

9.1 System specifications

System specifications

Parameter	Data
System configuration	Benchtop system, external computer
Control system	UNICORN 6.3 or other compatible version
Connection between PC and instrument	Ethernet
Dimensions (W x D x H)	535 x 470 x 630 mm
Weight (excluding computer)	up to 53 kg
Power supply	100-240 V ~, 50-60 Hz
Power consumption	300 VA (typical) 25 VA (power-save)
Enclosure protective class	IP 21
Tubing and connectors	ÄKTA pure 25: • Inlet: FEP tubing, i.d. 1.6 mm, Tubing connector 5/16" + Ferrule (yellow), 1/8" • Pump to Injection valve: PEEK tubing, i.d. 0.75 mm, Fingertight connector, 1/16" • After Injection valve: PEEK tubing, i.d. 0.50 mm, Fingertight connector, 1/16" • Outlet and waste: ETFE tubing, i.d. 1.0 mm, Fingertight connector, 1/16" • Optional tubing kits: i.d. 0.25 mm, i.d. 0.75 mm, i.d. 1.0 mm

Parameter	Data
Tubing and connectors	ÄKTA pure 150: • Inlet: FEP tubing, i.d. 2.9 mm, Tubing connector 5/16" + Ferrule (blue), 3/16" • Pump to injection valve: PEEK tubing, i.d. 1.0 mm, 10-32 UNF connections • After Injection valve: PEEK tubing, i.d. 0.75 mm, 10-32 UNF connections • Outlet: FEP, i.d. 1.6 mm, 5/16-24 UNF connections • Waste: ETFE tubing, i.d. 1.0 mm, Fingertight connector, 1/16" • Optional tubing kits: i.d. 0.5 mm, i.d. 1.0 mm

Environmental ranges

Parameter	Data
Storage and transport temperature range	-25°C to +60°C
Chemical environment	See the relevant purification instrument <i>User manual</i> .

Operating ranges

Parameter	Data
Operating temperature range	4°C to 35°C
Relative humidity	20% to 95%, non-condensing

Equipment noise level

Equipment	Acoustic noise level
ÄKTA pure instrument	< 60 dB A

9.2 Module specifications

Introduction

This section specifies the operating data of the components in ÄKTA pure. For general data for the system see [System specifications, on page 411](#).

System pumps

Parameter	Data
Pump type	Piston pump, metering type
Flow rate range	ÄKTA pure 25: 0.001 to 25 ml/min (up to 50 ml/min during column packing) ÄKTA pure 150: 0.01 to 150 ml/min (up to 300 ml/min during column packing)
Pressure range	ÄKTA pure 25: 0 to 20 MPa (2900 psi) ÄKTA pure 150: 0 to 5 MPa (725 psi)
Viscosity range	ÄKTA pure 25: 0.35 to 10 cP (5 cP above 12.5 ml/min) ÄKTA pure 150: 0.35 to 5 cP
Flow rate specifications	ÄKTA pure 25: - Accuracy: $\pm 1.2\%$ - Precision: RSD < 0.5% (Conditions: 0.25 to 25 ml/min, < 3 MPa, 0.8 to 2 cP) ÄKTA pure 150: - Accuracy: $\pm 1.5\%$ - Precision: RSD < 0.5% (Conditions: 1.0 to 150 ml/min, < 3 MPa, 0.8 to 2 cP)

Sample pump

Parameter	Data
Pump type	Piston pump, metering type
Dimensions (W x D x H)	215 x 370 x 210 mm
Weight	11 kg
Flow rate range	ÄKTA pure 25: 0.001 – 50 ml/min ÄKTA pure 150: 0.01 to 150 ml/min
Pressure range	ÄKTA pure 25: 0 to 10 MPa (1450 psi) ÄKTA pure 150: 0 to 5 MPa (725 psi)
Viscosity range	0.7 to 10 cP
Flow rate specifications	ÄKTA pure 25: - Accuracy: $\pm 2\%$ - Precision: RSD < 0.5% (Conditions: 0.25 – 50 ml/min, < 3 MPa, 0.8 – 3 cP) ÄKTA pure 150: - Accuracy: $\pm 2\%$ - Precision: RSD < 0.5% (Conditions: 1.0 – 150 ml/min, < 3 MPa, 0.8 – 3 cP)

Valves

Parameter	Data
Type	Rotary valves
Number of valves	Up to 12
Functions	Standard: Injection Options: Inlet A, Inlet B, Sample inlet, Extra inlet, Mixer bypass, Loop selection, Column selection, pH, Outlet, Versatile

Inlet options

Parameter	Data
Inlet A	1, 2 or 7 inlets
Inlet B	1, 2 or 7 inlets
Sample inlet	Up to 7 sample inlets and 1 buffer inlet

Outlet options

Parameter	Data
Number of outlets	1 or 10

Mixer

Parameter	Data
Mixing principle	Chamber with magnetic stirrer
Mixer volume	ÄKTA pure 25: 0.6, 1.4 or 5 ml ÄKTA pure 150: 1.4, 5 or 15 ml

Gradient formation

Parameter	Data
Gradient flow rate range	ÄKTA pure 25: 0.1 to 25 ml/min ÄKTA pure 150: 0.5 to 150 ml/min
Gradient composition accuracy	ÄKTA pure 25: ±0.6% (Conditions 5 to 95% B. 0.5 to 25 ml/min, 0.2 to 2 MPa, 0.8 to 2 cP) ÄKTA pure 150: ±0.8% (Conditions 5 to 95% B. 2 to 150 ml/min, 0.2 to 2 MPa, 0.8 to 2 cP)

Pressure monitors

Parameter	Data
Number of sensors	Up to 4
Placement of sensors	Standard: The System pressure monitor is located after the System pump Options: - The Pre-column pressure monitor and the Post-column pressure monitor are integrated in Column valve V9-C or V9H-C. - The Sample pressure monitor is located after the Sample pump.

External air sensor options

Parameter	Data
Number of sensors	Up to 7
Placement	- Integrated in inlet valve A, inlet valve B and sample inlet valve - After the injection valve - Before the system pumps - Before the sample pump
Sensing principle	Ultrasonic

UV monitor options

Parameter	Data
Number of monitors	Up to 2
Wavelength range	U9-L: 280 nm U9-M: 190 to 700 nm in steps of 1 nm, up to 3 wavelengths
Absorbance range	-6 to 6 AU
Resolution	0.001 mAU
Linearity	U9-L: within $\pm 5\%$ at 0 to 2 AU U9-M: within $\pm 2\%$ at 0 to 2 AU
Drift	U9-L (2 mm cell): $\leq 0.2 \text{ mAU} \text{ AU/h}$ U9-M (2 mm cell at 280 nm): $\leq 0.2 \text{ mAU} \text{ AU/h}$

Parameter	Data
Noise	U9-L: < 0.1 mAU U9-M: < 0.08 mAU
Operating pressure	0 to 2 MPa
Lamp operating time	U9-L: > 10000 h U9-M: > 5000 h
Flow cells: U9-L	Standard: Optical path length 2 mm Cell volume 2 µl Total volume: 30 µl Option: Optical path length 5 mm Cell volume 6 µl Total volume 20 µl
Flow cells: U9-M	Standard: Optical path length 2 mm Cell volume 2 µl Total volume: 11 µl Option: Optical path length 10 mm Cell volume 8 µl Total volume 12 µl Optical path length 0.5 mm Cell volume 1 µl Total volume 10 µl

Conductivity monitor options

Parameter	Data
Conductivity reading range	0.01 to 999.99 mS/cm
Accuracy	± 0.01 mS/cm or ± 2%, whichever is greater, (within 0.3 to 300 mS/cm)
Operating pressure	0 to 5 MPa
Flow cell volume	22 µl
Temperature monitor range	0°C to 99°C
Temperature monitor accuracy	±1.5°C within 4°C to 45°C

pH monitor option

Parameter	Data
pH reading range	0 to 14
Accuracy	± 0.1 pH unit within pH 2 to 12, temperature within ±3°C from calibration temperature
Operating pressure	0 to 0.5 MPa
Flow cell volume	ÄKTA pure 25: 76 µl ÄKTA pure 150: 129 µl

Outlet valve fractionation option

Parameter	Data
Number of outlets	10
Fraction volumes	0.01 to 20 000 ml
Delay volume (UV – outlet valve)	ÄKTA pure 25: 125 µl 66 µl with optional tubing kit (i.d. 0.25 mm) ÄKTA pure 150: 296 µl 245 µl with optional tubing kit (i.d. 0.5 mm)

Fraction collector options

Parameter	Data
Number of fraction collectors	Up to two. The second fraction collector must be an F9-R.
Number of fractions	F9-C: Up to 576 F9-R: Up to 175

Parameter	Data
Vessel types	F9-C: • Deep well plates, 96, 48 or 24 wells • Tubes 3, 5, 8, 15, 50 ml • Bottle, 250 ml F9-R: 3, 5, 8, 15 or 50 ml tubes
Fraction volumes	F9-C: 0.1 to 250 ml F9-R: 0.1 to 50 ml
Spillage-free mode	F9-C: Automatic, Drop sync or Accumulator F9-R: Drop sync
Flammable liquids	F9-C: no F9-R: yes
Delay volume (UV – dispenser head)	ÄKTA pure 25: F9-R: 205 µl, 86 µl with optional tubing kit (i.d. 0.25 mm) F9-C: 435 µl, 214 µl with optional tubing kit (i.d. 0.25 mm) ÄKTA pure 150: F9-R: 473 µl, 278 µl with optional tubing kit (i.d. 0.5 mm) F9-C: 876 µl, 508 µl with optional tubing kit (i.d. 0.5 mm)
Dimensions (W x D x H)	• F9-C: 390 x 585 x 320 mm • F9-R: 320 x 400 x 250 mm
Weight	• F9-C: 21 kg • F9-R: 5 kg

I/O box

Parameter	Data
Number of ports	2 analog in, 2 analog out 4 digital in, 4 digital out
Analog range	In +/- 2 V Out +/- 1 V

9.3 Tubing and connectors

Tubing types

The table below shows the tubing types used in ÄKTA pure.

Description	Color	Scope of use	Volume/cm
PEEK, o.d. 1/16", i.d. 0.25 mm	Blue	High pressure tubing Reference capillary 1 Tubing Kit 0.25	0.5 µl
PEEK, o.d. 1/16", i.d. 0.50 mm	Orange	High pressure tubing Tubing kit 0.5 (stan- dard)	2.0 µl
PEEK, o.d. 1/16", i.d. 0.75 mm	Green	High pressure tubing Tubing kit 0.75	4.4 µl
PEEK, o.d. 1/16", i.d. 1.0 mm	Beige	High pressure tubing Tubing kit 1.0	7.8 µl
FEP, o.d. 1/8", i.d. 1.6 mm	Transparent	Inlet tubing	20.0 µl
FEP, o.d. 3/16", i.d. 2.9 mm	Transparent	Inlet tubing for high flow rate and high vis- cosity	66.0 µl
ETFE, o.d. 1/16", i.d. 0.75 mm	Transparent	Narrow inlet tubing (optional)	4.4 µl
ETFE, o.d. 1/16", i.d. 1.0 mm	Transparent	Outlet and waste tub- ing	7.8 µl
Silicone, o.d. 12 mm, i.d. 8 mm	Transparent	Waste tubing from Buffer tray	0.3 ml
		Pump rinse solution tubing	

- Note:**
- Many different sizes/types of tubing can be connected to a chromatography system. Tubing with a smaller inner diameter (i.d.) holds less delay volume and will therefore generate less dilution of the protein peak. Narrow tubing, however, increases the system pressure, especially when running at high flow rates. The tubing used should match the application needs. See [Section 9.4 Recommended tubing kits for prepacked columns, on page 428](#) for more information.
 - When using the high pressure tubing kit with i.d. 1.0 mm to allow high flow rates in combination with high viscosities in the pumps, inlet tubing with a larger i.d. than standard might be needed to avoid outgassing.

Tubing connectors

The table below shows the tubing connectors used in ÄKTA pure.

Description	Use with tubing...
Fingertight connector, 1/16"	• PEEK, o.d. 1/16", i.d. 0.25 mm • PEEK, o.d. 1/16", i.d. 0.50 mm • PEEK, o.d. 1/16", i.d. 0.75 mm • PEEK, o.d. 1/16", i.d. 1.0 mm • ETFE, o.d. 1/16", i.d. 1.0 mm
Tubing connector 5/16" + Ferrule (blue), 1/16"	ETFE, o.d. 1/16", i.d. 0.75 mm
Tubing connector 5/16" + ferrule (blue) 3/16"	FEP o.d. 3/16" i.d. 2.9 mm
Tubing connector 5/16" + Ferrule (yellow), 1/8"	FEP, o.d. 1/8", i.d. 1.6 mm

Other connectors

The table below shows other connectors used in ÄKTA pure.

Description	Scope of use
Stop plug 1/16"	Stop plug for valve ports
Luer female	Syringe connector for pH valve and Injection valve