boxes. This field is hidden by default. To make this field visible, go to ***View: run data***.
3	The ***Chromatogram*** pane illustrates the chromatogram of the run.
4	The interactive ***Process Picture*** pane allows manual interactions with the system, illustrates the current flow path, and provides feedback on component status and run parameters.
5	The ***Run Log*** pane shows all registered events during the run.

System Control toolbar buttons

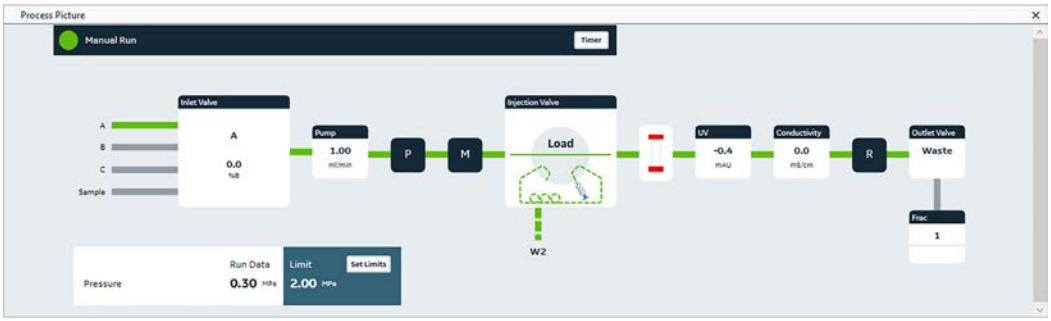
The following table shows the ***System Control*** toolbar buttons.

Button	Function	Button	Function
	***Open Method Navigator*** This button opens the ***Method Navigator*** where saved methods are listed.		***Run*** This button starts a method run. The last method run will be started.
	***Hold*** This button suspends the method run, while current flow rate and valve positions are sustained.		***Pause*** This button suspends the method run and stops all pumps.
	***Continue*** This button resumes a held or paused method run.		***End*** This button permanently ends the run.
	***Documentation*** This button opens a dialog containing information about the system and the current run.		***Customize*** This button opens the ***Customize*** dialog box where curve settings, run data groups and run log contents can be set.
	***Column Handling*** This button opens the ***Column Handling*** tool, which contains a column list, with parameters for GE Healthcare columns. With an additional license, a ***Column Logbook*** to keep track of user-purchased columns is also available.		***Connect to Systems*** This button opens the ***Connect to Systems*** dialog box where systems can be connected, and currently connected users are displayed.

Process Picture pane

The most commonly used manual interactions can be done using the ***Process Picture***. Click on the different parts of the ***Process Picture*** pane to interact with the system.

For a complete list of manual instructions, go to ***Manual: Execute manual instructions***.



4 Installation

About this chapter

This chapter contains information on how to prepare for, and perform an installation of ÄKTA go.

In this chapter

This chapter contains the following sections:

4.1 Site preparation

Introduction

This section describes the site planning and the preparations necessary for the installation of ÄKTA go.

The performance specifications of the system can be met only if the laboratory environment fulfills the requirements stated in this chapter.

In this section

4.1.1 Delivery, storage, and unpacking

ÄKTA go Unpacking Instructions

CAUTION

Heavy object. Use suitable precautions when moving the instrument. Two people are recommended to lift the instrument safely.

For information on how to receive and store the delivery box, and to unpack the ÄKTA go instrument see *ÄKTA go Unpacking Instructions* that is attached on the delivery box. It is also available on the web. Two people are required to safely unpack the ÄKTA go, and no special equipment is needed.

When you receive the delivery

- Record on the receiving documents if there is any apparent damage on the delivery box. Inform your GE Healthcare representative of such damage.
- Move the delivery box to a protected location indoors.

Storage requirements

The delivery box should be stored in a protected place indoors. The following storage requirements must be fulfilled for the unopened box:

Parameter	Allowed range
Ambient temperature, storage	-25°C to 60°C for 48 h
Relative humidity	up to 90% atmospheric humidity at 40°C

Moving the ÄKTA go instrument

The instrument is heavier at the front. Do not tip the instrument when lifting. The illustration below shows the recommended way to lift the ÄKTA go instrument.

4.1.2 Space requirements

Introduction

This section describes the requirements for the laboratory bench on which the ÄKTA go is placed.

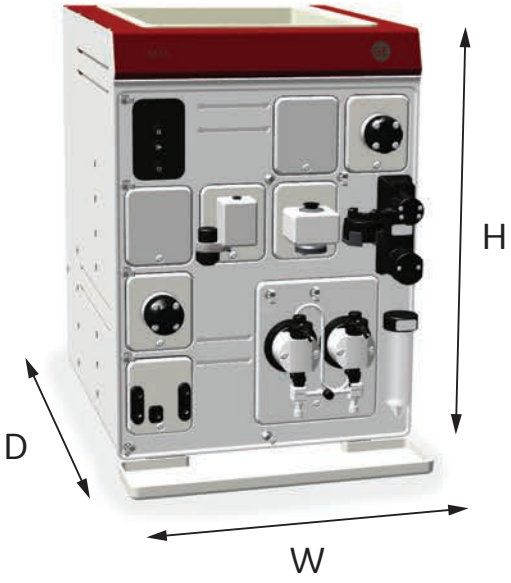
WARNING

Access to power plug. Do not block access to the power outlet and power plug. The power cord with plug must always be easy to disconnect.

Laboratory bench

The bench must be clean, flat and stable, and of sufficient size for the ÄKTA go system with accessories. The computer is located on the right side of the instrument to make room for accessories on the left side of the instrument.

Size and weight



Parameter	Value
W (width)	335 mm
H (height)	482 mm
D (depth)	464 mm
Weight	27 kg
Allowed weight of buffer bottles on the top tray	10 kg

4.1.3 Site environment

Introduction

This section describes the environmental requirements for installation of ÄKTA go.

Environmental requirements

The following general requirements must be fulfilled:

- The room must have exhaust ventilation.
- The instrument must not be exposed to direct sunlight.
- Dust in the atmosphere must be kept to a minimum.

The installation site must comply with the following specifications.

Parameter	Requirement
Allowed location	Indoor use only
Ambient temperature, operating	4°C to 35°C
Ambient temperature, storage	-25°C to 60°C for 48 h
Relative humidity	20% to 95%, non-condensing
Altitude, operating	Up to 2000 m [1]
Pollution degree of the intended environment	Pollution degree 2

1 If the installation is situated at a higher altitude, the customer is responsible for establishing that the ÄKTA go instrument can be used safely in accordance with local regulations.

Instrument ventilation

There should be at least 10 cm clearance at the back of the instrument to allow adequate air circulation.

NOTICE

Do not block the air vents on the rear of the instrument.

Heat output

The heat output is listed in the table below.

Component	Heat output
ÄKTA go instrument	Typical 100 W Max 150 W Power save < 20 W

For heat output of the computer, refer to the manufacturer's specifications.

4.1.4 Power requirements

Introduction

This section describes the power supply requirements for ÄKTA go.

Electrical power requirements

WARNING

Protective ground. The product must always be connected to a grounded power outlet.

WARNING

Power cord. Only use power cords with approved plugs delivered or approved by GE Healthcare.

The following table specifies the power requirements for the ÄKTA go instrument. For power requirements for the computer, refer to the manufacturer's specifications.

Parameter	Requirement
Supply voltage	100 to 240 V~
Frequency	50/60 Hz
Transient overvoltages	Overvoltage category II
Max power consumption	300 VA

4.1.5 Computer requirements

Introduction

ÄKTA go instruments are controlled by UNICORN software running on an external computer. The computer is not included with the ÄKTA go instrument.

A suitable computer may be ordered from GE Healthcare or obtained from a third party supplier.

NOTICE

Any computer used with the equipment must comply with IEC 60950 and be installed and used according to the manufacturer's instructions.

NOTICE

When installing a computer, make sure that it is installed with appropriate protection for the intended environment that might expose the computer to liquids and moisture.

General computer specifications

For information on computer specifications, see http://www.gelifesciences.com/UNICORNPCspecifications.

For information about compatibility between UNICORN versions, the supported operating systems, database versions, and instrument configuration, see the UNICORN compatibility matrix at http://www.gelifesciences.com/UNICORNcompatibility.

Network connection requirements

If the computer is to be connected to a network by a network cable, two Ethernet ports are required on the computer, one for connection to the ÄKTA go instrument and one for connection to a network.

Network settings are described in UNICORN user documentation.

4.1.6 Required materials

Introduction

This section describes the materials required for the installation and operation of the ÄKTA go instrument.

Solutions

The solutions listed in the following table are required during the installation procedure and should be provided at the installation site.

Buffer/solution	Required volume	Scope of use
Distilled water	1 L	System test, Pump test, and Mixer test If applicable, Fraction Collector F9-R test, and/or Column Valve V9-C test
1.0% acetone and 1.0 M NaCl in distilled water	1 L	System test and Mixer test
20% ethanol in distilled water	150 mL	Priming of the pump rinsing system

4.2 Hardware installation

Introduction

This section describes the installation procedures for ÄKTA go.

In this section

This section contains the following subsections:

4.2.1 Connect the system

Introduction

The following connections must be made:

- Power supply to the ÄKTA go instrument and the computer
- Network connection between the computer and the ÄKTA go instrument

WARNING

Access to power plug. Do not block access to the power outlet and power plug. The power cord with plug must always be easy to disconnect.

WARNING

Protective ground. The product must always be connected to a grounded power outlet.

WARNING

Power cord. Only use power cords with approved plugs delivered or approved by GE Healthcare.

WARNING

Supply voltage. Before connecting the power cord, make sure that the supply voltage at the wall outlet corresponds to the marking on the instrument.

Connector illustration

The illustration below shows where the connectors are located on the ÄKTA go instrument. For connectors on the computer equipment, refer to the manufacturer´s documentation.

Connect to power

Follow the steps below to connect power to the ÄKTA go instrument and the computer.

Step	Action
1	Select the correct power cord to be used. Each instrument is delivered with 2 alternative power cords: • Power cord with US-plug, 2 m • Power cord with EU-plug, 2 m Recycle the power cord that is not to be used.
2	Connect the power cord to the **Power** input connector on the back of the instrument and to a grounded power outlet 100-240 V~, 50/60 Hz.
3	Connect the computer to a power source using the manufacturer's instructions.

Connect ÄKTA go to the computer

Follow the steps below to connect the ÄKTA go to the computer.

Step	Action
1	Connect a network cable to the back of the instrument. The appropriate port at the back of the instrument is indicated by this symbol:  **Computer**
2	Connect the other end of the network cable to the appropriate connector on the computer.
3	Make sure that the IP address of the instrument is on the same subnet as the IP address of the port used in the computer. ***Note:*** *The IP address of the instrument is displayed on the instrument control panel when the instrument is powered on but not connected to UNICORN.*
4	If the computer is to be connected to a network, connect a network cable between the computer and a network wall outlet.

4.2.2 Install waste tubing

Introduction

The table below lists the waste tubing of the instrument and where it is located. Make sure that the waste tubing is connected to the correct positions on the modules.

Module	Tubing connections	Location of tubing
Injection valve	Waste ports **W1** and **W2**	Front of the ÄKTA go instrument.
Outlet valve	Waste port **W**	Front of the ÄKTA go instrument.

Prepare waste tubing

Follow the instructions below to prepare the waste tubing.

CAUTION

Fasten the waste tubing. Make sure that tubing is securely fastened to the waste ports **W**, **W1**, and **W2**.

CAUTION

Make sure that the waste vessel will hold all the produced volume of the run. For ÄKTA go, a suitable waste vessel should typically have a volume of 2 to 10 liters.

CAUTION

Cut injuries. The tubing cutter is very sharp and must be handled with care to avoid injuries.

NOTICE

The highest level of liquid in the waste vessel must be lower than the Waste port **W** on the Outlet valve of the ÄKTA go instrument.

Step	Action
1	Insert the waste tubing from all installed modules in a suitable vessel.
2	Cut the waste tubing to appropriate length. It is important that the tubing is not bent.

Note:

If the tubing is too short, replace it with new tubing. Do not lengthen the tubing as this might cause obstruction of the tubing.

3	Fasten all waste tubing to the waste vessel.

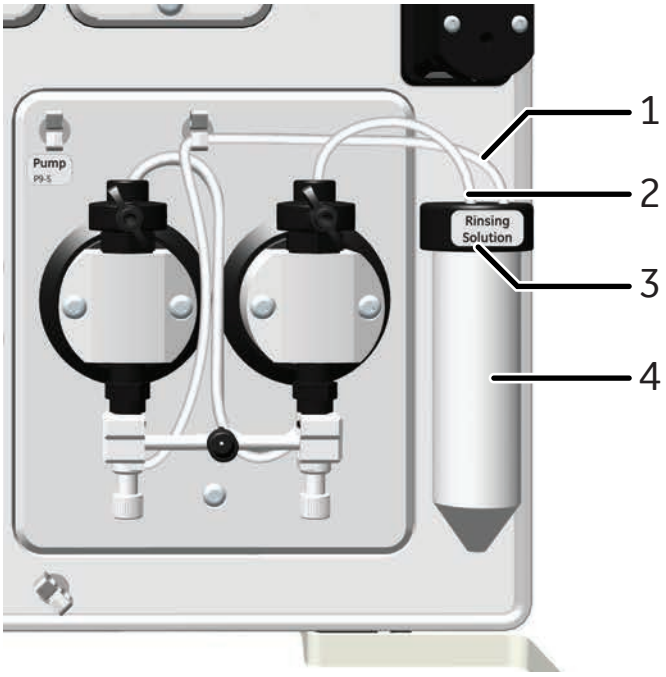
4.2.3 Prepare the pump rinsing system

Introduction

The pump rinsing system protects the pump seals from damage caused by precipitated buffer remaining in the system. The seal prevents leakage between the pump chamber and the drive mechanism of the pump.

Illustration of the pump rinsing system

The illustration below shows the parts and tubing of the pump rinsing system.



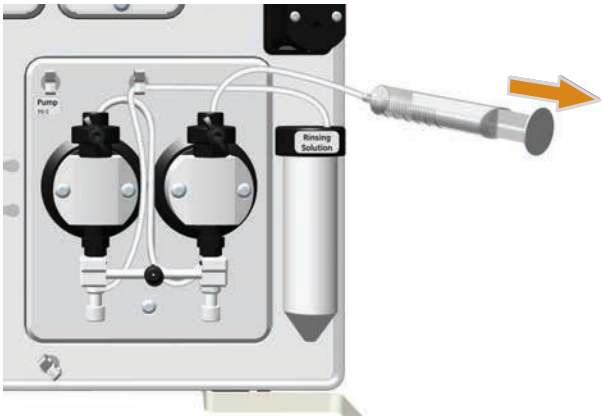
Part	Description
1	Inlet tubing
2	Outlet tubing
3	Rinsing solution tube holder
4	Rinsing solution tube

Prime the pump rinsing system

Follow the instructions below to fill the pump rinsing system with rinsing solution.

Step	Action
1	Unscrew and remove the rinsing solution tube from the holder.

2	Fill the rinsing solution tube with 50 mL of 20% ethanol or aqueous buffer.
3	Screw the rinsing solution tube back into the holder.
4	Insert the inlet tubing into the solution in the rinsing solution tube. ***Note:*** *Make sure that the inlet tubing reaches close to the bottom of the rinsing liquid tube.*
5	Connect a 25 to 30 mL syringe to the outlet tubing. Draw liquid slowly into the syringe until the rinsing system tubing is filled.



Step	Action
6	Disconnect the syringe and discard its contents.
7	Insert the outlet tubing into the liquid in the rinsing solution tube.
8	Unscrew the rinsing solution tube and fill it with 50 mL of 20% ethanol or aqueous buffer.

4.2.4 Start the instrument

Follow the steps below to start the instrument.

Step	Action
1	Turn on the instrument by pressing the On/Off button for 2 seconds. 
2	The instrument control panel displays a white light for approximately 2 seconds. 
3	The instrument is on, but is not connected to the UNICORN instrument server.  *Result:* The displays toggles between ***Offline***, the instrument IP address, and the instrument serial number.

4.3 Software installation

Introduction

This section gives an overview of how to install UNICORN and adapt the software to your instrument. For more information, see the *UNICORN Quick Installation Guide*.

The software should be installed by someone assigned to be a UNICORN system administrator at the site. Detailed information about software installation and configuration is available in the *UNICORN Administration and Technical Manual*.

In this section

This section contains the following subsections:

4.3.1 Download and Install UNICORN

UNICORN is delivered via e-Delivery. A path to e-Delivery and Activation ID are delivered upon ordering the ÄKTA go system.

Follow the steps below to install the UNICORN software. For more information on installing UNICORN, Windows settings, and configuring the e-license, refer to the *UNICORN Quick Installation Guide*.

Step	Action
1	Download UNICORN from the e-Delivery portal.
2	Start the installation wizard.
3	On the welcome dialog box, click ***Next***.
4	Select installation type, ***Full installation*** or ***Custom installation***, and click ***Next***. ***Note:*** *Any missing prerequisites will be installed. The computer might need to be restarted several times during the installation.*
5	Download a e-license from the e-Delivery portal and configure the e-license for the UNICORN installation.
6	Adapt UNICORN to your system, see *Section 4.3.3 Adapt UNICORN to your system, on page 55*. ***Note:*** *The computer and the instrument must have IP addresses on the same subnet*.

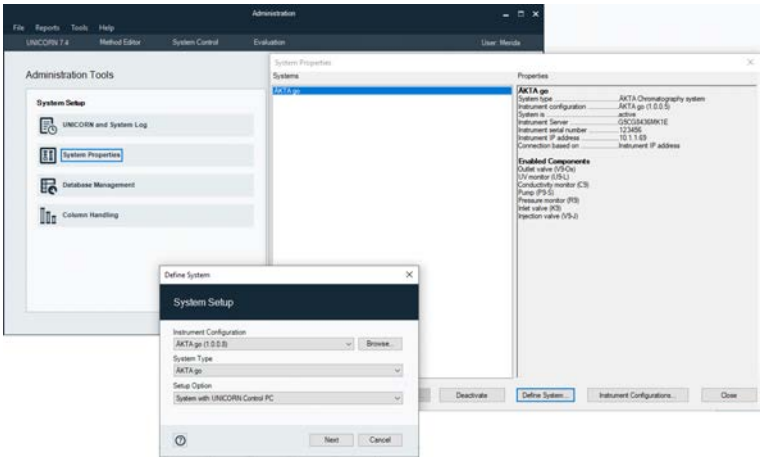
4.3.2 Download the Instrument Configuration

An instrument configuration is used to adapt UNICORN to your instrument. Follow the instructions below to import the Instrument Configuration into the UNICORN software.

Step	Action
1	Go to www.gelifesciences.com/aktago.
2	Click ***RELATED DOCUMENTS***.
3	Click ***SOFTWARE***.
4	Download the ***Instrument configuration software***.
5	Unzip the downloaded file to a folder on the local computer.
6	Use the downloaded instrument configuration to define your system, see *Section 4.3.3 Adapt UNICORN to your system, on page 55*.

4.3.3 Adapt UNICORN to your system

To be able to connect to the system, UNICORN must be adapted to the instrument with the correct instrument configuration installed and the correct modules selected in the software. This is done using the following steps.

Step	Action
1	Download the latest instrument configuration for ÄKTA go from www.gelifesciences.com/aktago, see *Section 4.3.2 Download the Instrument Configuration, on page 54*. ***Note:*** *An instrument configuration is used to adapt UNICORN to your instrument.*
2	In the ***Administration*** module, click ***System Properties:Define System.*** 
3	Choose the instrument configuration that was downloaded, ***System Type***, and ***Setup Option***. Click ***Next***.
4	Choose a system name and enter the serial number of the instrument. ***Note:*** *The serial number is found on the back of the instrument and on the instrument control panel when the instrument is offline.*
5	Click ***Finish***.
6	In the ***Administration*** module, click ***System Properties: Edit System***. Step through the different component types and choose the valves and the sensors that are present on the instrument. Also tick the appropriate box if you have a fraction collector or an I/O-box.
7	Click ***OK***.

Note: *A detailed description of how to adapt UNICORN to your system, including system setup, is found in the UNICORN Administration and Technical Manual.*

4.4 Start UNICORN and connect to system

Introduction

This section describes how to start and log on to UNICORN, and how to connect to the system in UNICORN.

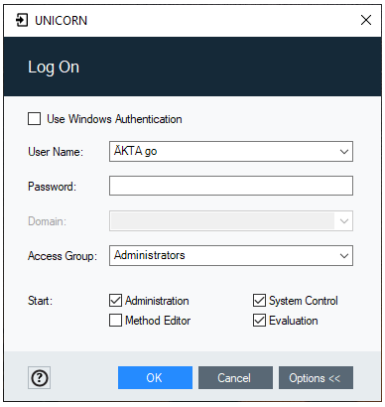
Prerequisites

For UNICORN to be correctly installed, the following conditions must be set:

- the IP address of the computer must be set to the same subnet as that of the instrument
- the e-license needs to be downloaded and configured for the computer
- the system has to be defined with the correct modules in UNICORN

Start UNICORN and log on

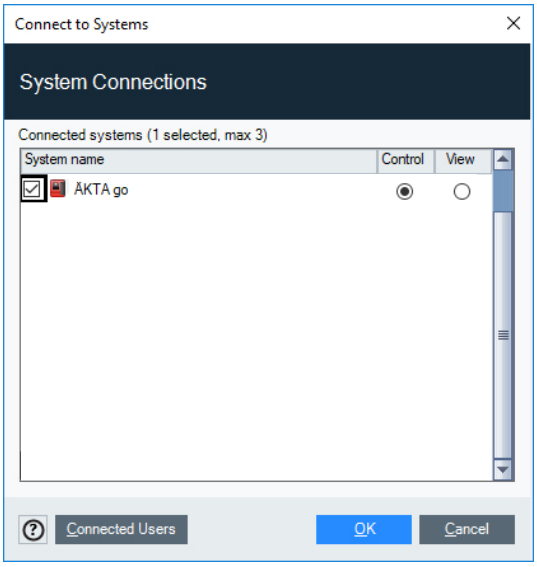
Follow the instructions to start UNICORN and log on to the program.

Step	Action
1	Double-click the UNICORN icon on the desktop.
2	In the ***Log On*** dialog box, select ***User Name*** and enter ***Password***. 
3	Tick the boxes for the UNICORN modules that you want to start.
4	Click ***OK***.

Connect to system

Follow the instructions to connect to the system in UNICORN.

Note: *The system must have been defined by the UNICORN system administrator for it to be present in the database.*

Step	Action
1	In the ***System Control*** module, click the ***Connect to Systems*** button. 
2	In the ***Connect to Systems*** dialog box: • Select a system checkbox. • Click ***Control*** for that system. • Click ***OK***. 

Tip:

If UNICORN is unable to connect to the selected instrument, try restarting the computer. See Chapter 8 Troubleshooting, on page 99 for more information.

Set up *Power-save*

To minimize power consumption when the system is not used, there is a ***Power-save*** function in UNICORN. Follow the steps below to activate the ***Power-save*** function.

Step	Action
1	In ***System Control*** click ***System:Settings:Advanced***.
2	Turn on the ***Power-save*** function.
3	Enter a ***Time*** for the ***Power-save***
4	Click ***OK***.

5 Prepare the system for a run

About this chapter

This chapter gives instructions on how to prepare the ÄKTA go system for a run and what to do before the first run.

Safety precautions

WARNING

Explosion hazard. To avoid building up an explosive atmosphere when using flammable liquids, make sure that the room ventilation meets the local requirements.

CAUTION

Fire hazard. Before the system is turned on, make sure that there is no unintentional leakage of flammable liquids in ÄKTA go.

In this chapter

This chapter contains the following sections:

5.1 Prepare the flow paths

Introduction

The ÄKTA go instrument, as delivered, is prepared with a default flow path. The modules in this flow path must be defined in the software, see *Section 4.3.3 Adapt UNICORN to your system, on page 55*. It is possible to remove modules from the flow path and to add some additional valves and monitors. If the modules in the flow path on the instrument are changed, the ***System properties*** in the software must be updated.

CAUTION

Fasten bottles. If bottles are being fastened to the rails at the front or side panels, the appropriate holders must be used. Shattered glass from falling bottles might cause injury. Spilled liquid may cause fire hazard and personal injury.

CAUTION

Max. weight on top tray. Do not place containers with a volume of more than 2 liters each on the top tray. The total allowed weight on the top tray is 10 kg.

CAUTION

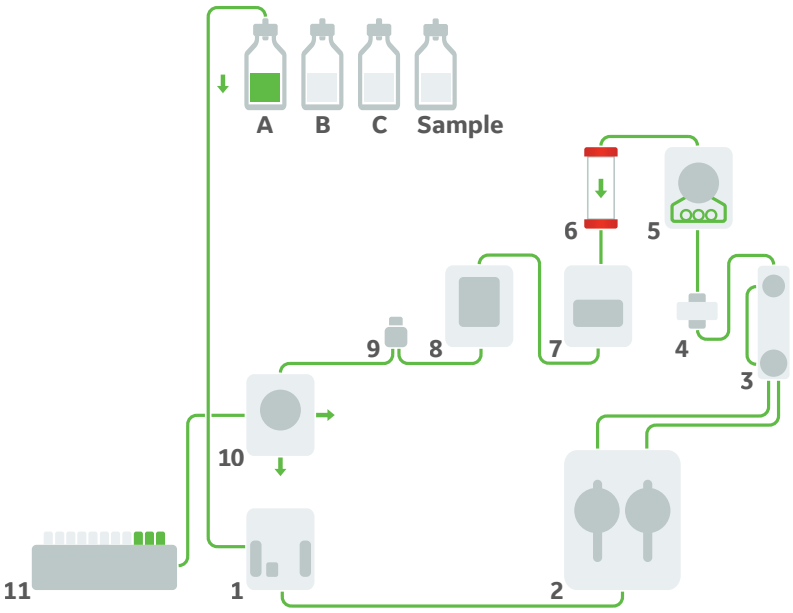
Avoid spillage and overflow during collection. Make sure that outlet tubing is connected to the outlet, **Out1** or **Frac**, that there is a vessel to collect from **Out1**, and that a fraction collector is connected and loaded with correct tubes.

CAUTION

Avoid spillage and overflow from waste. Make sure that the waste tubing is inserted in an appropriate waste container and secured in place.

Illustration of the flow path

The illustration below shows the flow path for a standard configured ÄKTA go instrument with an optional fraction collector connected. The individual instrument modules are presented in the table below. The system configuration is defined by the user in the UNICORN ***Administration*** module.



Part	Description	Part	Description
1	Inlet valve **K9**	7	UV monitor **U9-L**
2	Pump **P9-S**	8	Conductivity monitor **C9**
3	Pressure monitor **R9**	9	Flow restrictor **FR-902**
4	Mixer	10	Outlet valve **V9-Os**
5	Injection valve **V9-J**	11	Fraction collector **F9-R**
6	Column		

Prepare the waste tubing

CAUTION

Fasten the waste tubing. Make sure that tubing is securely fastened to the waste ports **W**, **W1**, and **W2**.

Make sure that the waste tubing is prepared according to the instructions in *Section 4.2.2 Install waste tubing, on page 46*.

Prepare the outlet tubing

Connect tubing to the outlet ports of the outlet valve that are to be used during the run, **Out1** and/or **Frac**.

If no fraction collector is used, immerse the outlet tubing from **Out1** in a suitable flask.

If a fraction collector is used, make sure that 400 mm tubing is connected between the fraction collector and the **Frac** port on the outlet valve, and prepare the fraction collector for a run. For more information, see the *Fraction collector F9-C and F9-R Operating instructions*.

Plug unused valve ports

It is recommended to plug all unused valve ports with stop plugs before starting a run. See *ÄKTA go User Manual* for information about connectors.

CAUTION

Make sure there is a sample loop or a stop plug in place in the loop positions in the injection valve to avoid liquid spurting out during valve turns.

5.2 Prime inlets and purge pump heads

Introduction

Before using the pump, it is important to prime all of the inlets and purge the pump heads, that is, to fill the inlets and pump heads with liquid so that no air remains inside.

Overview

The procedure consists of the following stages:

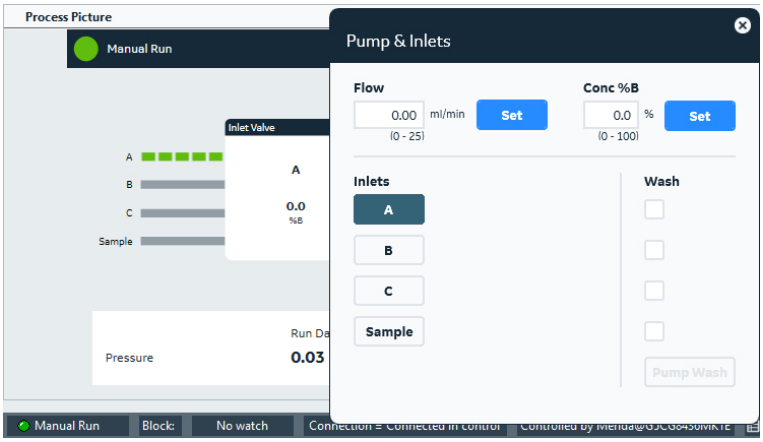
1 Prime the inlet tubing

2 Purge the pump and confirm that it is free from air

Prime the inlet tubing

Follow the steps below to prime all inlet tubing that is to be used during the run.

Step	Action
1	Make sure that all inlet tubing that is to be used during the run is placed in the correct buffer.
2	Open the ***System Control*** module.
3	In the ***Process Picture*** pane, click on ***Inlet Valve*** and select one of the inlets to be primed.



Result: The inlet valve opens the selected inlet.

Step	Action
4	Connect a 25 to 30 mL syringe to the purge valve of one of the pump heads.

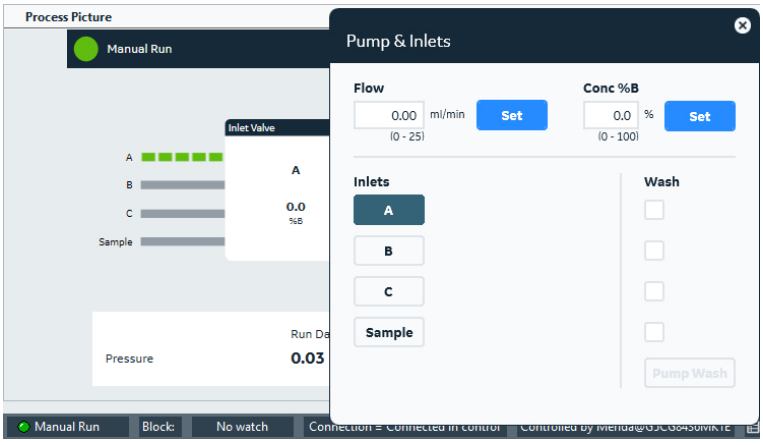
5	Open the purge valve by turning it counter-clockwise one and a half turns. Draw liquid slowly into the syringe until liquid reaches the pump and the inlet tubing is filled with liquid.
6	Close the purge valve by turning it clockwise. Disconnect the syringe and discard its contents.
7	Repeat steps 3 to 6 for each inlet that is to be used during the run.

Purge the pump and confirm it is free from air

Follow the steps below to purge the two pump heads of the pump so that they are free from air.

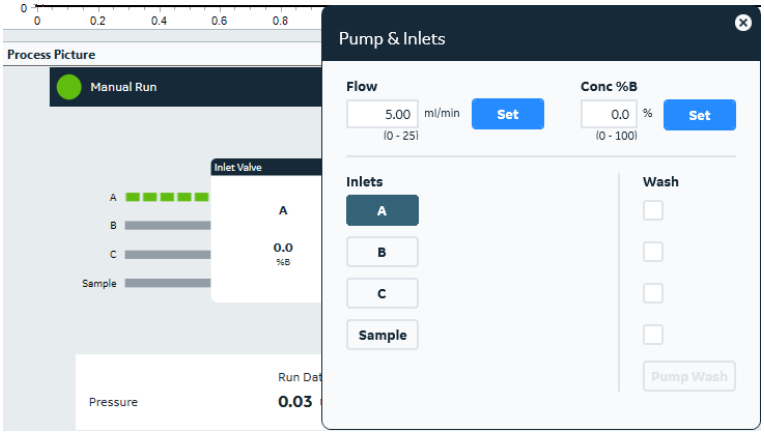
Step	Action
1	In the ***Process Picture*** pane, click ***Injection valve*** and select ***Waste***. *Result:* The injection valve switches to waste position and opens inlet **A**.

2	In the ***Process Picture*** pane, click ***Inlet Valve*** and select the inlet that will be used at the beginning of the run.



Result: The inlet valve opens the selected inlet.

Step	Action
3	Under ***Flow***, enter 5 mL/min and click ***Set***.

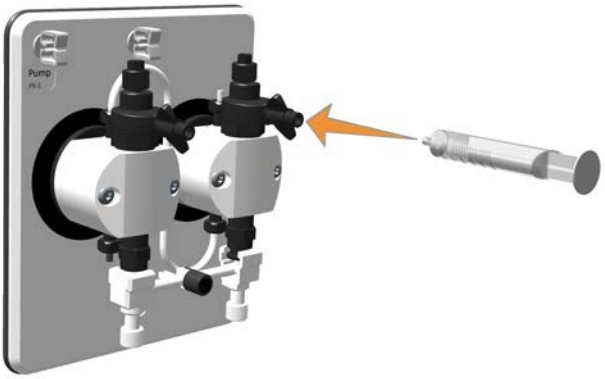


Result: A system flow starts.

4	Connect a 25 to 30 mL syringe to the purge valve of the left pump head.

5	Open the purge valve by turning it counter-clockwise about one and a half turns. Draw liquid slowly into the syringe, at a rate of approximately 1 mL per second, until there are no air bubbles in the liquid that reaches the syringe.
6	Close the purge valve by turning it clockwise. Disconnect the syringe and discard its contents.

Step	Action
7	Keep the system flow running. Connect the syringe to the purge valve of the right pump head, and repeat steps 5 and 6.

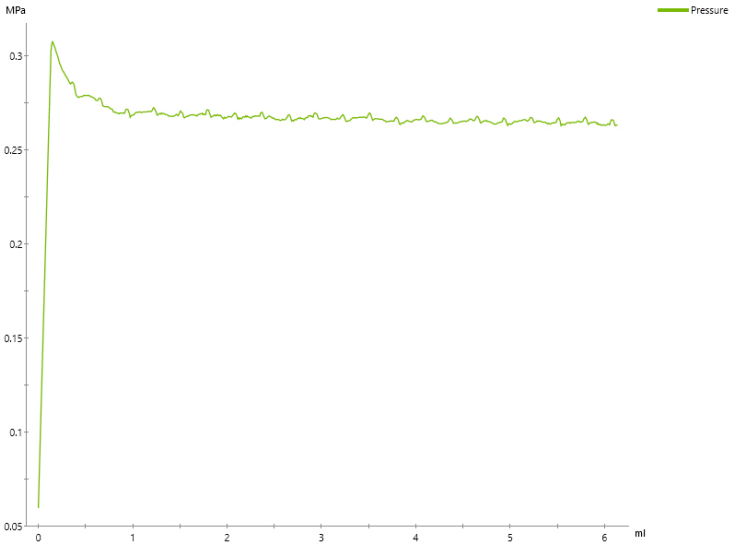


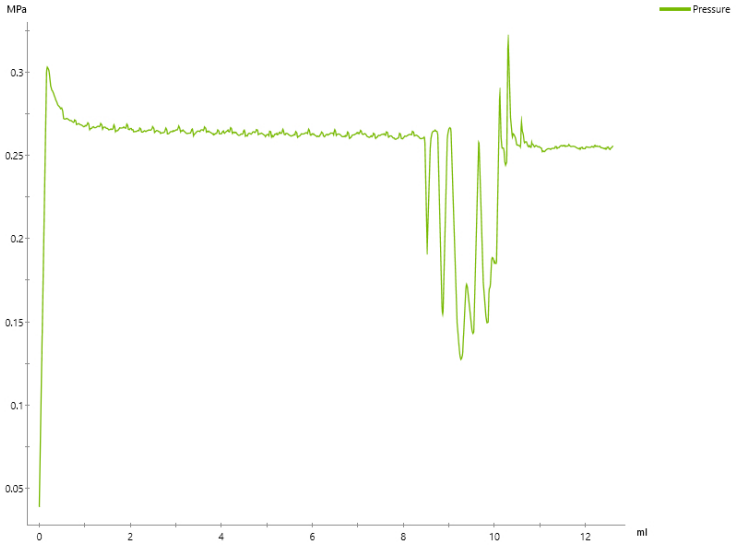
8	In the ***Chromatogram*** pane, check the pressure curve. If the pressure does not stabilize within a few minutes, there could be air left in the pump.

Note:

The pressure signal is considered stable if the fluctuation is no more than 5% up or down. See examples below.

Stable pressure (no air in the Pump)



Step	Action
	Unstable pressure (air in the Pump) 
9	If the pressure does not stabilize within a few minutes, repeat the procedures to prime the inlet tubing and purge the pump. If the pressure still does not stabilize, see the *ÄKTA go User Manual* for further instructions.

5.3 Performance tests

Introduction

This section describes how to run performance tests. Performance tests should be run before taking ÄKTA go into use, to check the functionality of the equipment. After installation of a standard equipped ÄKTA go instrument, the ***System test*** and ***Mixer test*** must be run. Performance tests must also be run for all modules that have a corresponding test in the software. For example, if you have the Fraction collector **F9-R**, the ***Fraction collector F9-R*** test must be run, and if you have the Column Valve **V9-C**, the ***Column valve V9-C*** test should be performed. The ***Pump test*** is a shorter test that can be run to test the pump. This is recommended if the pump has been replaced or undergone maintenance.

Details of the individual tests including purpose and required material are given in the method notes for each test method.

Note: *The performance tests are always run without a column.*

Procedure

Performance tests are provided with the instrument configuration in the UNICORN software.

Follow the general steps below to run a performance test. Detailed requirements and procedures are shown on the screen when starting the test.

Step	Action
1	In the ***System Control*** module, select ***System:Performance Test and Report***.

Step	Action
2	In the ***System Performance Test*** tab, in the list ***Available performance methods***, select the test you want to run. Method notes for the selected test are shown in the right side panel.

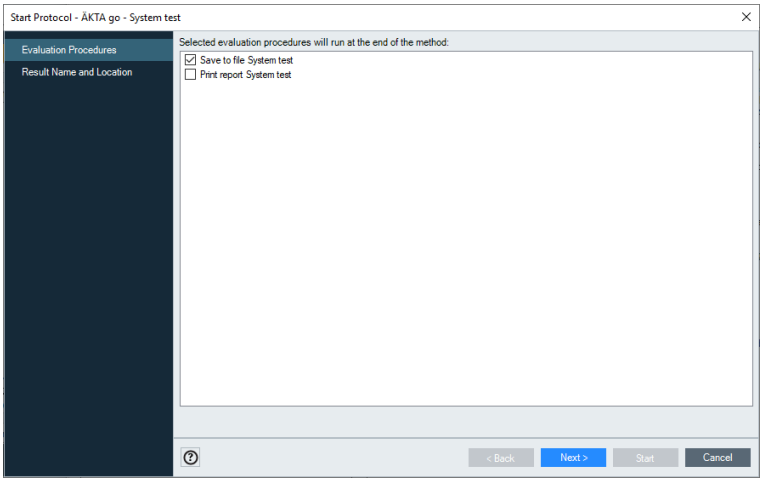
Note:

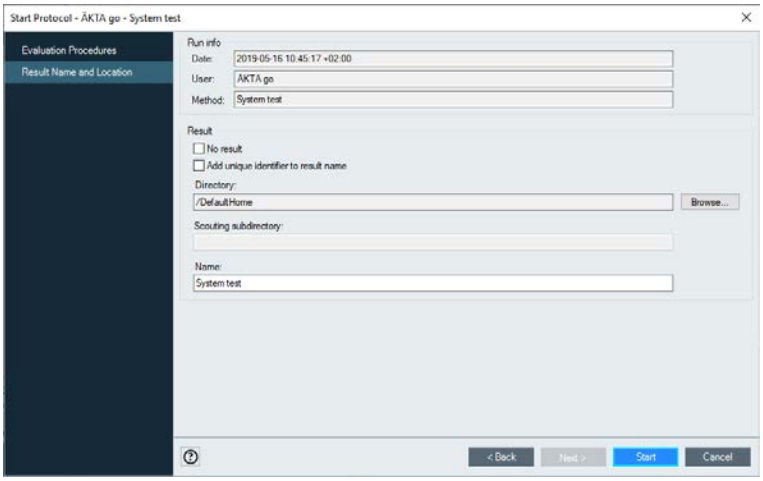
This dialog lists all tests that are available for the modules that can be installed in the ÄKTA go system. Attempting to run a test for a module that is not installed will generate an error message.

Note:

The dialog for selecting and running a performance test includes a tab with the heading ***System Performance Report****. This tab does not contain the reports for the performance tests.*

3	Read the information in the ***Method Notes*** panel carefully. Click ***Run Performance Test***.

Step	Action
4	Tick the checkboxes ***Save to file System test*** and ***Print report System test***. Click ***Next >*** to continue. ***Note:*** *A printer must be installed on the UNICORN Instrument Server to be able to print the report (see the UNICORN Administration and Technical Manual for details).* 

Step	Action
5	Specify the details of the result file from the performance test. Click ***Start*** to start the performance test. ***Note:*** *The result file is separate from the test report. The report will be generated even if* ***No result*** *is selected.* 
6	Follow any instructions that are shown on the screen.
7	Check whether the test was passed or failed in the ***System Performance Report***, which is located at C:\Program Files (x86)\GE Healthcare\UNICORN\UNICORN x.x\Temp, where x.x is the UNICORN version number. The test result is stated at the top of the report. If the test was failed refer to *ÄKTA go User Manual* for possible causes.

Note: *The progress of the performance test is shown in the* ***Chromatogram*** *pane in the* ***System Control*** *module.*

5.4 Connect a column

Introduction

This section describes how to connect a column to the instrument, without introducing air into the flow path. Use a column holder to secure the column. Several types of column holders are available for ÄKTA go.

WARNING

To avoid exposing the column to excessive pressure, make sure that the pressure limit is set to the specified maximum pressure of the column. Before connecting a column to the ÄKTA go instrument, read the instructions for use of the column.

CAUTION

Cut injuries. The tubing cutter is very sharp and must be handled with care to avoid injuries.

Methods automatically include a pressure alarm based on the specifications of the chosen column. When performing a manual run, you must set the pressure limits yourself. See *Section 5.5 Pressure alarms, on page 77* for more information on pressure alarms.

Attach a column holder and connect a column

Follow the instructions below to connect a column to the instrument.

Note: *If the column is filled with 20% ethanol, do not use a salt-containing liquid when connecting it to the flow path because salt might precipitate in 20% ethanol.*

Step	Action
1	Attach an appropriate column holder to the rail on the instrument.
2	Attach the column to the column holder.
3	Cut a tubing of appropriate length to connect it between the injection valve and the top of the column. Connect this tubing to the column port **Col** of the injection valve. ***Note:*** *Use red fingertights for columns with a red top and black for other columns.*
4	In the ***Process Picture*** pane, select ***Pump***, enter a low System flow (e.g., 0.2 mL/min), and click ***Set***. *Result:* A system flow of 0.2 mL/min starts. ***Note:*** *If your system is equipped with a column valve, make sure to start a flow in the correct position in the column valve, and connect the column to those positions.*
5	In the ***Process Picture*** pane, select ***Select limits*** in the ***Pressure*** pane. Choose an appropriate column or manually enter a pressure limit suitable for your column. Click ***Set***. *Result: A pressure limit suitable for your column is set.*
6	Remove the stop plug from the top of the column.

Step	Action
7	When buffer is dripping from tubing prepared in step 3, fill the top part of the column with buffer by letting it drip from the tube. When it is filled, connect the tubing drop-to-drop to the top of the column.

Note:

Make sure that the connectors are properly tightened, but do not overtighten when connecting columns. Overtightening might rupture the connectors or squeeze the tubing and thereby result in high back pressure.

8	Cut a piece of tubing with appropriate length to connect the bottom of the column to the UV monitor. Remove the stop plug from the bottom of the column and connect this tubing in its place.
9	When buffer is dripping from the tubing connected to the bottom of the column, connect this piece of tubing to the UV monitor.

5.5 Pressure alarms

Introduction

The ÄKTA go instrument is equipped with a pressure monitor directly after the pump, which measures the highest pressure in the instrument. The advanced column valve, **V9-C**, adds two extra pressure sensors, one directly before the column and one directly after the column. These pressure monitors enable the measurement of pre-column pressure, which is the pressure on the column hardware, and delta-column pressure, which is the pressure on the packed bed.

Methods automatically include a pressure alarm based on the specifications of the chosen column. When performing a manual run, you must set the pressure limits yourself.

Note: *There is a default pressure limit of 2 MPa, but this limit does not protect all columns.*

Set a pressure alarm in a method

In a method, the pressure alarm is set in ***Method Settings***. See *Section 6.1 Create a method, on page 80*.

Set a pressure alarm in a manual run

In a manual run, the pressure alarm is set using the ***Process Picture*** pane or using the ***Manual Instructions*** box. In the ***Process Picture***, click ***Set limits*** in the ***Pressure*** pane and enter a suitable pressure limit, or choose a column to get a suitable pressure limit. Click ***Set***.

5.6 Prepare for a run at low temperature

Introduction

The viscosity of the liquids increase as the temperature decreases. Therefore, when using the instrument in a cold room or cold cabinet, decrease the flow rate and follow the precautions listed below.

Precautions concerning runs at cold room temperature

NOTICE

Avoid condensation. If ÄKTA go is kept in a cold room, cold cabinet or similar, keep it switched on in order to avoid condensation.

NOTICE

Avoid overheating. If ÄKTA go is kept in a cold cabinet and the cold cabinet is switched off, make sure to switch off ÄKTA go or keep the cold cabinet open to avoid overheating.

NOTICE

Place the computer in room temperature. If the ÄKTA go instrument is placed in a cold room, use a cold room compatible computer or place the computer outside the cold room and use the Ethernet cable delivered with the instrument to connect to the computer.

Note: *When the instrument is kept in a cold room, it is important to retighten all tubing connectors and inlet connectors, because the plastics will shrink at a low temperature. Otherwise air might get into the flow path.*

Note: *Make sure that the instrument, buffers and sample have had time to reach the ambient temperature. When the instrument has reached the ambient temperature, calibrate all pressure sensors.*

6 Run a method

About this chapter

This chapter gives instructions on how to run your method.

In this chapter

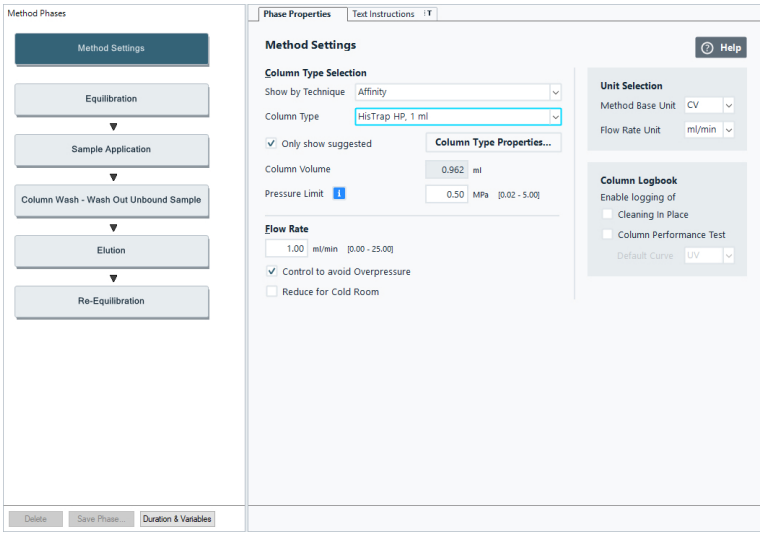
6.1 Create a method

Create a new method using the *Method Editor*

Follow the steps below to create a method using a predefined method template. The example given uses an Affinity Chromatography method from UNICORN 7.4. The ***Method Settings*** phase sets up parameters that are used throughout the method, such as unit for method base and flow rate.

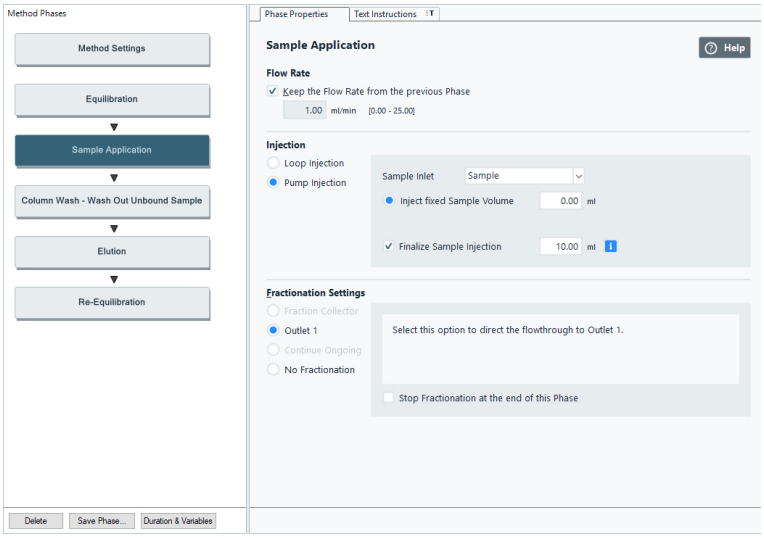
There are more ways to create methods in UNICORN. Refer to the *UNICORN Method Manual* for more information.

Step	Action
1	Open the ***Method Editor*** module, click the ***New Method*** button and choose the system and a suitable predefined method.
2	Open the ***Phase Properties*** tab and confirm that all of the selections made in the phases correspond to your intended method by following the steps below.
3	In the ***Method Settings*** phase, select column type to get suitable values, or enter correct values at ***Column volume*** (column volume), ***Pressure limit*** (pressure limit) and ***Flow rate*** (flow rate).



4	In the ***Equilibration*** phase, set a suitable volume and concentration of buffer B.

Step	Action
5	In the ***Sample Application*** phase, choose an appropriate sample application technique and volume. See *Section 6.2 Prepare sample for loading, on page 82* for suitable sample application techniques for your sample volume.



Tip:

If you are using a sample loop, empty the loop with 3 to 5 volumes of buffer. This will make sure that the loop is completely emptied.

Note:

For sample application using a Superloop, refer to the ÄKTA go User Manual.

6	In the ***Column wash*** phase, choose a suitable volume and concentration of buffer B, and whether a fraction collection is to be performed.
7	In the ***Elution*** phase, set how to elute the sample, the duration of the elution, the concentration of buffer B, and how the eluted sample will be collected.
8	In the ***Re-equilibration*** phase, choose a suitable volume and concentration of buffer B.
9	Click the save button, choose the system, name, and location for your method and click ***Save***.

Tip: *It is advisable to run a blank run, without sample, before running the method with sample. This makes sure that the column is clean and that the method and the system are set up properly.*

6.2 Prepare sample for loading

Introduction

This section describes how to prepare the sample for loading onto the column. This can be done using either a sample loop, a Superloop, or the pump. When using the pump to apply the sample, the sample inlet must first be primed.

Sample application technique	Suitable volume
Sample loop	25 µL to 10 mL
Superloop	1 mL to 150 mL
Pump	From 5 mL

Prepare sample for application using a sample loop

Follow the steps below to prepare for sample application using a sample loop.

Step	Action
1	Connect a suitable sample loop to the injection valve ports **LoopF** (fill) and **LoopE** (empty).
2	Fill a syringe with sample.
3	Connect the syringe to the injection valve port **Syr**.
4	In the ***Process Picture***, make sure that the injection valve is in position ***Load***. ***Note:*** ***Load*** *is the default position for the valve.*
5	Load sample into the sample loop. To avoid sample loss due to siphoning, leave the syringe in the port until the sample has been injected onto the column during the run. ***Tip:*** *When repeatability is important overload the loop with 3 to 5 volumes of sample to make sure that the loop is completely filled.* ***Note:*** *Make sure the waste bottle is located below the injection valve, to avoid waste going back into the sample loop.*

Prepare sample for application using the pump

Follow the steps below to prepare for sample application using the pump.

Step	Action
1	Make sure that the sample inlet tubing that is to be used during the run is placed in the sample container.
2	In the ***Process Picture*** pane, click on ***Inlet Valve*** and select ***Sample***. *Result: The inlet valve opens the* ***Sample*** inlet.
3	Connect a 25 to 30 mL syringe to the purge valve of one of the pump heads.

4	Open the purge valve by turning it counter-clockwise one and a half turns. Draw liquid slowly into the 25 to 30 mL syringe until the liquid reaches the inlet valve.
5	Close the purge valve by turning it clockwise. Disconnect the syringe and discard its contents.

6.3 Start a method run

Prerequisites

Make sure that the system is correctly prepared. Confirm the following:

- The sample inlet is primed or the sample loop is loaded.
- The column is properly connected.
- The pressure alarm has an appropriate limit set.
- That there is no air in the system.
- The buffer inlet tubing(s) is immersed in correct buffer vessels.
- All waste tubing is immersed in appropriate waste vessels that have sufficient empty volume.
- No tubing is twisted and the flow path is free from leakage.
- If a Fraction collector is being used, that the correct tubes are used and loaded.

Start a method run

Follow the steps below to start the method run.

Step	Action
1	Open the ***System Control*** module and click the button ***Open Method Navigator***. 
2	Select the method to run, and click the ***Run*** button. 
3	Step through the displayed pages in the ***Start Protocol***, add requested input and make appropriate changes if necessary. Click ***Next***.
4	Click ***Start*** on the last page of the ***Start Protocol***.

6.4 Monitor or interact with the run

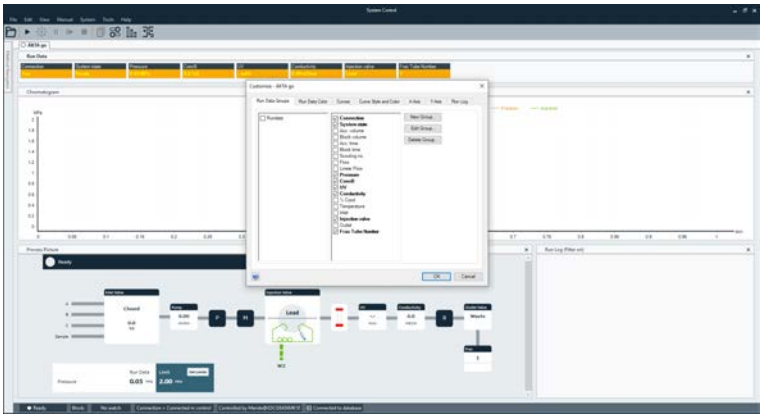
Monitor or interact with the run using the *System Control* module

You can follow your ongoing method run in the ***System Control*** module.

If you need to interrupt your run, use the ***Hold***, ***Pause***, or ***End*** buttons in the ***System Control*** toolbar. A held or paused method run can be resumed by clicking the ***Continue*** button in the ***System control*** toolbar, or the ***Pause*** and ***Continue*** button on the instrument control panel.

When the method is completed, the run stops automatically. The pump stops, the valves return to their default positions, and the result is saved.

Which panes are visible in the ***System Control*** module can be customized in ***View***. To further customize these panes, use the following steps.

Step	Action
1	Open the ***System Control*** module and click the ***Customize*** button. 
2	Select the desired options, from the ***Customize*** dialog. Click ***OK***. 

6.5 Evaluate the run

Introduction

After the run is completed, the results can be evaluated using the ***Evaluation*** module. To open the results, use the following steps. For more information on evaluating results, refer to the UNICORN user documentation.

Step	Action
1	In the ***Evaluation*** module, click ***Result***. Browse or search for your result file.
2	Check in the preview that you have the correct result file and click ***Open***.
3	To save an evaluation file, click ***File:Save***.

Illustration of an evaluated run

The image below shows an example of the features available in the ***Evaluation*** module in UNICORN 7.4.

Part	Function
1	To integrate or remove integration click the ***fx*** button next to the curve name. To adjust integration parameters go to the ***Peak*** tab.
2	Data from the integration is shown in a ***Peak*** table below the chromatogram. Customize the ***Peak*** data table by clicking the settings icon on the top right of the ***Peak*** table.

6.6 Procedures after the run

Introduction

After the run, the instrument and column should be cleaned to prevent bacterial growth, sample contamination in the next run, and column clogging.

This section describes how to clean the column using a ***Column CIP*** (Cleaning-In-Place) method, prepare the column and the instrument for storage, and how to shut down the system.

Create a CIP method

To create a ***Column CIP*** method, use the following procedure.

Step	Action
1	Open the ***Method Editor*** module and click the ***Create new*** method button.
2	Select ***Column CIP method***.
3	In the method settings, select the column being used.
4	In ***Column CIP*** phase, click ***get suggested steps***. ***Note:*** *The suggested steps are only available for some techniques and might not be optimized for your column. Read the instructions provided with the column to get the recommended CIP steps.*
5	Click the save button, choose the system, name, and location for your method and click ***Save***.

Run a column CIP

To clean the column using the ***Column CIP*** method, use the following procedure.

Step	Action
1	Open the ***System Control*** module and click the ***Open Method Navigator*** button.
2	Select the ***Column CIP*** method created above and click the ***Run*** button.
3	Make sure that the inlet tubings are in the correct solutions.
4	Click ***Start***.

Column storage

If the column is not going to be used for a couple of days or longer, it must be placed in a storage solution (20% ethanol) after a ***Column CIP*** run. Refer to the instructions for your column for specific storage instructions. To place the column in a storage solution, use the following procedure.

Note: *If the column is in a salt-containing buffer, equilibrate the column in water before putting it in 20% ethanol, otherwise salt might precipitate in the column.*

Step	Action
1	Place the inlet tubing in the storage solution (20% ethanol).
2	In the ***Process Picture***, click on ***Pump***.
3	Enter a flow rate of half the recommended flow rate of your column.
4	Click on ***Timer*** and select ***Volume***.
5	Under ***Volume***, enter 4 times the column volume. Click ***Start***.
6	When the run has finished, remove the column, plug the top and bottom of the column, and place in a refrigerator.

System storage

If the system is not going to be used for a couple of days or longer, clean the system using the ***System CIP*** method (see *Section 7.2 Perform system Cleaning-In-Place (CIP), on page 92*) and then put the system in storage solution. Start by removing the cleaned column from the system, see above. To put the system in storage, follow the steps below.

Step	Action
1	Clean the system using a ***System CIP*** method created for the system, see *Section 7.2 Perform system Cleaning-In-Place (CIP), on page 92*.
2	Place all inlet tubing in storage solution (20% ethanol).
3	In the ***Process Picture***, click on ***Pump***.
4	Tick the ***Wash*** box for all inlet tubing in storage solution and click ***Pump Wash***.
5	If the system is equipped with a fraction collector, start a fractionation.
6	Enter a flow rate of 10 mL/min.
7	Click on ***Timer***, select ***Volume***, and enter 25 mL.

Note: *If you have a column valve, make sure all positions are put in storage solution.*

Shut down the system

Follow the steps below to shut down the system.

Step	Action
1	Select ***Exit UNICORN*** from the ***File*** menu in any module in the UNICORN software.
2	Press the **On/Off** button on the instrument control panel. The circular illumination flashes with white color while the instrument is shutting down.

WARNING

Power is still supplied to some internal electronics circuits when the instrument is switched off using the **On/Off** button. Disconnect the instrument from the power supply before maintenance or service.

7 Maintenance

About this chapter

This chapter provides information on how to perform basic maintenance procedures that are to be carried out often.

For a complete list of maintenance procedures, see the *ÄKTA go User Manual*.

WARNING

All maintenance procedures inside the instrument chassis must be performed by a GE Healthcare service representative.

In this chapter

7.1 Clean the instrument externally

CAUTION

Disconnect the power cord form the power outlet before cleaning the instrument.

Maintenance interval

Clean the instrument externally when required. Do not allow spilled liquid to dry on the instrument.

Required material

The following materials are required:

- Cloth
- Mild cleaning agent or 20% ethanol

Instruction

Follow the steps below to clean the instrument externally.

Step	Action
1	Turn off the instrument and disconnect the power cord from the wall socket.
2	Wipe the surface with a damp cloth. Wipe off stains using a mild cleaning agent or 20% ethanol. Wipe off any excess.
3	Remove the top and bottom tray for cleaning. Put them back once they are cleaned.
4	Let the instrument dry completely before using it.

7.2 Perform system Cleaning-In-Place (CIP)

Maintenance interval

Perform a system CIP using when required, for example between runs where different samples are used. This is important to prevent cross-contamination and bacterial growth in the instrument.

Required material

The following materials are required:

- Appropriate cleaning solutions (1 M NaOH, buffer solution, and distilled water).
- Syringe, 25 to 30 mL

Introduction

The ***System CIP*** method is used to clean the flow path.

WARNING

Hazardous biological agents during run. When using hazardous biological agents, run ***System CIP*** to flush the entire system tubing with bacteriostatic solution (1 M NaOH) followed by a neutral buffer before service, maintenance, and decommissioning.

CAUTION

Hazardous substances. When using hazardous chemical and biological agents, take all suitable protective measures, such as wearing protective glasses and gloves resistant to the substances used. Follow local and/or national regulations for safe operation, maintenance and decommissioning of the equipment.

CAUTION

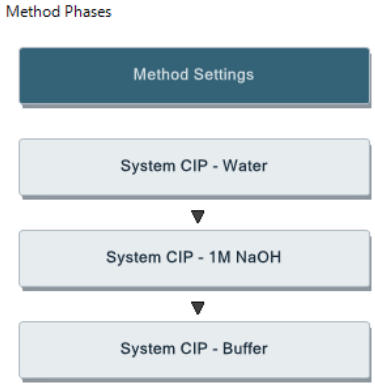
Explosion hazard if flammable liquid leaks during cleaning of the flow path. When cleaning the flow path of ÄKTA go with a flammable liquid like ethanol, carefully inspect the flow path, including the waste tubing, to make sure there will be no leakage.

Tip: *If hazardous chemicals are used for system or column cleaning, wash the system or columns with a neutral solution in the last phase or step.*

Create a System CIP method

The default ***System CIP*** method comprise three phases that cleans the system with water, 1M NaOH, and buffer from inlets **Sample**, **C**, and **A** respectively. The inlets used can be changed in each phase. Follow the steps below to create a ***System CIP*** method.

Step	Action
1	In the ***Method Editor*** module, click the ***Create New Method*** button. 
2	In the ***New Method*** dialog, select ***System:System CIP*** in the ***Predefined Method*** drop-down list. Click ***OK***. *Result:* A ***System CIP*** method is opened, comprising the ***Method Settings*** phase and three ***System CIP*** phases. Each ***System CIP*** phase uses one cleaning solution.
3	If desired, add additional ***System CIP*** phases to the method by dragging and dropping them from the ***Phase Library***.



Step	Action
4	Click the ***Save*** button.
5	In the ***Save As*** dialog, select a target folder, enter the ***Name*** for the method, select a ***System*** from the list, and click ***Save***.

Perform a System CIP

Follow the steps below to run a ***System CIP*** method.

Step	Action
1	Remove the column tubing and connect tubing between the **Col** port on the injection valve and the UV monitor. ***Note:*** *If you have a column valve, connect bypass tubing to all column positions.*
2	Prepare cleaning solutions and immerse the selected inlet tubing in the solutions. ***Note:*** *The default solutions to use are buffer for inlet **A**, 1M NaOH for inlet **C**, and water for the **Sample** inlet.*
3	In the ***System Control*** module, select the ***System CIP*** method created above, and start the run.
4	For complete cleaning of the flow path, clean the manual injection port of the injection valve manually, see the instructions below.

Clean the syringe port of the injection valve

Follow the steps below to manually clean the syringe port and the sample loop.

Step	Action
1	In the ***Process Picture*** make sure the the injection valve is in position ***Load***. ***Note:*** ***Load*** *is the default position for the valve.*

Step	Action
2	Connect a suitable sample loop to the injection valve ports **LoopF** (fill) and **LoopE** (empty). ***Note:*** *Do not use a Superloop when cleaning the Injection valve.*
3	Make sure there is waste tubing to the injection valve port **W2** and **W1** and that they are secured in a waste container.
4	Fill a syringe with approximately 10 mL of an appropriate cleaning solution (1 M NaOH or buffer solution). Connect the syringe to injection valve port **Syr**, and inject the cleaning solution. 
5	Fill a syringe with distilled water. Connect the syringe to injection valve port **Syr**, and inject the distilled water.

7.3 Replace pump rinsing liquid

Replace pump rinsing liquid once a week if you are using 20% ethanol and daily if you are using an aqueous buffer. For instructions, see *Section 4.2.3 Prepare the pump rinsing system, on page 48*.

7.4 Replace the main fuses

WARNING

Disconnect power. Always disconnect power from the instrument before replacing fuses.

WARNING

For continued protection from fire hazard, replace only with same type and rating of fuse.

WARNING

If a fuse requires repeated replacement, do not continue to use the instrument. Contact an authorized service engineer.

Required tools

Tool	Dimension
Flat screwdriver	2 to 3 mm

Procedure

Follow the instructions below to replace the fuses.

Note: *There are two identical fuses at the mains power inlet. Replace both fuses even if only one is blown.*

Step	Action
1	Disconnect the power cord from the power inlet.

Step	Action
2	Use a small flat-bladed screwdriver to prise open the fuse holder cover on the power inlet.

3	Pull the fuse holder out of the mains connector panel by hand.
4	Remove the fuses from the fuse holder.
5	Fit new fuses of the same size and rating [1].
6	Replace the fuse holder in the power inlet.

NOTICE

When replacing fuses, make sure that the fuse holder is pushed fully into position.

7	Reconnect the power cord.

1 Fuse rating: T4AL 250 V, 5 × 20 mm

8 Troubleshooting

About this chapter

This chapter provides a list of the most commonly encountered problems that might occur when operating ÄKTA go. For a more comprehensive list and a more detailed description of the actions to take, refer to the *ÄKTA go User Manual*.

Problem	Possible cause	Corrective action
Spike in the UV signal	The **Flow restrictor** has been removed after the **UV cell**.	Replace the **Flow restrictor** back in the flow path after the **Conductivity monitor**.
	There is air in the system.	Prime the inlets and purge the pump, see *Section 5.2 Prime inlets and purge pump heads, on page 64*.
Unstable conductivity signal	There is air in the pump	Prime the inlets and purge the pump, see *Section 5.2 Prime inlets and purge pump heads, on page 64*.
Unstable pressure	There is air in the pump.	Prime the inlets and purge the pump, see *Section 5.2 Prime inlets and purge pump heads, on page 64*.
Pressure alarm issued	The pressure is too high, possibly due to running the system at a flow rate that is too high for the column used.	Lower the flow rate.
	There is a kink in the tubing, overtightened tubing connections, or precipitation in the flow path.	Replace the tubing. If this does not fix the problem, refer to the *ÄKTA go User Manual* to continue troubleshooting.

Problem	Possible cause	Corrective action
Difficulty connecting to the system	IP addresses are on different subnets.	Make sure the instrument IP address and the computer IP address are on the same subnet, see *UNICORN Administration and Technical manual*. The instrument IP address can be seen on the instrument control panel when the instrument is powered on but does not have connection to UNICORN.
	UNICORN instrument server is not started.	Restart the computer.
The text in UNICORN is large and cannot be read because it is truncated	Scaling in Windows has been changed.	Set the zoom level in Windows to 100% and restart the computer.

System error report

When you request troubleshooting assistance from GE Healthcare, you should generate a ***System error report*** and submit it to your service representative.

Follow the instructions below to generate a ***System error report***.

Step	Action
1	Select ***System:Create System Error Report*** in the ***System Control*** module. Users with sufficient access rights can also create a ***System error report*** from the ***Administration*** module.
2	Step through the report wizard using the ***Next*** and ***Back*** buttons. Provide information as requested at each step. Add results, methods and logs as appropriate.
3	Save the report in the default folder. The report is saved as a zip file with the name ***Report_YYYYMMDDnn.zip***.
4	Submit the file to your GE Healthcare service representative. ***Note:*** *The file may be large (> 15 Mb).*

9 Reference information

About this chapter

This chapter contains reference information.

In this chapter

9.1 System specifications

Technical specifications

Parameter	Data
System configuration	Benchtop system, external computer
Flow rate range	0.01 to 25 mL/min
Pressure range	0 to 5 MPa (0 to 50 bar)
Control system	UNICORN 7.4 or later version
Connection between PC and instrument	Ethernet
Dimensions (width × height × depth)	335 × 482 × 464 mm (depth without tray 451 mm, depth without modules 380 mm)
Weight (excluding computer, columns, buffer bottles)	27 kg
Supply voltage	100 to 240 V~ autorange
Maximum voltage fluctuation	± 10% from the nominal voltage
Frequency	50/60 Hz
Power consumption	Rated max 300 VA [1] Max with all options 150 W [2] Typical 100 W Power-save < 20 W
Enclosure protective class	IP 21
Acoustic noise level	< 60 dB(A)

1 ÄKTA go can deliver 300 VA.

2 ÄKTA go equipped with all options consume 150 W.

Battery information

The instrument version with Real-Time Unit contains a lithium backup battery. The battery cannot be replaced by the user.

9.2 Chemical resistance specifications

Introduction

This section provides detailed information about chemical resistance of the ÄKTA go instrument to some common aggressive chemicals used in liquid chromatography. For information regarding chemicals not listed in this section, contact your GE Healthcare representative.

Note: *Refer to Safety Data Sheets (SDS) for information regarding characteristics, human and environmental risks and preventive measures for chemicals used. Make sure that you have the SDS available from your chemical distributor and/or databases on the internet.*

Scope

The information in this section applies to the ÄKTA go flow path. Recommended solutions for the pump rinsing system are aqueous buffers or 20% ethanol. Do not use other chemicals in the pump rinsing system.

Chemical resistance, long term

The following chemicals are suitable for continuous use.

Chemical	Concentration	CAS no	EC no
Aqueous buffers, pH 2 to 12	N/A	N/A	N/A
Acetone	10%	67-64-1	200-662-2
Ammonia	30%	7664-41-7	231-635-3
Ammonium chloride	2 M	12125-02-9	235-186-4
Ammonium sulfate	3 M	7783-20-2	231-984-1
Arginine	2 M	74-79-3	200-811-1
Benzyl alcohol	2%	100-51-6	202-859-9
Dimethyl sulfoxide (DMSO)	5%	67-68-5	200-664-3
Dithioerythritol (DTE)	100 mM	6892-68-8	229-998-8
Dithiothreitol (DTT)	100 mM	3483-12-3	222-468-7
Ethanol	20%	75-08-1	200-837-3

Chemical	Concentration	CAS no	EC no
Ethylene glycol	50%	107-21-1	203-473-3
Ethylenediaminetetraacetic acid (EDTA)	100 mM	60-00-4	200-449-4
Glycerol	50%	56-81-5	200-289-5
Guanidinium hydrochloride	6 M	50-01-1	200-002-3
Mercaptoethanol	20 mM	37482-11-4	253-523-3
Phosphoric acid	0.1 M	7664-38-2	231-633-2
Potassium chloride	4 M	7447-40-7	231-211-8
Sodium dodecyl sulfate (SDS)	1%	151-21-3	205-788-1
Sodium hydroxide	0.01 M	1310-73-2	215-185-5
Tween™ 20	1%	9005-64-5	500-018-3
Urea	8 M	57-13-6	200-315-5

Chemical resistance, short term

The following chemicals are suitable for up to 2 h contact time at room temperature.

Chemical	Concentration	CAS no	EC no
Acetic acid	70%	75-05-8	200-835-2
Decon™ 90	10%	N/A	N/A
Ethanol	100%	75-08-1	200-837-3
Hydrochloric acid [1]	0.1 M	7647-01-0	231-595-7
Isopropanol	100%	67-63-0	200-661-7
Methanol	100%	67-56-1	200-659-6
Sodium hydroxide	2 M	1310-73-2	215-185-5
Sodium hydroxide/ethanol	1 M/40%	N/A	N/A
Sodium chloride	4 M	7647-14-5	231-598-3

Chemical	Concentration	CAS no	EC no
Sodium hypochlorite	10%	7681-52-9	231-668-3

1 Hydrochloric acid concentration should not exceed 0.1 M in pressure sensors, for example, in the pressure monitor, or in the column valve **V9-C**. For other parts of the system up to 1 M HCl is acceptable for short periods of use.

For cleaning of columns with HCl concentrations exceeding 0.1 M, manually fill a loop with HCl and inject the cleaning agent.

9.3 Recycling information

Introduction

This section contains information about the decommissioning of ÄKTA go.

WARNING

Hazardous biological agents during run. When using hazardous biological agents, run ***System CIP*** and ***Column CIP*** to flush the entire system tubing with bacteriostatic solution (e.g., NaOH) followed by a neutral buffer and finally distilled water, before service, maintenance, and decommissioning.

CAUTION

Always use appropriate personal protective equipment when decommissioning the equipment.

Decontamination

The product must be decontaminated before decommissioning. All local regulations must be followed with regard to scrapping of the equipment.

Disposal of the product

When taking the product out of service, the different materials must be separated and recycled according to national and local environmental regulations.

Recycling of hazardous substances

The product contains hazardous substances. Detailed information is available from your GE Healthcare representative.

Disposal of electrical components

Waste electrical and electronic equipment must not be disposed of as unsorted municipal waste and must be collected separately. Contact an authorized representative of the manufacturer for information concerning the decommissioning of the equipment.

Disposal of batteries

Waste batteries must not be disposed of as unsorted municipal waste and must be collected separately. Follow applicable local regulations for recycling of batteries.

If equipped with a Real-Time Unit, the instrument contains a lithium battery which must not be disposed of in fire.

9.4 Regulatory information

Introduction

This section lists regulatory information that applies to the ÄKTA go system.

Manufacturing information

The table below summarizes the required manufacturing information.

Requirement	Information
Name and address of manufacturer	GE Healthcare Bio-Sciences AB Björkgatan 30 SE 751 84 Uppsala Sweden
Telephone number of manufacturer	+ 46 771 400 600

In this section

9.4.1 European Union and European Economic Area

Introduction

This section describes regulatory information for the European Union and European Economic Area that applies to the ÄKTA go system.

Conformity with EU Directives

See the EU Declaration of Conformity for the directives and regulations that apply for the CE marking.

If not included with the product, a copy of the EU Declaration of Conformity is available on request.

CE marking

The CE marking and the corresponding EU Declaration of Conformity is valid for the instrument when it is:

- used according to the Operating Instructions or user manuals, and
- used in the same state as it was delivered, except for alterations described in the Operating Instructions or user manuals.

9.4.2 Eurasian Customs Union

Introduction

This section contains additional regulatory information to comply with the Eurasian Customs Union technical regulations.

Manufacturer and importer information

The table below summarizes the manufacturer and importer information required by the Eurasian Customs Union.

Requirement	Information
Name, address and telephone number of manufacturer	See *Manufacturing information, on page 108*.
Importer and/or company for obtaining information about importer	GE Healthcare LLC GE Healthcare Life Sciences Presnenskaya nab., 10C, 12th floor RU-123 317 Moscow, Russian Federation Telephone 1: + 7 495 411 9714 Fax nr: + 7 495 739 6932 Email: LSrus@ge.com

Description of symbol on the system label

The following symbol may be present on the system label.

Label	Meaning
EAC	Eurasian Conformity mark: the single conformity mark indicates that the product is approved for circulation on the markets of the member states of the Eurasian Customs Union.

9.4.3 Regulatory statements

Introduction

This section shows regulatory statements that apply to regional requirements.

NOTICE

This equipment is not intended for use in residential environments and may not provide adequate protection to radio reception in such environments.

FCC compliance

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.

Note: *The user is cautioned that any changes or modifications not expressly approved by GE Healthcare could void the user's authority to operate the equipment*.

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.

EMC Statement Korea

NOTICE

Class A equipment (equipment for business use).

This equipment has been evaluated for its suitability for use in a business environment.

When used in a residential environment, there is a concern of radio interference.

주의사항

A급 기기 (업무용 방송통신 기자재)

이 기기는 업무용환경에서 사용할 목적으로 적합성평가를 받은 기기

로서 가정용 환경에서 사용하는 경우 전파간섭의 우려가 있습니다.

9.4.4 Declaration of Hazardous Substances (DoHS)

根据SJ/T11364-2014《电子电气产品有害物质限制使用标识要求》特提供如下有关污染控制方面的信息。

The following product pollution control information is provided according to SJ/T11364-2014 Marking for Restriction of Hazardous Substances caused by electrical and electronic products.

电子信息产品污染控制标志说明
Explanation of Pollution Control Label

该标志表明本产品含有超过中国标准GB/T 26572《电子电气产品中限用物质的限量要求》中限量的有害物质。标志中的数字为本产品的环保使用期，表明本产品在正常使用的条件下，有毒有害物质不会发生外泄或突变，用户使用本产品不会对环境造成严重污染或对其人身、财产造成严重损害的期限。单位为年。

为保证所申明的环保使用期限，应按产品手册中所规定的环境条件和方法进行正常使用，并严格遵守产品维修手册中规定的定期维修和保养要求。

产品中的消耗件和某些零部件可能有其单独的环保使用期限标志，并且其环保使用期限有可能比整个产品本身的环保使用期限短。应到期按产品维修程序更换那些消耗件和零部件，以保证所申明的整个产品的环保使用期限。

本产品在使用寿命结束时不可作为普通生活垃圾处理，应被单独收集妥善处理。

This symbol indicates the product contains hazardous materials in excess of the limits established by the Chinese standard GB/T 26572 Requirements of concentration limits for certain restricted substances in electrical and electronic products. The number in the symbol is the Environment-friendly Use Period (EFUP), which indicates the period during which the hazardous substances contained in electrical and electronic products will not leak or mutate under normal operating conditions so that the use of such electrical and electronic products will not result in any severe environmental pollution, any bodily injury or damage to any assets. The unit of the period is “Year”.

In order to maintain the declared EFUP, the product shall be operated normally according to the instructions and environmental conditions as defined in the product manual, and periodic maintenance schedules specified in Product Maintenance Procedures shall be followed strictly.

Consumables or certain parts may have their own label with an EFUP value less than the product. Periodic replacement of those consumables or parts to maintain the declared EFUP shall be done in accordance with the Product Maintenance Procedures.

This product must not be disposed of as unsorted municipal waste, and must be collected separately and handled properly after decommissioning.

有害物质的名称及含量
Name and Concentration of Hazardous Substances

产品中有害物质的名称及含量
Table of Hazardous Substances' Name and Concentration

部件名称 Component name	有害物质 Hazardous substance					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
29375260	X	O	O	O	O	O

本表格依据SJ/T 11364**的规定编制。**

This table is prepared according to SJ/T 11364.

0: **表示该有害物质在该部件所有均质材料中的含量均在**GB/T 26572**规定的限量要求以下。**

X: **表示该有害物质至少在该部件的某一均质材料中的含量超出** GB/T 26572**规定的限量要求。**

- **此表所列数据为发布时所能获得的最佳信息.**

0: Indicates that this hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement in GB/T 26572.

X: Indicates that this hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement in GB/T 26572.

- Data listed in the table represents best information available at the time of publication.

9.5 Health and Safety Declaration Forms

On site service

On Site Service Health & Safety Declaration Form

Service Ticket #:	

To make the mutual protection and safety of GE service personnel and our customers, all equipment and work areas must be clean and free of any hazardous contaminants before a Service Engineer starts a repair. To avoid delays in the servicing of your equipment, please complete this checklist and present it to the Service Engineer upon arrival. Equipment and/or work areas not sufficiently cleaned, accessible and safe for an engineer may lead to delays in servicing the equipment and could be subject to additional charges.

Yes	No	Please review the actions below and answer "Yes" or "No". Provide explanation for any "No" answers in box below.
○	○	**Instrument has been cleaned of hazardous substances**. Please rinse tubing or piping, wipe down scanner surfaces, or otherwise ensure removal of any dangerous residue. Ensure the area around the instrument is clean. If radioactivity has been used, please perform a wipe test or other suitable survey.
○	○	Adequate space and clearance is provided to allow safe access for instrument service, repair or installation. In some cases this may require customer to move equipment from normal operating location prior to GE arrival.
○	○	**Consumables, such as columns or gels, have been removed or isolated from the instrument and from any area that may impede access to the instrument.**
○	○	**All buffer / waste vessels are labeled. Excess containers have been removed from the area to provide access.**
Provide explanation for any "No" answers here:		

Equipment type / Product No:		**Serial No:**	
I hereby confirm that the equipment specified above has been cleaned to remove any hazardous substances and that the area has been made safe and accessible.			
Name:		**Company or institution:**	
Position or job title:		**Date (YYYY/MM/DD):**	
Signed:			

DOC1149542/28-9800-26 AC 05/2014

Product return or servicing

Health & Safety Declaration Form for Product Return or Servicing

Return authorization number:		*and/or* **Service Ticket/Request:**	

To make sure the mutual protection and safety of GE personnel, our customers, transportation personnel and our environment, all equipment must be clean and free of any hazardous contaminants before shipping to GE. To avoid delays in the processing of your equipment, please complete this checklist and include it with your return.

1. Please note that items will NOT be accepted for servicing or return without this form
2. Equipment which is not sufficiently cleaned prior to return to GE may lead to delays in servicing the equipment and could be subject to additional charges
3. Visible contamination will be assumed hazardous and additional cleaning and decontamination charges will be applied

Yes	No	Please specify if the equipment has been in contact with any of the following:	
		Radioactivity (please specify)	
		Infectious or hazardous biological substances (please specify)	
		Other Hazardous Chemicals (please specify)	

Equipment must be decontaminated prior to service / return. Please provide a telephone number where GE can contact you for additional information concerning the system / equipment.

Telephone No:		
Liquid and/or gas in equipment is:		**Water**
		Ethanol
		None, empty
		Argon, Helium, Nitrogen
		Liquid Nitrogen
	Other, please specify	

Equipment type / Product No:		**Serial No:**	

I hereby confirm that the equipment specified above has been cleaned to remove any hazardous substances and that the area has been made safe and accessible.

Name:		**Company or institution:**	
Position or job title:		**Date (YYYY/MM/DD)**	
Signed:			

To receive a return authorization number or service number, please call local technical support or customer service.

DOC1149544/28-9800-27 AC 05/2014

For local office contact information, visit
www.gelifesciences.com/contact

GE Healthcare Bio-Sciences AB
Björkgatan 30
751 84 Uppsala
Sweden

www.gelifesciences.com/aktago

GE Healthcare Europe GmbH
Munzinger Strasse 5, D-79111 Freiburg, Germany

GE Healthcare UK Limited
Amersham Place, Little Chalfont, Buckinghamshire, HP7 9NA, UK

GE Healthcare Bio-Sciences Corp.
100 Results Way, Marlborough, MA 01752, USA

GE Healthcare Japan Corporation
Sanken Bldg. 3-25-1, Hyakunincho Shinjuku-ku, Tokyo 169-0073, Japan

29360951 AC 10/2019 a1251