ÄKTA go

CHROMATOGRAPHY SYSTEMS

ÄKTA™ go is a small and compact liquid chromatography system that allows researchers to perform routine protein purification with ease while allowing for efficient use of bench and cold cabinet space (Fig 1). ÄKTA go has been developed for automated chromatography from the heritage of our fast protein liquid chromatography (FPLC) technology. The robust and reliable system hardware and UNICORN™ control software is designed to work together with our prepacked columns and chromatography resins for an efficient and successful way to purify proteins. The system supports commonly used chromatography techniques in an easy and accessible manner.

System benefits

- Routine protein purification fitted into a compact system, with a footprint of only 335 × 464 mm, to make the most of valuable laboratory bench and cold cabinet/room space.
- Intuitive method creation in minutes and interactive process picture for maximum control and easy access to manual controls even during methods runs.
- Proven design of ÄKTA systems and UNICORN software combined with prepacked columns and resins for reliable operation and trusted results in protein purification.

System overview

ÄKTA go is a chromatography system including everything needed for routine chromatography (Fig 2). The instrument weighs less than 27 kg in standard configuration. The low weight and small footprint enable easier placement in the laboratory as well as in cold room/cabinets. ÄKTA go is designed to work together with UNICORN software and our columns and resins to form a complete solution for preparative, lab-scale protein chromatography.

Fig 1. ÄKTA go is a compact chromatography system for routine protein purification.

The system is modular in design with all valves, monitors, and columns mounted on the front, wet side of the system. The design allows for easy interaction with all instrument modules.

Several rails for attachment of column holders and extra valves are located at the front and on both sides of the instrument. A buffer tray on top of the instrument provides storage area for bottles. The large storage capacity is 2 × 2 L in combination with 2 × 1 L flasks giving a total 6 L buffer on top of the system.

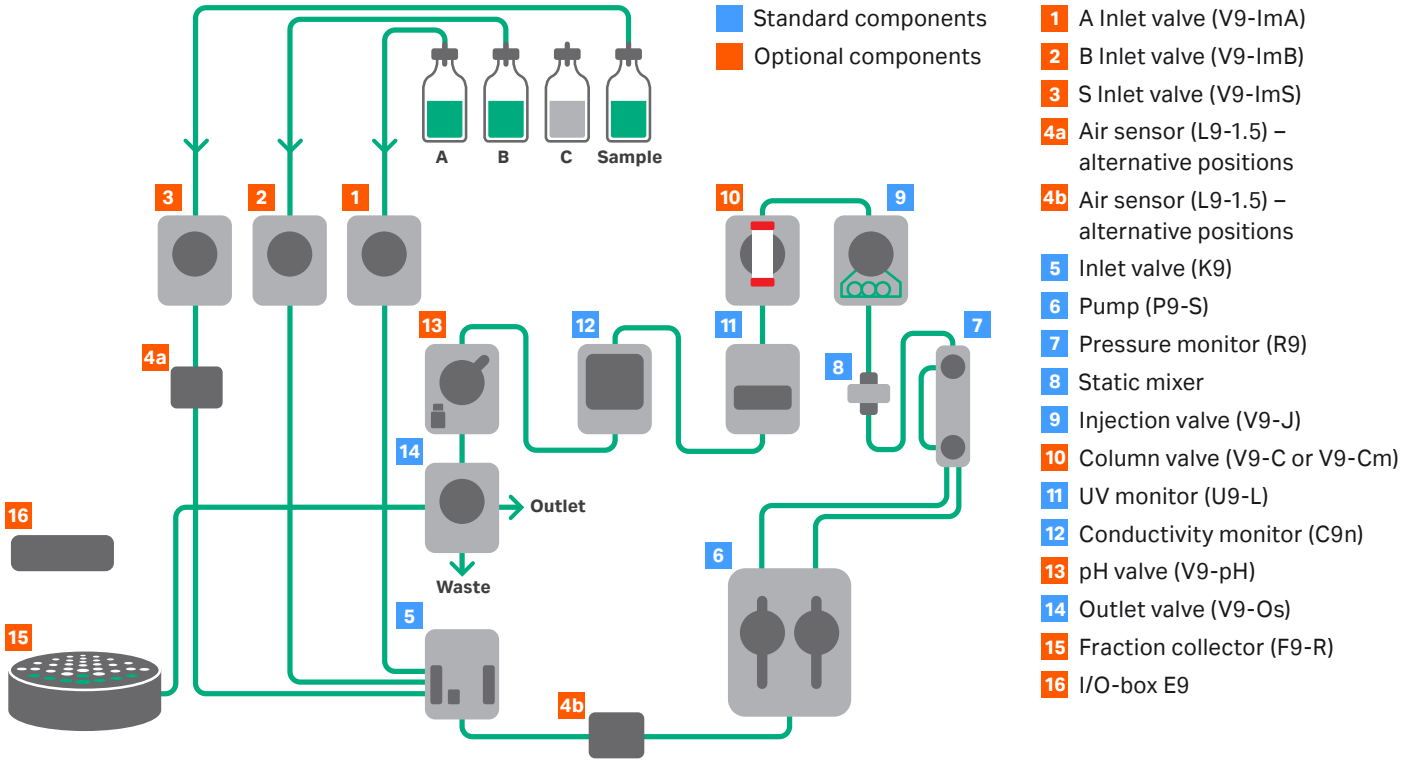


Fig 2. Flow path of ÄKTA go with standard and optional components that may be added to expand the capability of the system.

The instrument control panel shows the system state via both text and color coding. It also allows interaction with the run (pause/continue) at the touch of a button. This will be especially handy in a cold room where the controlling computer is outside of the refrigerated area. The system's main switch is located on the front for easy access when placed in a cold cabinet or in a crowded laboratory environment.

Standard components

The standard configuration comes with a high-performance system pump, a system pressure monitor for column and system protection, inlet valve for gradient formation, static mixer, injection valve, UV and conductivity monitors, and outlet valve (Fig 2).

The system flow path is designed to minimize band-broadening effects and to enable high-resolution protein separation. All wetted materials used in the flow path are biocompatible and resistant to commonly used buffers.

The pump consists of the same robust and reliable titanium pump heads used in well-established ÄKTA chromatography systems such as ÄKTA avant and ÄKTA pure. The instrument front is designed with two empty module positions where optional valves can be mounted to fit the laboratory's routine needs. Optional valves can also be mounted on the rails of the system using the Extension box. If preferred, the system can be set up to enter "power save mode" at the end of the chromatography run, which reduces power consumption by 75%.

ÄKTA go system standard components are described in more detail in Figure 3.

1. Instrument control panel: text and color coding ensures easy overview of system state and intuitive interaction. Power switch and run/pause buttons located on front for easy access
2. Conductivity monitor to monitor gradients
3. Outlet valve with three ports for outlet, waste, and connection to a fraction collector
4. Compact Inlet valve for sample application and formation of buffer gradient
5. Injection valve enables precise injection of samples from loop/superloop or direct loading of large sample volume with the pump
6. The silent and eco-friendly UV monitor has low power consumption and long life span. Requires no warm-up prior to runs and does not heat up samples
7. Static mixer is silent and requires only low maintenance due to no moving parts
8. Pressure monitor ensures safety and integrity for the column and system
9. System pump: proven design with titanium heads and back-wash

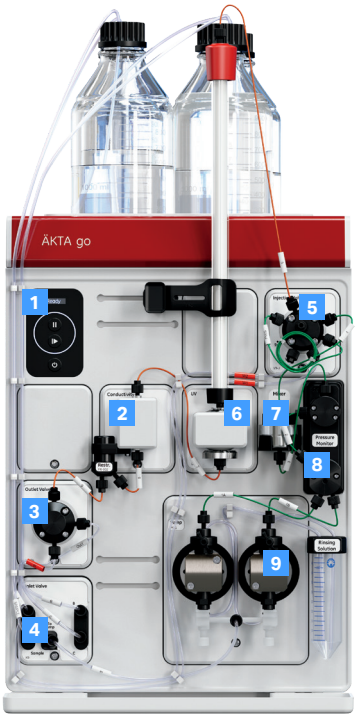


Fig 3. ÄKTA go standard system and its components.

Optional components

ÄKTA go has a range of optional components, such as extra inlet valves, column valve, pH valve, air sensor, and fraction collector, that can be added as required to suit the requirements of your laboratory workflows.

1. Extra sample inlet valve (with five sample inlets and one buffer inlet) and buffer selection valves with extra A and B inlets (six inlets per valve) mounted on the rails using the Extension box
2. pH valve enables in-line pH monitoring during a run
3. Fraction collection is made possible by adding Fraction collector F9-R for collection of fractions in up to 175 tubes
4. Column valve V9-Cm allows flexible use of up to three columns without replumbing

   Column selection valve V9-C, with five column positions and built-in pressure sensors positioned before and after the columns

   The two column selection valves enable up- and downflow of the column as well as by-passing the column
5. I/O-box for connecting external equipment to the system such as an autosampler or detectors for measurement of refractive index, light scattering, and fluorescence
6. Air sensors for detecting air in sample or buffers, or advancing the method to the next step when sample loading is complete

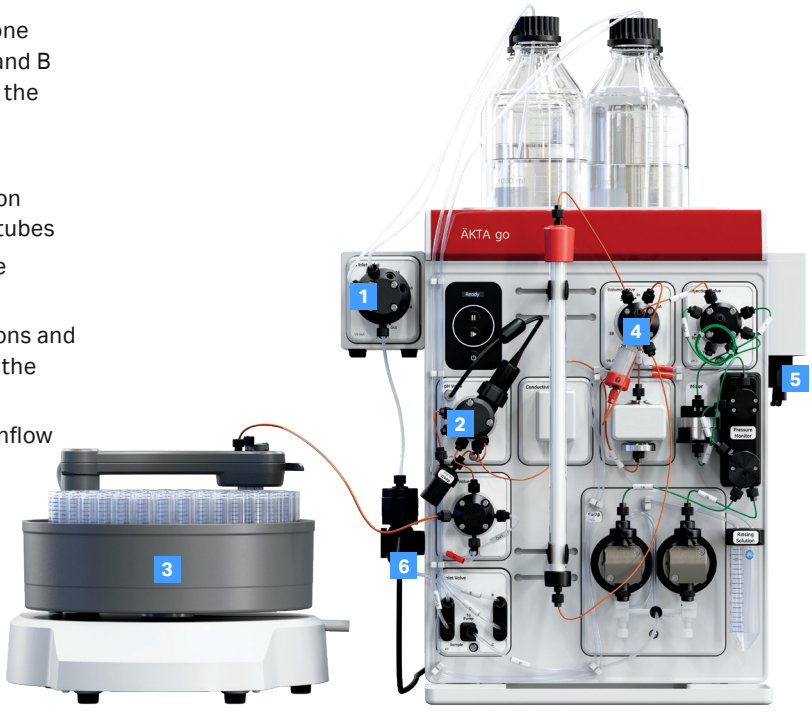


Fig 4. Optional components can be added in the two empty positions in the system chassis or mounted on rails to expand the capability of the ÄKTA go system. A total of maximum six options can be added at the same time.

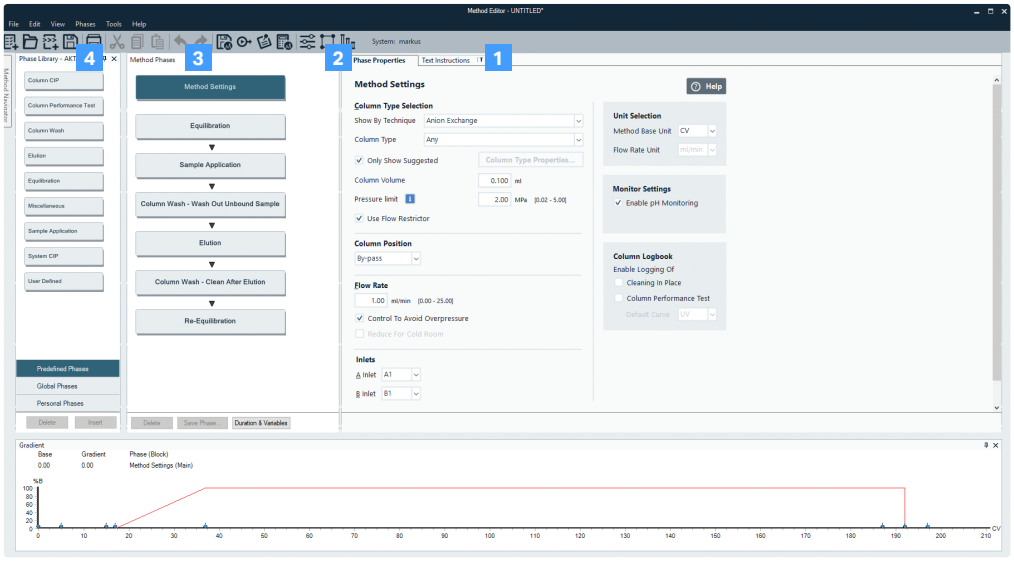
Software

ÄKTA go is fully supported by UNICORN software and gives you real-time control of your chromatography system. Automated methods can be created in minutes for most common chromatography techniques using preprogramed methods. UNICORN also supports evaluation of results.

UNICORN consists of four modules: ***Administration, Method editor*** (Fig 5), ***System control*** (including ***Process picture***, Fig 6), and ***Evaluation***. The modules work together for increased operational security, efficiency, and productivity.

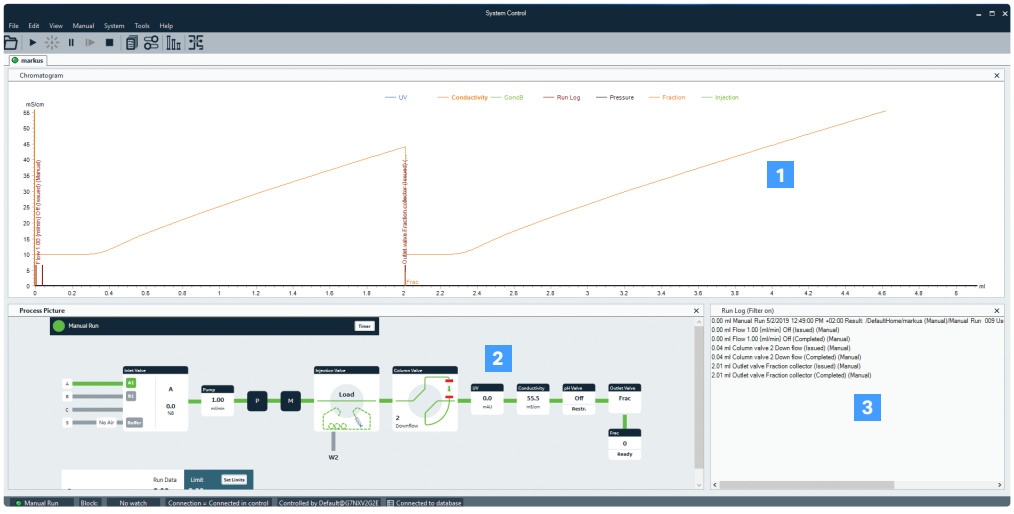
The ***Method editor*** module allows you to create or adjust methods to suit your application needs (Fig 5). A method is simply created by drag-and-drop of modules called phases. Each phase represents a step in the run—such as sample application or wash—and a chromatography run (method) is represented by several phases. UNICORN also includes a library of predefined Cytiva columns and column parameters (e.g., flow rate and pressure limits) that are automatically programmed into the methods. For added flexibility, you can edit programming instructions directly in the ***Text instructions*** pane.

The ***System control*** module is used to start, view, and control a method run. The module consists of three panes that provide an overview of the status of the run (Fig 6).



1. Tweaking of the method can be performed using ***Text instructions***
2. Set conditions to match your application in ***Phase properties***
3. ***Method phases*** shows the outline of a specific method
4. Drag and drop phases (steps) from the ***Phase library*** to create methods or use preprogrammed methods

Fig 5. UNICORN 7.4 ***Method editor*** for easy method creation and overview.

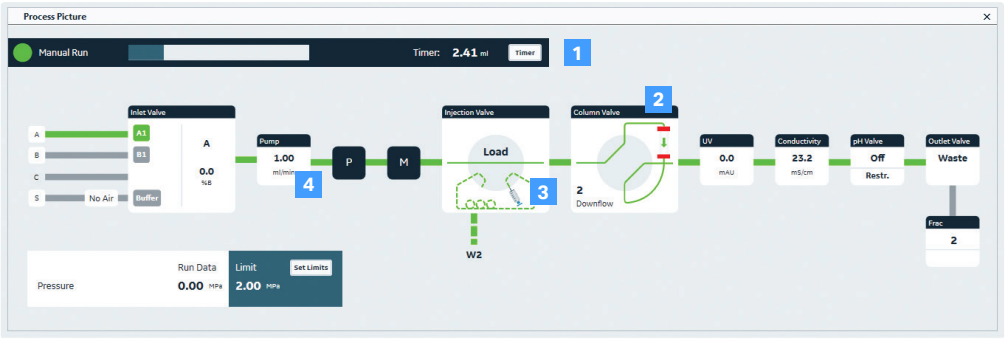


1. The ***Chromatogram*** pane illustrates data as curves during the entire method run
2. The ***Process picture*** displays the current flow path during the run and can be used to control the run. Current state of the flow path is indicated and real-time data from monitors are also displayed
3. The ***Run log*** presents current data in numerical values

Fig 6. ***System control*** module showing ***Chromatogram pane, Process picture***, and ***Run log*** features simultaneously.

The interactive ***Process picture*** helps you to quickly start manual runs and enables manual interaction during automated runs (Fig 7). The ***Process picture*** also allows easy monitoring of the run, clearly displaying all relevant run data and system state. Among the most important attributes is the ability to monitor system pressure. The column pressure limits are easily set in the ***Process picture***, either by importing them from the ***Column library*** or by manual settings, all to ensure the highest level of safety and integrity for the column and run. Estimated remaining time gives the user the estimated time for a method run to complete, providing the possibility to focus on other tasks, and still return to the system on time when the chromatography run ends. The timer function can be set to either volume or time, for smooth and easy equilibration or preparation of columns.
In conclusion, the ***Process picture*** gives you intuitive access to all essential information and necessary functionality.

With UNICORN 7, the ***Evaluation*** module provides a simplified user interface optimized for most commonly used workflows like quick evaluation, comparison of results, and work with peaks and fractions. In addition, the software is modular, allowing the addition of features such as ***Column logbook***. The ***Column logbook*** keeps track of column performance, which is especially useful when each column is used by multiple individuals in the lab.



1. Estimated remaining volume or time can be set using the timer function
2. Easy overview and full control over both injection valve and column valves to ensure both sample and column safety and integrity
3. Clearly displayed flow path of the injection using color-coded valve
4. Click on a module for interaction and to change settings and parameters

Fig 7. The ***Process picture*** represents the system flow path with a clear overview of placement of system components. All parts of the system are interactive and developed to ensure integrity of your run, samples, and columns.

Accessories

A wide range of accessories can be used with ÄKTA go, such as column holders and clamps for attaching columns up to 25 mm in diameter, flasks, and tubing to the system. A selection of tubing allows for optimization of the flow path if needed.

Prepacked columns

Cytiva offers an extensive range of prepacked columns for purification, from microgram levels to hundreds of milligrams of target protein and for almost every chromatography technique. The range includes HiTrap™, HiPrep™, HiScreen™, HiScale™, and HiLoad™ columns for preparative chromatography. Tricorn™ columns are also available for high-resolution, semipreparative purifications at microgram scale as well as for protein characterization.

1. Flexible column holder for HiScreen columns
2. Column holder rod
3. Bottle and airsensor holder
4. Tubing holder, spool
5. Column and bottle holder, o.d. 10-50 mm
6. Column clamp, o.d. 10–21 mm (two included with system)
7. Multipurpose holder
8. Multidirectional column clamp (one included with system)
9. Rail extension

Fig 8. ÄKTA go accessories.

System specifications

Control system software	UNICORN 7.4 or later version
Connection between computer and instrument	Ethernet
Dimensions (width × height × depth), instrument	335 × 482 × 464 mm without accessories Depth without bottom tray 451 mm, depth of chassis 380 mm
Weight, instrument	< 27 kg (instrument only)
Power supply, instrument	100 to 240 VAC, 50/60 Hz, max voltage fluctuation ± 10% of nominal voltage
Power consumption, instrument	Rated max. 300 VA Max. with all options 150 W Typical 100 W Power-save < 20 W
Enclosure protective class, instrument	IP 21
Acoustic noise level	< 60 dB(A)
Operating range	Flow rate 0.01 to 25 mL/min Pressure 0 to 5 MPa (50 bar, 725 psi)
Ambient temperature, operating	4°C to 35°C
Ambient temperature, storage	-25°C to 60°C
Relative humidity	20% to 95%, non-condensing
Altitude, operating	≤ 2000 m

Standard components

System pump

Pump type	Piston pump (metering type)
Flow rate range	0.01 to 25 mL/min
Flow rate accuracy	± 2% Conditions: 0.25 to 25 mL/min, 0.7 to 3 cP
Viscosity range	0.7 to 10 cP

Valves

Number of valves	Up to seven
Valves included as standard	Inlet valve (sample and three buffer inlets), injection valve and outlet valve (three outlets).

Mixer

Mixing principle	Static
Mixer chamber volume	1 mL

Gradients

Gradient formation	Switch valve
Gradient composition range	0.0% to 100.0% liquid in B inlet (B)
Gradient composition accuracy	± 2% B Conditions: 2% to 98% B, 0.5 to 20 mL/min, 0.7 to 2 cP
Gradient step composition fluctation	< ± 0.3% B Conditions: 2 to 98% B, 0.5 to 20 mL/min, 0.7 to 2 cP
Gradient linearity	within ± 1% Conditions: within 10% to 85% B, gradient volume ≥ 20 mL, 0.5 to 20 mL/min, 0.7 to 2 cP

Pressure sensor

Pressure reading range	0 to 5 MPa (50 bar, 725 psi)
Pressure accuracy	± 2% or ± 0.02 MPa (0.2 bar, 2.9 psi), whichever is greater

UV monitor, U9-L

UV wavelength	280 nm
UV flow cell path length	2 or 5 mm
UV reading range	-6 to +6 AU
UV linearity	within ± 5% Conditions: 0 to 2 AU
UV noise	< 0.1 mAU
UV operating pressure	0 to 2 MPa (20 bar, 290 psi)

Conductivity monitor

Conductivity reading range	0.01 to 999.99 mS/cm
Conductivity accuracy	± 0.01 mS/cm or ± 2%, whichever is greater Conditions: within 0.3 to 300 mS/cm
Conductivity operating pressure	0 to 2 MPa (20 bar, 290 psi)
Temperature monitor reading range	0˚C to 70
Temperature monitor accuracy	± 1.5˚C Conditions: 4˚C to 35˚C

Optional components

Valves

Optional valves	Inlet selection valves; Column selection valve for three columns; Column selection valve for five columns including pressure sensors; and pH valve

pH monitor

pH reading range	0 to 14
pH accuracy	± 0.1 after calibration Conditions: within pH 2 to 12, within ± 3˚C from calibration temperature
pH operating pressure range	0 to 0.5 MPa (5 bar, 72.5 psi)

Round fraction collector, F9-R

Number of fraction collectors	1
Number of fractions	Up to 175
Tubes	175 (3 mL tubes) 95 (8 or 15 mL tubes) 40 (50 mL tubes)
Fraction volumes	0.1 to 50 mL
Spillage-free mode	DropSync
Dimensions (W × H × D)	320 × 250 × 400 mm
Weight	5 kg
Delay volume (UV – dispenser head)	223 µL with standard tubing

Air sensor

Number of sensors	1
Placement of sensor	Before Sample inlet or system pump
Sensing principle	Ultrasonic

I/O-box

Number of I/O boxes	1
Number of ports per box	Two analog in, two analog out, four digital in, four digital out
Analog range	In ± 2 V; out ± 1 V
Digital range	Max 5 V

Ordering information

Main system and software

Product	Product code
ÄKTA go chromatography system	29383015
UNICORN 7 workstation license	29128116
System modules and accessories	
Inlet valve (K9) (included with system)	29383535
A Inlet valve (V9-ImA)	29383527
B Inlet valve (V9-ImB)	29383528
Sample inlet valve (V9-ImS)	29383529
Air sensor L9-1.5mm	28956500
Pressure monitor, R9-1n (included with system)	29383536
Mixer, 1 mL (included with system)	29383537
Injection valve, V9-J (included with system)	29298324
Column valve (V9-Cm, 3 columns)	29383526
Column Valve Kit (V9-C, 5-columns)	29011367
I/O-box E9	29011361
Extension box	29110806
UV monitor, U9-L	
UV monitor U9-L (included with system)	29011360
UV flow cell 2 mm for U9-L (included with system)	29011325
UV flow cell 5 mm for U9-L	18112824
pH and conductivity monitors	
pH valve kit (V9-pH)	29011359
pH electrode	28954215
Conductivity monitor (C9n) (included with system)	29011363
Fraction collector, F9-R	
Fraction collector F9-R	29011362
Tube rack with 175 positions for 12 mm vials, bowl, tube support, holder, and guide	19868403
Tube rack with, 95 positions for 10–18 mm vials	18305003
Tube rack with 40 positions for 30 mm vials, bowl, tube support, holder, and guide	18112467

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