

Preparative Pumps Family

This new generation of preparative and process pumps use a very sophisticated three pumps head system (patent pending) design to achieve:

- Precise low-pressure quaternary gradient
- Noise free flow
- Built in recycling
- Automated through pump injection

The combination of a third head to a traditional dual head system generates the most noise free preparative pump on the market today (Fig.1).

The reason is that when an operational flow is selected on a pump the flow is created by regulating the flow of solvents through solenoid operated valves. The regulation of these valves can lead to negative and positive pressure peaks with consequent cavitations and bubble formation, especially at high flow rates. This is indicated in (Fig.2).

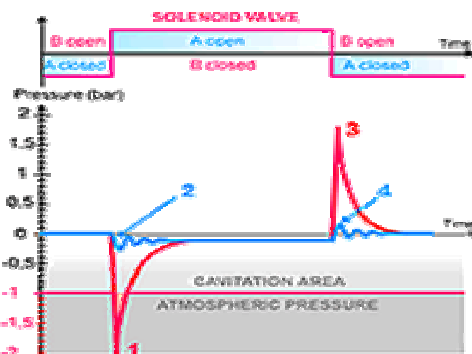


Fig. 2 Pump principle of operation

In conventional system, when the solenoid valve closes, the negative acceleration to stop the liquid flow inside the inlet tubing produces a pressure peak (peak 3) increasing the solenoid valve closure pressure.

The same pressure (peak 1) is then necessary to start the suction in the next cycle. The flow that was stopped needs to accelerate very quickly. This is often impossible and the valve opening time is delayed introducing cavitation and bubble formation. In addition, in this mode of operation the mixture of solvent in gradient mode and flow rate accuracy are reduced.

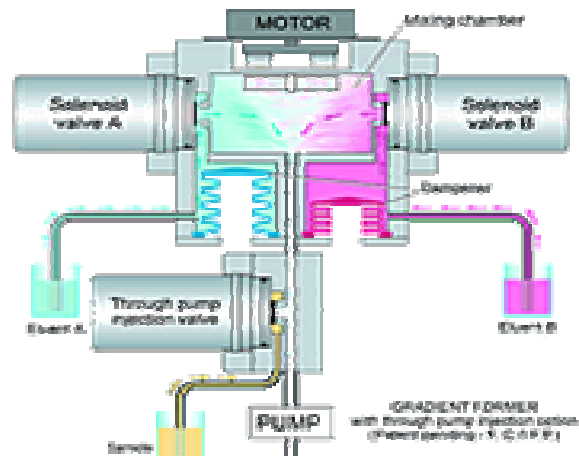


Fig. 1 Pump schematics

The Armen pump family has been especially designed to overcome these problems. A pulse less, constant suction flow is obtained by the incorporation of a third pump head (Patent pending) which ensures that the inlet of the solenoid valves are always supplied with liquid at the same flow rate to produce a constant mixture by avoiding stop and delay of flow (peaks 2 and 4). The conclusion is not only an excellent flow noise in isocratic mode but outstanding performance in gradient mode (fig.3). The result of this innovation is a gradient pump with exceptional accuracy, reproducibility and linearity better than 0.25% from 0.5% to 99.5% solvent ratio.

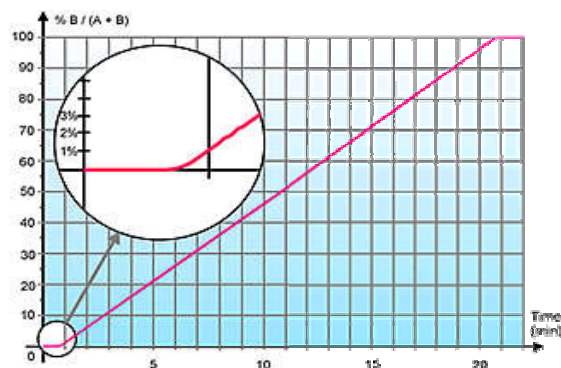


Fig.3 Gradient example

The same principle provides also a very efficient way to work in recycling mode.

AP PUMP FAMILY



Operating Temperature
Flow calibration
Accuracy and Precision
Liquid-contact Materials
Injection

0° - 40° C for instrument.

Can be done via the keyboard.
 Maximum accuracy error is $\pm 0.25\%$, depending of the solvents and calibration.

316 stainless steel/titanium, sapphire/ceramic, ruby, PCTFE, PTFE, PTFE / HDPE.

Three techniques "Loop injection", "Through-pump-injection" with manual control via the keyboard and "Through-pump-injection" for a programmable volume

Manual and programmed gradient

A flow rate gradient or elution gradient (two, three or four eluents) can be programmed and modified in manual mode at any time during the elution as well as in automatic program.

Fraction collector

At any time during manual operation, the fraction collector (8 ports) and associated valves, when installed may be operated via the keyboard.

Automatic programs

Via the keyboard (on the front panel). Every parameter can be programmed through data transmission (in direct control or downloading).

Electrical Interface

RS 232 and RS 422 Voltage 230/110V, 50 - 60Hz

RODUCT	REFERENCE	FLOW ml/min	MAX. PRESSURE	COMMENTS
2 head pump	AP-1000-200-2	2 to 1000	200bar	✦ For isocratic mode
3 head pump	AP-1000-200-3	2 to 1000	200bar	✦ For gradient mode
2 head pump	AP-2000-100-2	4 to 2000	100bar	✦ For isocratic mode
3 head pump	AP-2000-100-3	4 to 2000	100bar	✦ For gradient mode
2 head pump	AP-4000-050-2	8 to 2000	050bar	✦ For isocratic mode
3 head pump	AP-4000-050-3	8 to 2000	050bar	✦ For gradient mode
Gradient former 1000 - 2000				
2 Eluents	GF 1000-2000-2	✦ The gradient former is equipped with a plunger to adjust the dynamic mixing chamber volume. ✦ The linearity of the gradient from 0.5% to 99.5% is better than 0.25% for all flow range.		
3 Eluents	GF 1000-2000-3			
4 Eluents	GF 1000-2000-4			
Gradient former 4000				
2 Eluents	GF 4000-2	✦ The gradient former is equipped with a plunger to adjust the dynamic mixing chamber volume. ✦ The linearity of the gradient from 0.5% to 99.5% is better than 0.25% for all flow range.		
3 Eluents	GF 4000-3			
4 Eluents	GF 4000-4			
Inject through pump	INJ-1000 to 4000	✦ Installed on accessories unit ACC 250-500 with GF 250-500 ✦ Injected volume from 1ml up to 9999ml by step of 1ml. ✦ Installed on accessories unit ACC 100 without GF 250-500		
Inject through pump	INJ-S-1000 to 4000			