

BlueShadow Pump 40P

The BlueShadow Pump 40P was designed to provide exceptionally precise and reliable solvent delivery for a wide range of dosing applications. Exchangeable pump heads with maximum flow rates of 10 and 50 ml/min cover a wide range of high-pressure dosing tasks. Practically pulse-free flow is achieved by our enhanced smart drive control which actively prevents pressure ripple instead of just dampening it. The improved design features a built-in inline filter and low dead volume fluidic path. Change your metering rate with the wipeable membrane keyboard or use the remote control from your process control system.

Pump heads for high-temperature applications enable solvent delivery at up to 120°C. Minimize temperature gradients by adding a pump head heater and insulation sleeve.



Specifications

Solvent delivery

Pump type	High-Pressure Dosing Pump
Delivery system	Dual piston pump with one working piston, one auxillary piston
Pulsation compensation	Active Pulsation Compensation
Piston seal washing	Active Wash
Flow rate accuracy	± 0.25 % (measured at 5-80 % of flow range, using ethanol)
Flow rate precision	≤ 0.04 % RSD or 0.008 min SD (whichever is greater)
Pulsation	< 2 % amplitude (typically < 1.3 %) or < 0.3 MPa (3 bar), whatever is greater, at 1 ml/min ethanol, at all pressures > 1 MPa (10 bar, 147 psi).
System protection	Pmin und Pmax adjustable
Liquid temperature range	4-60 °C (39.2-140 °F)
Leak management	No
Pump head inlet (standard)	1/8" OD, 2.1 mm ID FEP tubing (UNF 1/4-28 Thread, flat bottom)
Pump head outlet (standard)	UNF 10-32 Thread (for 1/16" capillary)

Communication

Display	Yes
Inputs	LAN, RS-232, Pin header connectors (Analog IN, Start In, Error IN)
Analog inputs	Flow rate, 0 - 10 V via pin header connectors
Analog control input	Flow Rate
Level/event outputs	8 event outputs (TTL, OC, Relais) and 24 V
Control	Standalone, LAN, RS-232, Analog and event control
Programming	10 programs, 9 program links + wake up program, supports gradients

Technical parameters

Leak sensor	No
Special features	Pump Head is detected automatically using radio frequency indentificaion (RFID), Inline filter
GLP	RFID pump head recognition, detailed report
Conformity	IP20 ingress protection
Display	LCD Display
Ambient conditions	4 - 40 °C (50-104 °F), Air humidity below 90 %, non-condensing

General

Power supply	100 - 240 V; 50 - 60 Hz; Maximum power consumption 320 Watt
Dimensions	242 mm x 165 mm x 399 mm (W x H x D)
Weight	6.1 kg
Optional accessories	High temperature pump head, pump head heating and cooling device



For accessories see page 25.



A variety of software control options is available: KNAUER offers various options for drivers. For more information, please visit <https://www.knauer.net/softwarecontrol>

BlueShadow Pump 40P with 10 ml pump head

Specifications

Pump specifications

Pump head	10 ml
Flow rate range	0.001 - 10 ml/min
Maximum delivery pressure	9430 psi / 650 bar / 65 MPa up to 5 ml/min; 5800 psi / 400 bar / 40 MPa up to 10 ml/min
Wetted materials	Stainless steel version: GFP (graphite fiber reinforced PTFE), sapphire, ruby, PEEK, stainless steel, Zirconium oxide Ceramic version: GFP (graphite fiber reinforced PTFE), sapphire, ruby, PEEK, Zirconium oxide, aluminium oxide
Maximum viscosity	100 mPa s
Flow rate increment	0.001 ml/min
Best working conditions	0.1 - 8.0 ml/min
Continuous working conditions	0.1 -4.0 ml/min
Pumphead material	Stainless steel / ceramic

Ordering details:

APC40EA	BlueShadow Pump 40P with 10 ml/min stainless steel pump head
APC40EE	BlueShadow Pump 40P with 10 ml/min stainless steel pump head, high-temperature version (Tmax=120° C)
APC40EI	BlueShadow Pump 40P with 10 ml/min stainless steel pump head, high-temperature version (Tmax=120° C), with piston seal wash
APC60EB	BlueShadow Pump 40P with 10 ml pump head, ceramic (metal-free)

BlueShadow Pump 40P with 50 ml pump head

Specifications

Pump specifications

Pump head	50 ml
Flow rate range	0.001 - 50 ml/min
Maximum delivery pressure	4350 psi / 300 bar / 30 MPa up to 10 ml/min; 2900 psi / 200 bar / 20 MPa up to 50 ml/min
Wetted materials	Stainless steel version: GFP (graphite fiber reinforced PTFE), sapphire, ruby, PEEK, Zirconium oxide Ceramic version: GFP (graphite fiber reinforced PTFE), sapphire, ruby, aluminium oxide, Zirconium oxide
Maximum viscosity	100 mPa s
Flow rate increment	0.001 ml/min
Best working conditions	0.1 - 40 ml/min
Continuous working conditions	0.1 - 20 ml/min
Pumphead material	Stainless steel / ceramic

Ordering details:

APC40FA	BlueShadow Pump 40P with 50 ml/min stainless steel pump head
APC60FB	BlueShadow Pump 40P with 50 ml/min ceramic pump head
APC40FE	BlueShadow Pump 40P with 50 ml/min stainless steel pump head, high-temperature version (Tmax=120° C)
APC40FH	BlueShadow Pump 40P with 50 ml/min stainless steel pump head, high-temperature version (Tmax=120° C), with piston seal wash