

Pulsless high pressure piston pump CP 04 is designed for accurate dosing of corrosive liquids that do not attack stainless steel 316 (AISI), polytetrafluorethylene (PTFE), polyetheretherketone (PEEK), high molecular weight polyethylene (HDPE), titanium nitride and synthetic sapphire or ruby.

The pistons of the four parallel pumping heads (in two blocks) are actuated by rods supported by ball bearings tracing eccentric cams. Motion is transmitted to the pistons by means of flat steel profiles supported by small ball-bearing guides.

The pump is driven by an asynchronous motor using a teeth belt (gear reduction 3 : 1). The rotor speed is controlled by a vector frequency converter. The full pistons stroke is kept in all regimes, as the flow rate is changed only due its frequency.

The suction and delivery ball valves of the CP 04 pumps are single-stage, mounted in removable cartridges. The seats are made of sapphire monocrystals, the balls are made of ruby. Pump pistons are made of 316 stainless steel, polished and covered with titanium nitride layer to improve their hardness. Pump sealing is made of two high density polyethylene conical rings which are pressed by PEEK made insert which allows together with secondary sealing the of back flow, to secure the pump when dissolved solids are contained in mobile phase. Liquid delivered by pump heads is collected in a manifold where pressure sensor is located. Standard version (CP 04EP) is provided with keyboard and two lines alphanumeric display for a control of the flow rate, pressure limit.



The high-pressure pump CP 02 has the same design as CP 04 type, but only one block with two piston heads is employed. Standard version CP 02EP is provided with display and keyboard. CP 02EPG with gradient master is available. Basic CP 02 has only LED display to show flow rate and a knob to set it. All CP 02 versions can be delivered also with 10 mm O.D. pistons (CP 02R type) for half flow rate and higher pressure. CP 02M is delivered to be use as constant flow metering pump for different applications. It consist of mechanical block, gearbox and motor.

The laboratory pumps of CP 03 series are two - piston heads pumps for smaller, laboratory type preparative chromatographs, with pistons of 7 mm diameter and 7,5 mm stroke. Ball valves are made of sapphire and ruby monocrystals. The liquid is in contact with stainless steel class 316 (AISI), titanium nitride (TiN), polytetrafluoroethylene (PTFE), polyetheretherketone (PEEK), high molecular weight polyethylene (HDPE), synthetic sapphire and ruby. The rod system is similar to the CPI 02/04 series. A DC motor with accurate optoelectronic control actuates the piston rods through a two-steps gearbox.

The pump is equipped with flowrate calibration and an output pressure measuring device. It is controlled via double-line alphanumeric display and a keyboard. The installed pressure gauge enables a limit pressure to be set. In the version CP 03G gradient controller is installed to produce three phase low pressure gradient. The pump is mounted in a metal box; panels have an epoxide, chemically resistant coating.



Technical parameters of CP line pumps

Type	CP 02	CP02R	CP 04	CP 03
Weight (kg)	16 kg	16	25	8
Dimension (d x w x h) (mm)	500 x 300 x 180	500 x 300 x 180	500 x 500 x 180	220 x 300 x 400
Power (V) / input (W)	230/600	230/600	230/1100	230/200
Number of heads	2	2	4	2
Piston diameter (mm)	16	10	16	7
Piston stroke (mm)	7,5	7,5	7,5	7,5
Flow rate range (ml/min)	130 - 1500	50 - 700	250 - 3000	1 - 200
Max. pressure (bar)	150	220	150	150

D-FORCEs are new, one piston, double action metering pumps specially designed for heavy conditions of preparative chromatography applications.

D-FORCEs are less sensitive to solid impurities in mobile phases than other pumps. The unique design results in nearly pulsless flow although pumps have one piston head only. Flow rate practically does not depend on outside pressure.

D-FORCE pumps are corrosion resistant as wet parts are made of HDPE (high density polyethylene), PEEK (polyetheretherketone), PTFE (polytetrafluorethylene) and AISI 316 stainless steel only.

D-FORCE pumping head consist of a polished stainless steel cylinder with a piston inside. Piston front part is equipped with a ruff made of high density polyethylene. Piston rod has just half cross-section in comparison with the cylinder and is sealed on back side of the cylinder with well-tried conical sealing which is known from Labio CP pumps line. On the bottom front part of the cylinder is located robust check valve with large ball inside. Output valve is created by piston ruff.

All **D-FORCE** pumps are placed in single block shaped box with a two line display and the keyboard on the front panel. Box is covered by U shaped stainless steel sheet. Inside of the box is situated motor, gearbox, cam mechanism, pressure gauge and electronics. Flow rate, time of the action and pressure limit are controlled from the keyboard, actual flow and pressure is monitored.



Technical parameters

D-FORCE 0.5	0,5 - 500 ml/min, 30 bar, cylinder I.D. 14 mm	DC motor, optoel. control
D-FORCE 1	1 - 1000 ml/min, 10 bar, cylinder I.D. 25 mm	DC motor, optoel. contro
D-FORCE 4	300 - 4000 ml/min, 25 bar, cylinder I.D. 42 mm	AC motor, frequency changer
D-DORCE 8	600 - 8000 ml/min, 10 bar, 2 cylinders I.D. 42 mm	AC motor, frequency changer

Analytical HPLC pump CP 05 is a precise instrument combines reliable mechanical part made in USA with Labio electronics. Pump is equipped with step motor and specially formed cams to exclude pulsations. Piston heads are removable by hands. Sapphire made pistons have diameter 2,4 mm and stroke and 8 mm (12 ul/stroke). It brings high precision especially in small flow rate range and gradient applications. Ball valves are made of sapphire and ruby monocrystals.

The liquid is in contact with stainless steel class 316 (AISI), polytetrafluoroethylene (PTFE), synt-hetic sapphire and ruby. On the output is installed lowl volume pressure measuring gauge in combination with bypass valve.

Pump CP 05G is equipped with external control of all variables due a serial line which connector is situated ob back side. A gradient pogrammer and three way solenoid valve are integrated in this version to produce three phase low pressure gradient in ten linear steps. The combination of a pump with two phase gradient programmer (CP 05G2) and a simple pump without control panel, pressure sensor and by-pass valve (CP 05S) is offered for high precise gradient applications.



Technical parameters:

Flow rate range	: 0,01 – 9,99 ml/min
Max. Pressure	: 300 bar (4200 PSI)
Low pressure gradient	: 3 phases, 10 lin. steps
High pressure gradient	: 2 phases, 10 lin. steps
Ext. control	: (a) start stop : (b) serial line to PC
Dimensions (hxwx d)	: 200 mm x 220 mm x 350 mm
Power	: 230 V, 50 Hz, 200 W
Weight	: 8 kg

LINAR 30 positive displacement pump is destined for micro-chromatography. It has very short time of filling and broad flow range which means that can be used for current analytical HPLC too. Its heart is a stainless steel precisely polished cylinder having volume 30 ml. A piston with front PTFE sealing is moving in the cylinder. Piston drive is secured by special ball screw which is connected to the gearbox and step motor.

Mechanical part is situated in pump box in horizontal position and pump cylinder is slightly inclined to ensure that all air bubbles leave lightly the cylinder. Input needle valve is closed and opened by a motoric drive. There is a ball valve (saphir, ruby) on the output in combination with small cell of pressure gauge.

Inner space of the pump where cylinder and other hydraulic parts are situated is heated and kept on slightly increased stable temperature to avoid problems with flow changes due liquid volume dependence on temperature.

Flow rate (1 ul/min – 1999 ul/min) and its linear change in time can be set well as an interval of pump action. The suction (full cylinder within 1,5 min) can be adjusted to be done either manually or automatically when pump stop the action. The flow rate calibration is enabled using special password. The installed pressure gauge enables upper pressure limit setting (max 300 bar – 4200 PSI). External control is here to start and stop the pump (connecting jack on the back side).

There is twoline alphanumeric illuminated display on the upper oblique part of the front panel together with small keyboard to control pump parameters and to show information about displaced volume and system pressure.



Peristaltic Pump PP 02E is a high-pressure, two-channel peristaltic pump adapted for work with tubes of 2 to 6 mm I.D. The rotor has four rollers made of PTFE. The pump is driven by a dc motor with optoelectronic speed control and a worm-gear transmission.

The swinging, crescent-shaped stator adapts itself to the forces exercised by the tubing. PP 02 design enables to use either a single channel or two tubes of different diameter. Pump is microprocessor-controlled and is supplied with a two-line alphanumeric display and keyboard. The pump can be programmed as time-restricted or discontinuous for repeated batch pumping. Flow rate range (and batch size) is automatically set in dependence on tube diameter. Calibration is easy and allow to work with high precision.

The rotor assembly is mounted horizontally, inlet and outlet tubes are directed to the right.

Technical specification:

Channels	: 2
Min. flow rate	: (tube 2 mm I.D.) 0,1 ml . min ⁻¹ /chan
Max. flow rate	: (tube 6 mm I.D.) 150 ml . min ⁻¹ /chan
Max. Pressure	: 200 kPa
Features	: two modes . pump, dosage
Batch size	: 0,5 ml . 50000 ml /chan
Repeating time	: 0,1 min . 600 min
Number of batches	: up 1 - 100
calibration setting	: ± 50%
Dimensions (d×w×h)	: 220 mm × 180 mm × 180 mm
Operating voltage	: 230 V
Power input	: 300 VA
Weight:	: 4 kg

Peristaltic Pump PP 01E is a one-channel peristaltic pump having the same design as PP 02. It is adapted for work with tubes 6 - 12 mm I.D. Min. flow rate (tube 6 mm I.D.) is 1 ml . Min⁻¹, max. flow rate (tube 12 mm I.D.) is 600 ml . Min⁻¹. Batch size is: 2 ml . 50000 ml

Peristaltic pump PP 01-16E is a robust, single-channel, high-flow peristaltic pump adapted for work with tubes of up to 16 mm I.D. The rotor contains three ball-bearing rollers. The pump is driven by an asynchronous motor with a gearbox. Flow changes are secured by a frequency converter enables the rotor speed to be set. The pump is microprocessor-controlled, supplied with a two-line alphanumeric display and keyboard. It can be programmed as time-restricted or discontinuous for repeated batch pumping. Pump speed can be externally controlled (as option). The displayed flow rate or batch volume can be modified by a calibration procedure. Min. flow rate for tube 10 mm I.D. is 120 ml . Min⁻¹, max. flow rate (tube 16 mm I.D.) is 3000 ml . min⁻¹. Max. Pressure is 2 bar, batch size is 500 ml . - 500000 ml.

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