

ÄKTA™ explorer ancillary equipment

Data File

High performance liquid chromatography

- Simple function and easy operation in a wide variety of applications – equipment specially designed for ÄKTAexplorer
- Biocompatible and integrated flow path from sample injection to collection – complete range including valves, mixer and fraction collector
- All functions programmed and monitored via one easy-to-use interface – units controlled via UNICORN® control system
- Reliable and easy to service – minimal routine maintenance and service

Introduction

The chromatography system ÄKTAexplorer is supported by a full range of dedicated ancillary equipment. The range includes the following items; motor valves for sample injection, column selection, sample and eluent switching, fraction collection and other flow operations, a gradient mixer and a fraction collector. Figure 1 illustrates these items. The schematic flow path shown in Figure 2 indicates their positions in ÄKTAexplorer. All ancillary equipment is controlled via UNICORN control system. The operator can program the units via one easy-to-use interface as well as monitor the status of their operation.

The equipment ensures efficient and smooth operation of ÄKTAexplorer, making even complex applications easy to manage. The components are resistant to all buffers commonly used in liquid chromatography and are fully biocompatible, ensuring high recovery and no loss of activity.

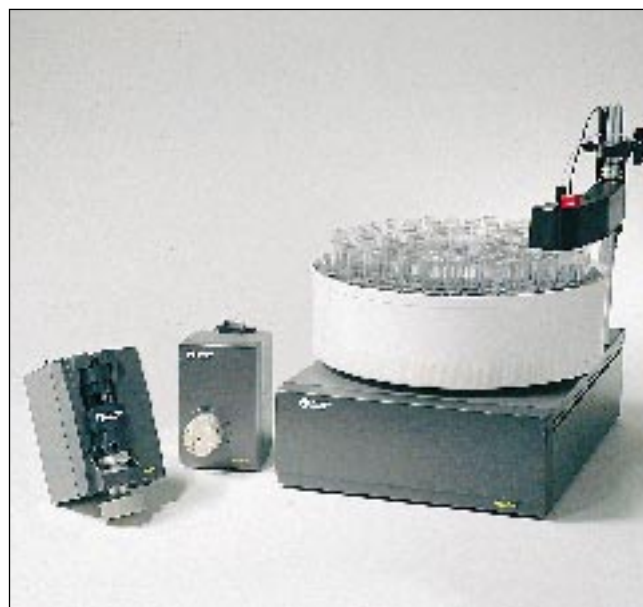


Fig. 1. The range of dedicated equipment for ÄKTAexplorer includes a mixer, injection valves, 8-way valves (not shown) and a fraction collector.

Motor valves INV-907, PV-908 and IV-908

Motor valves INV-907, PV-908 and IV-908 are motorized valves for automatic sample injection, column selection, sample and eluent switching, fraction collection and other automatic flow operations in ÄKTAexplorer.

The geometry of the valves ensures that no eluent or sample remains behind after switching, thus minimising the risk of cross contamination.

The valves are controlled by UNICORN control system and communicate their current position to UNICORN. If deviations occur, an alarm is activated and the run is paused.

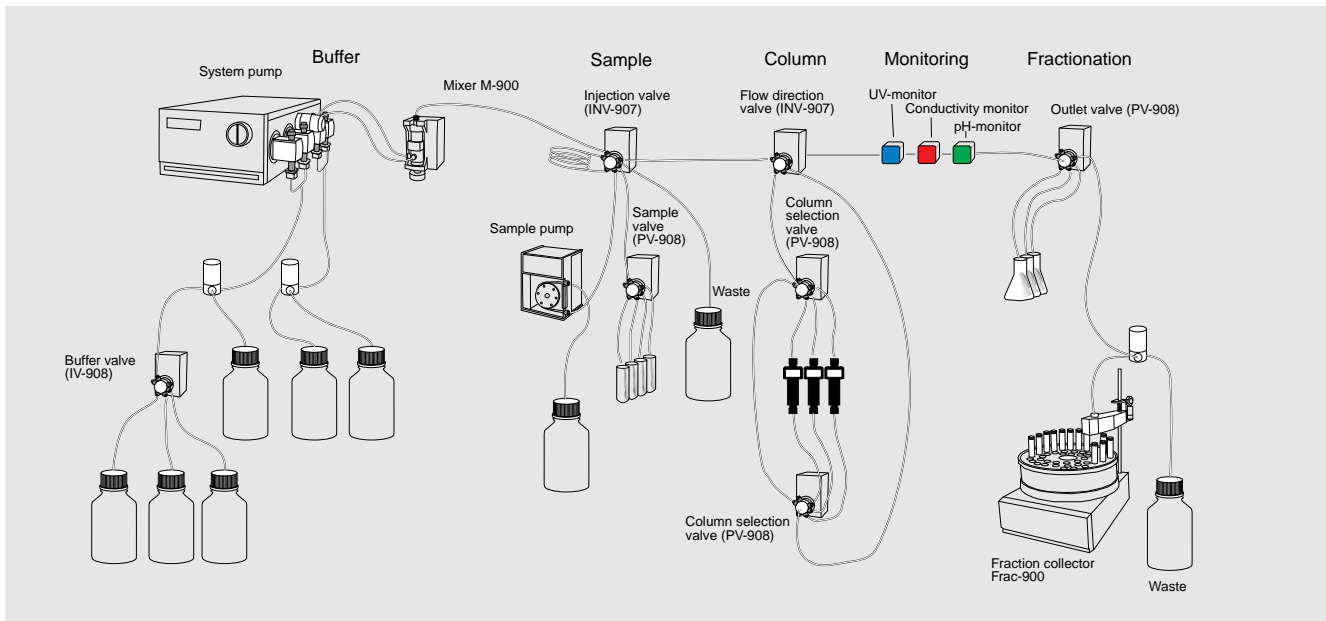


Fig. 2. Positions of the main ancillary units in ÄKTAexplorer, a system specially designed for method and process development.

Injection Valve INV-907

ÄKTAexplorer contains two seven-port motorized valves, one used as a sample application valve and the other for reversed flow through the column (see Fig. 2).

Figure 3a shows the three operating positions of the sample application valve.

When used as a sample application valve, these three operating positions make it possible to:

- Load a sample loop without disturbing column equilibration.
- Inject the sample onto the column while the loop waste tubing is washed.
- Wash the sample loop while the column is in operation.
- Wash the pump for quick eluent exchange without disturbing the column.

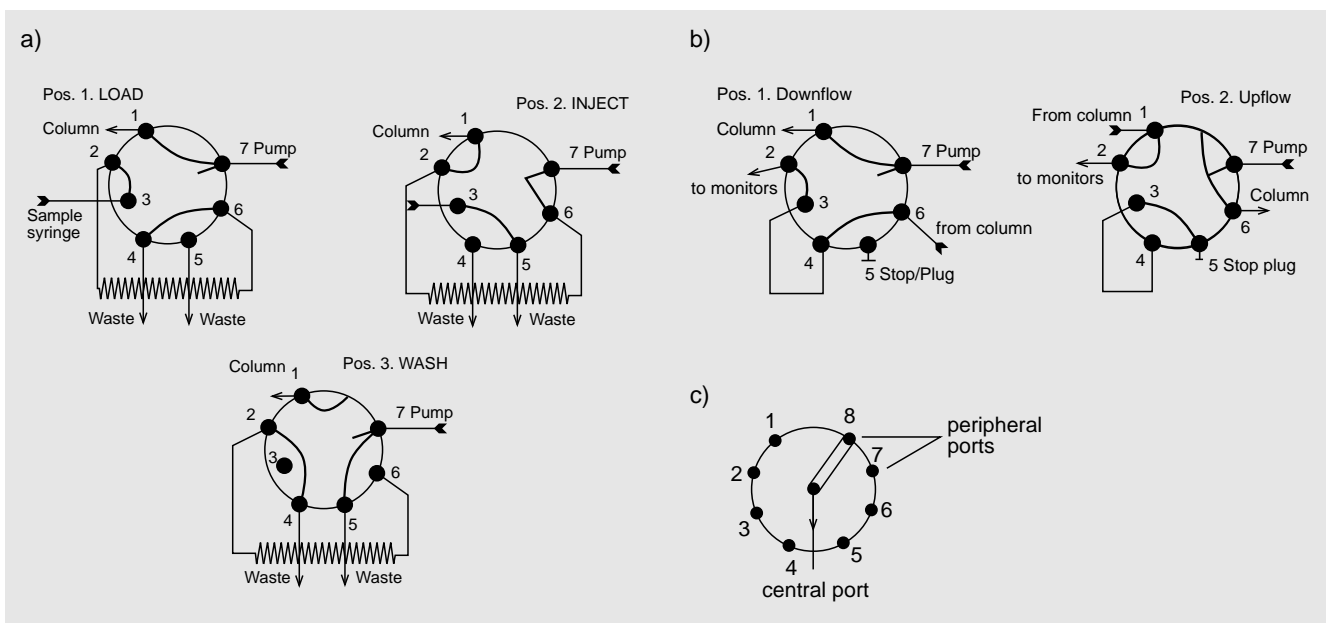


Fig. 3. The operating positions of (a) INV-907 used for sample application, (b) INV-907 used for reversed flow through the column and (c) PV-908/IV-908 valves.

Sample volumes up to 150 ml can be applied via loops connected to the injection valve:

- a) Using a range of fixed volume loops for applying samples from 100 µl to 2 ml with accuracy and precision. Partially filling a loop allows sample application of volumes smaller than 100 µl.
- b) Using Superloop™ 10 ml, Superloop 50 ml and Superloop 150 ml for applying samples in the range 1–10 ml, 1–50 ml and 1–150 ml respectively. All three are loaded by a syringe.

Larger volumes are applied via the system pump, Pump P-901, which allows the application of several litres of sample.

The second seven-port valve in ÄKTAexplorer is for reversed flow through the column, and is used for column cleaning as well as when reversed elution is preferred.

PV-908 and IV-908

Valve PV-908, with a pressure limit of 10 MPa, and IV-908, with a pressure limit of 2 MPa, are motorized 8-way valves. Compared with PV-908, IV-908 allows higher flow rates at lower back-pressures because it has larger diameter flow channels and is used on the inlet side of the system.

ÄKTAexplorer contains four PV-908 valves (see Fig. 2). Two are used for automatic column switching, which facilitates media scouting. One PV-908 can be used for automatic sample application of up to 8 samples. Another is utilized for collecting up to seven large fractions.

For eluent switching, one IV-908 is available. It is connected to Pump P-901 and allows switching between 8 different buffers or samples.

Mixer M-900

Mixer M-900 is a dynamic, single chamber mixer powered and controlled from Pump P-901. All eluents commonly used in ion exchange, hydrophobic interaction, affinity and reversed phase chromatography can be mixed with a high degree of accuracy and reproducibility. The mixer is positioned directly after the pump in ÄKTAexplorer (Fig. 2).

Mixer M-900 has three interchangeable mixing chambers (2, 5, and 12 ml) for optimal mixing in the entire flow rate range of ÄKTAexplorer (0.01–100 ml/min in isocratic mode and 0.5–100 ml/min in gradient mode). No special tools are needed to change the mixing chambers.

Fraction collector Frac-900

Frac-900 can be used for both small scale and preparative scale purifications with ÄKTAexplorer. It collects up to 175 fractions in 12 mm diameter tubes and up to 95 fractions in 10–18 mm diameter tubes.

In ÄKTAexplorer, the Frac-900 allows fixed volume fractionation or automatic peak fractionation. The latter function can be based on peak detection using slope or level sensing. Fraction marks and fraction numbers make it easy to identify fractions and peaks.

Fast tube change minimizes spills between tubes, eliminating it entirely below flow rates of 5 ml/min. Drop synchronization eliminates sample loss during tube change.

All Frac-900 functions, such as fraction control mode and automatic peak fractionation, are programmed from UNICORN control system.

Technical specifications

Motor valves INV-907, PV-908 and IV-908

Operating data	INV-907	IV-908	PV-908
Max. flow (ml/min)	100	100	100
Max. pressure (MPa (psi))	10 (1 450)	2 (290)	10 (1 450)
Viscosity (cP)	< 5	< 5	< 5
Switch time (ms between two adjacent positions)	250	250	250
Operating life time (cycles between two adjacent positions)	> 50 000	> 50 000	> 50 000
Environment			
Ambient temperature	+ 4 to + 40 °C,		
Relative humidity	20–95%		
Atmospheric pressure	86–106 kPa		
Physical data			
Internal volume in/out-port (µl)	5–9	26	7
Flow channel diameter (mm)	0.8	1.2	0.8
Wetted material	PEEK (polyetheretherketone)		
Power requirement	32 V DC from Pump P-901		
Power consumption	1.1 VA		
Dimensions, W × D × H	80 × 120 × 135 mm		
Control	UNICORN		

Mixer M-900

Internal volume	2, 5 or 12 ml
Mixing principle	1 static and 1 dynamic chamber
Pressure limit	10 MPa (1 450 psi)
Material of wetted parts	PEEK (polyetheretherketone) and FFPM (perfluororubber) PTFE (polytetrafluoroethylene)
Power requirement	12–40 V DC from Pump P-901
Power consumption	1 VA
Dimensions, W × D × H	77 × 111 × 152 mm
Control	UNICORN

Fraction collector Frac-900

Operating data	
Fraction size	0.05–99 ml (0.01 ml increments)
Tube capacity	175 in Tube Rack 12 mm 95 in Tube Rack 18 mm
Tube change time	12 mm Tube Rack, 0.2–0.4 s (depends on track) 18 mm Tube Rack, 0.3–0.6 s (depends on track)
Viscosity	Max 5 cP
Environment	
Ambient temperature	+4 to + 40 °C
Relative humidity	20–95%
Atmospheric pressure	84–106 kPa
Physical data	
Power requirement	100–120/220–240 V AC, 50–60 Hz
Power consumption	20 VA
Event mark	0.2 s for both contact closure and TTL output in remote socket
Wetted material fraction valve:	PTFE (polytetrafluoroethylene) ECTFE (ethylenechloro- trifluoroethylene)
Dimensions, W × D × H	290 × 370 × 380 mm
Weight	5.5 kg

Ordering information

Designation	Code No.
Injection Valve INV-907	18-1108-40
Motor Valve PV-908	18-1108-41
Motor Valve IV-908	18-1108-42
Injection Kit INV-907	18-1110-89
Sample loop 100 µl	18-1113-98
Sample loop 500 µl	18-1113-99
Sample loop 1.0 ml	18-1114-01
Sample loop 2.0 ml	18-1114-02
Superloop 10 ml	18-1113-81
Superloop 50 ml	18-1113-82
Superloop 150 ml	18-1023-85
Mixer M-900	18-1110-36
ÅKTAexplorer (Fraction collector not included)	18-1112-41
Fraction Collector Frac-900, complete with 18 mm tube rack	18-1104-99

Accessories and spare parts

Product	Quantity	Code No.
Fraction Collector Frac-900		
Tube Racks, complete with bowl, tube support, holder and guide.	12 mm 1 18 mm 1	19-8684-03 18-3050-03
Tube support	1	18-3054-02
Tube holder and guide	12 mm 2 18 mm 2	19-7242-02 19-8689-02
Bowl	1	18-3051-03

Related product literature

Product	Code No.
Monitor UV-900	Data File 18-1111-17
Pump P-901	Data File 18-1111-18
Monitor pH/C-900	Data File 18-1111-19
UNICORN control system	Data File 18-1111-20
ÅKTAexplorer	Data File 18-1111-21