separlab

product catalog

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COLUMNS FOR PREPARATIVE CHROMATOGRAPHY

separchrom PC01

HPLC COLUMNS FOR PREP CHROMATOGRAPHY

High performance Columns with biaxial compression

Columns ***Separchrom PC01*** correspond to the highest requirements of preparative liquid chromatography. PC01 columns are designed to be used in a mode of axial (or biaxial) compression. Columns can be packed by dynamic slurry technique or by sedimentation method. They are equipped with identical pistons on input and output. Pistons are provided by Poremet® 2 stainless steel (AISI 316 L) frits with porosity 3 µm and minimum hydraulic resistance. New developed patented liquid distributing system is installed under each frit. The design guarantees perfect piston flow, high efficiency even for high injection volume and simple accessibility of frit for cleaning.

Separchrom PC01 columns are made of high quality stainless steel (AISI 316 or AISI 316L on the request) and their inner surface is polished to reach Ra < 0,3 µm. Column flanges are not welded, but screwed on the column tube. It means that there is no temperature increasing during manufacture and thus no change of steel properties. Columns have input piston with large stroke (possibly through whole column length) and it is moved by a force generated by a hydraulic cylinder or by flange bolts tightening. Single hydraulic cylinders fitted on upper flange with manual oil pumps are offered as well as fully automated electric motor driven devices for columns' packing/unpacking procedure. Separchrom PC01 column output pistons movement is provided mechanically by tightening the flange bolts. In this case is functional stroke of the piston approximately 15 % of the column I.D. Pistons are sectional, frit squeezed to the frit ring can be released from piston body and cleaned as well the flow distributor. Distributor design effectively protects the frit from particles which can caused i´their blockage.

Separchrom PC01 columns are delivered with legs made of stainless steel closed profiles and fitted to the upper tube flange. It means that output flange is fully accessible for disassembling and sorbent releasing.

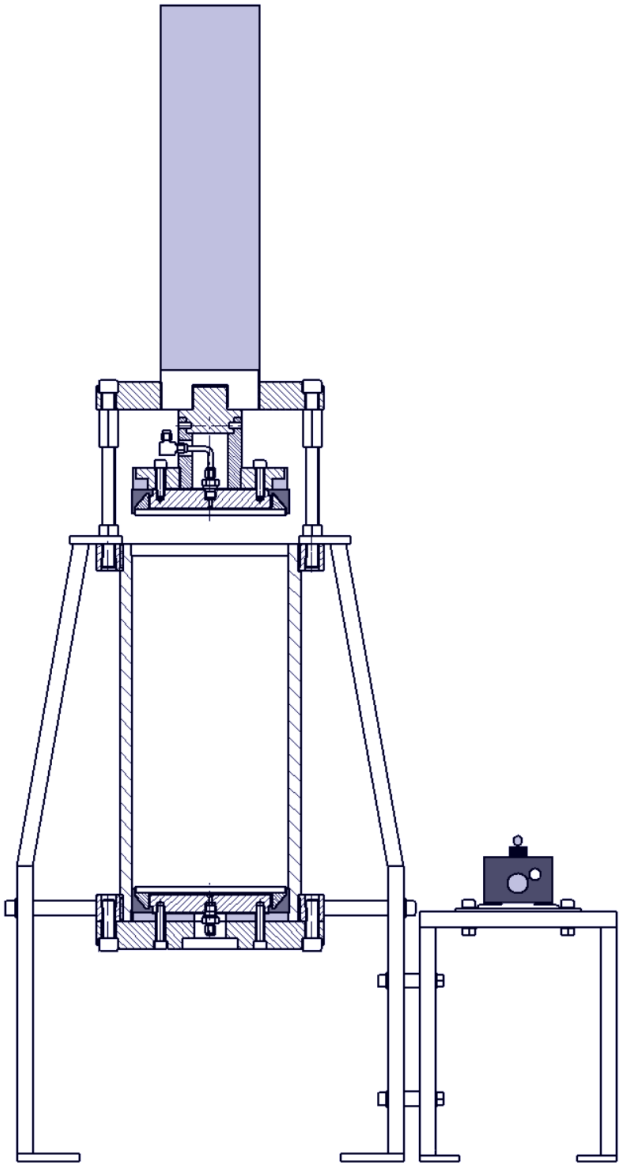
Separchrom PC01 columns are completed by a broad scale of accessories as filling adapters, slurry mixing vessels, slurry transporting pumps etc. for automatic filling using dynamic slurry technique as well as automatic emptying procedure.

Columns for laboratory applications

Type of column	I.D. mm	Length mm	Pressure bar	Note
SEPARCHROM PC01 25/50	25	50	200	Delivered without legs
SEPARCHROM PC01 25/100	25	100	200	Delivered without legs
SEPARCHROM PC01 25/250	25	250	200	Delivered without legs
SEPARCHROM PC01 50/50	50	50	200	Delivered without legs
SEPARCHROM PC01 50/100	50	100	200	
SEPARCHROM PC01 50/250	50	250	200	
SEPARCHROM PC01 50/500	50	500	200	
SEPARCHROM PC01 100/100	100	100	150	
SEPARCHROM PC01 100/250	100	250	150	
SEPARCHROM PC01 100/500	100	500	150	

Columns for industrial applications

Type of column	I.D. mm	Length mm	Pressure bar	Note
SEPARCHROM PC01-100/100	100	100	150	
SEPARCHROM PC01-100/250	100	250	150	
SEPARCHROM PC01-100/500	100	500	150	
SEPARCHROM PC01-100/600	100	600	150	
SEPARCHROM PC01-100/700	100	700	150	
SEPARCHROM PC01-100/800	100	800	150	
SEPARCHROM PC01-100/1000	100	1000	150	
SEPARCHROM PC01-150/150	150	150	150	
SEPARCHROM PC01-150/300	150	300	150	
SEPARCHROM PC01-150/500	150	500	150	
SEPARCHROM PC01-150/600	150	600	150	
SEPARCHROM PC01-150/900	150	900	150	
SEPARCHROM PC01-150/1000	150	1000	150	
SEPARCHROM PC01-200/200	200	200	120	
SEPARCHROM PC01-200/400	200	400	120	
SEPARCHROM PC01-200/500	200	500	120	
SEPARCHROM PC01-200/600	200	600	120	
SEPARCHROM PC01-200/800	200	800	120	
SEPARCHROM PC01-200/1000	200	1000	120	
SEPARCHROM PC01-300/300	300	300	100	
SEPARCHROM PC01-300/600	300	600	100	
SEPARCHROM PC01-300/900	300	900	100	
SEPARCHROM PC01-300/1200	300	1200	100	
SEPARCHROM PC01-400/400	400	400	80	
SEPARCHROM PC01-400/800	400	800	80	
SEPARCHROM PC01-400/1200	400	1200	80	



Separchrom PC 01 DS column, 150 mm I.D., hydraulic system with manual oil pump.

*separchrom*PC02

HPLC COLUMNS FOR PREP CHROMATOGRAPHY

Columns for Medium Pressure with axial bed compression

Separchrom PC02 medium pressure stainless steel column are intended for separation where high pressure is not necessary, but high efficiency can be still expected and useful. ***Separchrom PC02*** thus fill requirements of many users. They are made of cutted and polished stainless steel tubes and equipped on input either with ultra high molecular weight polyethylene made pistons (PC 02 UP) with steel support or stainless steel made pistons (PC 02 SP), both with Poremet® 5 stainless steel (AISI 316 L) frits with 02 porosity 5 µm and minimum hydraulic resistance. Flow distributors with groves for liquid distribution are incorporated in to the piston and the system guarantees perfect piston flow with nearly zero pressure drop. Columns have functional stroke of the input piston approximately 60 % of the inner diameter of the column when working with flange bolts and even higher when hydraulic cylinder is used.

Outputs of PC02 columns are designed as fix units (pistons on special request) and use the same flow distributors and frits like input pistons.

Due the low movement resistance of UHMWE pistons ***Separchrom PC02*** columns can be equipped with special software application in order to compensate swelling and deswelling of organic sorbents in different mobile phases (column piston is moved in very small steps up and down during use).

Columns for laboratory applications

Type of column	I.D. mm	Length mm	Pressure Bar	Note
SEPARCHROM PC02 -25/50	25	50	70	
SEPARCHROM PC02 -25/250	25	250	70	
SEPARCHROM PC02 -50/250	50	250	50	
SEPARCHROM PC02 -50/500	50	500	50	
SEPARCHROM PC02 -100/250	100	250	40	
SEPARCHROM PC02 -100/500	100	500	40	

Columns for industrial applications

Type of column	I.D. mm	Length mm	Pressure Bar	Note
SEPARCHROM PC02-100/250	100	250	40	
SEPARCHROM PC02-100/500	100	500	40	
SEPARCHROM PC02-150/300	150	300	40	
SEPARCHROM PC02-150/600	150	600	40	
SEPARCHROM PC02-200/400	200	400	35	
SEPARCHROM PC02-200/700	200	700	35	
SEPARCHROM PC02-200/800	200	800	35	
SEPARCHROM PC02-200/1200	200	1200	35	
SEPARCHROM PC02-300/300	300	300	30	
SEPARCHROM PC02-300/600	300	600	30	
SEPARCHROM PC02-300/700	300	700	30	
SEPARCHROM PC02-400/400	400	400	20	
SEPARCHROM PC02-400/800	400	800	20	
SEPARCHROM PC02-400/1200	400	1200	20	
SEPARCHROM PC02-500/500	500	500	10	
SEPARCHROM PC02-500/1000	500	1000	10	
SEPARCHROM PC02-500/1200	500	1200	10	
SEPARCHROM PC02-600/600	600	600	5	
SEPARCHROM PC02-600/1200	600	1200	5	

separchrom PC04

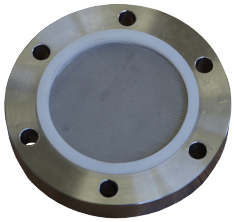
UHMWPE COLUMNS FOR PREP CHROMATOGRAPHY

Columns for Medium Pressure with axial bed compression
For flash chromatography are usually intended polyethylene cartridge columns. Metal free columns are requested in some special applications too. Separlab offers ***Separchrom PC04*** columns for both these purposes. Columns are made of high quality ultra high molecular weight polyethylene, have similar design

like stainless steel columns PC01 or PC02 and are equipped with polypropylene fabrics (non woven polypropylene 10 µm pores) made frits. Piston on the input moved by a robust central screw increases the efficiency due an elimination of free space between upper sorbent layer and frit with low pressure flow distributor. Output frit with flow distributor is incorporated in output flange. Columns are compatible with nearly all organic solvents and with all water solutions. Columns are designated for low pressure and medium pressure liquid chromatography.

Type of column	I.D. mm	Length mm	Pressure bar	Note
SEPARCHROM PC04-50/150	50	150	16	
SEPARCHROM PC04-50/250	50	250	16	
SEPARCHROM PC04-50/300	50	300	16	
SEPARCHROM PC04-50/500	50	500	16	
SEPARCHROM PC04-100/250	100	250	16	
SEPARCHROM PC04-100/300	100	300	16	
SEPARCHROM PC04-100/500	100	500	16	
SEPARCHROM PC 04-150/300	150	300	6	
SEPARCHROM PC 04-150/600	150	600	6	
SEPARCHROM PC 04-200/400	200	400	6	
SEPARCHROM PC 04-200/800	200	800	6	
SEPARCHROM PC 04-300/500	300	500	5	
SEPARCHROM PC 04-300/900	300	900	5	

separchrom PC06



HPLC COLUMNS FOR PREP CHROMATOGRAPHY

Columns for Medium Pressure without bed compression

Separchrom PC06 are intended for applications where sorbent does not change the volume during the use. Columns are equipped with frits and distributors incorporated in to input and output flanges. They are made of polished stainless steel tubes and equipped with non woven polypropylene frits with porosity 10 µm. Flow distributors are incorporated in to column flanges.

Columns for laboratory applications

Type of column	I.D. mm	Length mm	Pressure bar	Note
SEPARCHROM PC06 -25/50	25	50	100	
SEPARCHROM PC06 -25/250	25	250	100	
SEPARCHROM PC06 -50/250	50	250	50	
SEPARCHROM PC06 -50/500	50	500	50	
SEPARCHROM PC06 -100/250	100	250	40	
SEPARCHROM PC06 -100/500	100	500	40	

Columns for industrial applications

Type of column	I.D. mm	Length mm	Pressure bar	Note
SEPARCHROM PC06-100/250	100	250	40	
SEPARCHROM PC06-100/500	100	500	40	
SEPARCHROM PC06-150/300	150	300	40	
SEPARCHROM PC06-150/600	150	600	40	
SEPARCHROM PC06-200/400	200	400	35	
SEPARCHROM PC06-200/800	200	800	35	
SEPARCHROM PC06-300/300	300	300	30	
SEPARCHROM PC06-300/600	300	600	30	
SEPARCHROM PC06-400/200	400	200	20	
SEPARCHROM PC06-400/400	400	400	20	
SEPARCHROM PC06-400/800	400	800	20	
SEPARCHROM PC06-500/500	500	500	10	
SEPARCHROM PC06-500/1000	500	1000	10	
SEPARCHROM PC06-600/600	600	600	5	
SEPARCHROM PC06-600/1200	600	1200	5	

separchrom PC08

HPLC COLUMNS FOR PREP CHROMATOGRAPHY

Columns for Medium Pressure without bed compression

Separchrom PC08 columns are designed for high pressure, high performance preparative liquid chromatography. They are equipped by pistons on both ends. All metal parts in connection with mobile phase are made of AISI 316L stainless steel. Upper piston movement is secured by hydraulics, but in comparison with standard models, PC08 hydraulics is in incorporated into bottom column stand, own column is fixed in a robust frame and hydraulic piston press the whole column unit against a special flange in most upper part of the system.

PC08 columns are used for high performance separations in instances where small rigid particles are used as column filling. Only stainless steel and UHMWPE (ultra high molecular weight polyethylene) are in contact with mobile phase. Columns are resisting to all common solvents. PC08 columns with are designed for industrial separations and typically are working with flow rate 400 ml/min. – 1400 ml/min. depending on sorbent type and separation mode. Maximal column pressure is 120 bar.

PC08 columns are designed either for sedimentation packing with following axial compression of sorbent bed or for dynamic axial compression packing. Columns with I.D. 150 mm or 200 mm have a special stand with motor driven high pressure hydraulic aggregate and hydraulic cylinder (40 tons, 200 - 600 mm stroke, double action) which serves for sorbent pressing during the use to compensate bed volume changes as well.

PC08 column stand has hydraulic system in bottom part and column is fixed between hydraulic cylinder piston and upper stand flange which is connected to the stand box by five rods. Column itself can be removed from the frame without deassembling of the frame

Typically the ***PC08*** column has the same design as PC 01 columns - consists of tube, I.D. 150 mm or 200 mm with the length 400 - 700 mm. The internal surface of the column is mechanically polished to attain high smoothness. The tube is provided with two screwed stainless steel flanges (tube flanges). Column pistons are equipped with Poremet® 2 frits (3 um porosity) and flow distributors.

Type of column	I.D. mm	Length mm	Pressure bar	Note
SEPARCHROM PC08 -150/500	150	500	150	
SEPARCHROM PC08 -150/700	150	700	150	
SEPARCHROM PC08 -200/500	200	500	120	
SEPARCHROM PC08 -200/700	200	700	120	

separpress

Hydraulic systems for prep chromatography columns

Hydraulic system ***SEPARPRESS*** for prep chromatographic columns. Used to compress the piston inside the column and to compact the sorbent. Supplied as a kit that includes a hydraulic cylinder - double action (D) or with spring (S) with connecting hoses, oil pump - manual (M) or driven by motor (E) with control device - mechanical manometer (M) or electronic system with pressure gauge (E).

Type and specification	Power t	Stroke mm	Note
SEPARPRESS S005 MM 080	5	80	
SEPARPRESS S005 MM 180	5	180	
SEPARPRESS S005 MM 240	5	240	
SEPARPRESS D005 MM 150	5	150	
SEPARPRESS D010 MM 150	10	150	
SEPARPRESS D010 MM 250	10	250	
SEPARPRESS D020 MM 150	20	150	
SEPARPRESS D020 MM 250	20	250	
SEPARPRESS D030 MM 150	30	150	
SEPARPRESS D030 MM 250	30	250	
SEPARPRESS D050 MM 150	50	150	
SEPARPRESS D050 MM 250	50	250	
SEPARPRESS D100 MM 150	100	150	
SEPARPRESS D100 MM 350	100	350	
SEPARPRESS D150 MM 330	150	330	
SEPARPRESS D010 EE 250	10	250	
SEPARPRESS D020 EE 250	20	250	
SEPARPRESS D030 EE 250	30	250	
SEPARPRESS D050 EE 250	50	250	
SEPARPRESS D100 EE 350	100	350	
SEPARPRESS D150 EE 330	150	330	
SEPARPRESS D030 EEB 250	30	250	
SEPARPRESS D050 EEB 250	50	250	
SEPARPRESS D010 AM 250	10	250	
SEPARPRESS D020 AM 250	20	250	
SEPARPRESS D030 AM 250	30	250	

First three numbers defines the maximum compressive strength of the piston in tons, next three numbers define the maximum stroke of the piston in mm
EEB -supplied as a box UP, DOWN, HOLD buttons on the front panel, column is inserted in a frame on top side of the box.
AE – Electronic control of solenoid valves, oil pump driven by compressed air, electronic pressure gauge
AM - Mechanical valves control, oil pump driven by compressed air, mechanical gauge

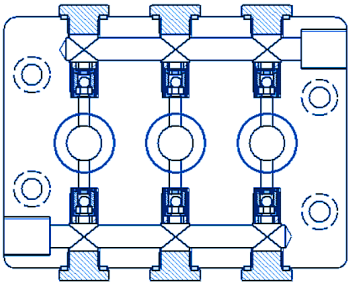
All Separlab made columns are designed and manufactured in accordance with EU regulation for pressure vessels and can be delivered with PV certificate. All stainless steel columns can be delivered with ATEX certificate as well.

MOBILE PHASE DELIVERY SYSTEMS

MOBILE PHASE DELIVERY

separtrixPP03

MULTI PISTON PUMPS



Piston pulse less pumps

Separtrix PP03 are pulse less triplex piston pumps designed for preparative chromatography applications - nevertheless they can be used everywhere, where high pressure, precise flow without pulsations and high resistance against corrosion is needed. Pumps are equipped with unique compact three piston head for smooth flow and easy maintenance without a risk of leakage on connecting parts. Back flushed pistons are covered by hard and chemically resistant polycrystalic carbon layer. Piston cylinders have low dead volume and samples injected through the pump appear low spreading.

Pumps with different flow rate ranges differ only in head type, piston diameters and tubing diameters. ***Separtrix PP03*** are usually supplied with an asynchronous motor and frequency converter but are also available with step motor which allows using the pump in extremely broad range of flow rates - both for analytical and preparative applications.

Special configurations of ***Separtrix PP03*** pumps are used for three phases low pressure gradient – in this case is extremly important that these pumps offer nearly constant flow rate not only on the output but on the input too. Low pressure gradient units are delivered with three solenoid valves on the plate which can be connected to the pump side. Power supply for valves is installed inside the pump box. 10 linear steps can be programmed.

Separtrix PP03 pumps are delivered in configuration for high pressure binary gradient as well. Two pumps – master and slave types – are working together. Master pump controls the flow rate and gradient composition (10 linear steps), slave pump is delivered without control display, keyboard(s) and pressure sensor. All ***Separtrix PP03*** pumps are equipped keyboard(s) and graphic display. There is a possibility to set flow rate, pressure limit and flow correction. A second keyboard is included for gradient programming in case of low pressure gradient pumps and high pressure gradient master pumps.

Separtrix PP03 can be used in mode of remote control. Pumps can cooperate with Clarity data station (Dataapex). Flow rate, gradient composition and pressure limit can be programmed. Control module for PP 03 pumps was successfully tested and agreed by Dataapex. PP 03 pumps can be controlled using Ecom software ***ECOMAC*** as well

Type	Description & technical parameters
SEPARTRIX PP03 A	Piston pulsless pump, three pistons O.D. 10 mm with diamond layer in one stainless steel head, ceramic ball valves, 620 W AC motor vector frequency converter, flow rate 25 ml/min. – 800 ml/min., 260 bar (3500 PSI), pressure measurement and limit, membrane keyboard, graphic display
SEPARTRIX PP03 B	Piston pulsless pump, three pistons O.D. 14 mm with diamond layer in one stainless steel head, ceramic ball valves, 620 W AC motor with vector frequency converter, flow rate 50 ml/min. – 1600 ml/min., 160 bar (2100 PSI), pressure measurement and limit, membrane keyboard, graphic display
SEPARTRIX PP03 C	Piston pulsless pump, three pistons O.D. 20 mm with diamond layer in one stainless steel head,ceramic ball valves, 620 W AC motor with vector frequency converter, flow rate 100 ml/min. – 3200 ml/min., 80 bar (1100 PSI), pressure measurement and limit, membrane keyboard, graphic display
SEPARTRIX PP03 AG	PP03 A pump, flow rate 25 ml/min. – 800 ml/min., max. 260 bar (3500 PSI), three phases low pressure gradient included, (3 x solenoid valves + connecting armature on own holder+3 x valve power supply in pump unit), second keyboard for gradient control
SEPARTRIX PP03 BG	PP03 B pump, three phases, flow rate 50 ml/min. – 1600 ml/min., max. 150 bar (2100 PSI), low pressure gradient included (3 x solenoid valves + connecting armature on own holder+3 x valve power supply in pump unit), second keyboard for gradient control
SEPARTRIX PP03 CG	PP03 C pump, flow rate 100 ml/min. – 3200 ml/min., 80 bar (1000 PSI), three phases low pressure gradient included, (3 x solenoid valves + connecting armature on own holder+3 x valve power supply in pump unit), second keyboard for gradient control
SEPARTRIX PP03S A	Piston pulsless pump, three pistons O.D 10 mm with diamond layer in one stainless steel head, ceramic ball valves, step motor, flow rate 1 ml/min. – 400 ml/min., 250 bar (3500 PSI), pressure measurement and limit
SEPARTRIX PP03S B	Piston pulsless pump, three pistons O.D 14 mm with diamond layer in one stainless steel head, ceramic ball valves, step motor, flow rate 1 ml/min. – 800 ml/min., 150 bar (2100 PSI), pressure measurement and limit, membrane keyboard, graphic display
SEPARTRIX PP03S C	Piston pulsless pump, three pistons O.D 20 mm with diamond layer in one stainless steel head, ceramic ball valves, step motor, flow rate 2 ml/min. – 1600 ml/min., 70 bar (800 PSI), pressure measurement and limit, membrane keyboard, graphic display
SEPARTRIX PP03S AG	PP03S A pump, flow rate 1 ml/min. – 400 ml/min., 250 bar (3500 PSI), three phases low pressure gradient included, (3 x solenoid valves + connecting armature on own holder+3 x valve power supply in pump unit), second keyboard for gradient control
SEPARTRIX PP03S BG	PP03S B pump, flow rate 1 ml/min. – 800 ml/min., 150 bar (2100 PSI), three phases low pressure gradient included, (3 x solenoid valves + connecting armature on own holder+3 x valve power supply in pump unit), second keyboard for gradient control
SEPARTRIX PP03S CG	PP03S B pump, flow rate 2 ml/min. – 1600 ml/min., 70bar (800 PSI), three phases low pressure gradient included, (3 x solenoid valves + connecting armature on own holder+3 x valve power supply in pump unit), second keyboard for gradient control
SEPARTRIX PP03SM A	PP03S A pump, flow rate 0,5 ml/min. – 400 ml/min., 250 bar (3500 PSI), master pump for binary high pressure gradient, second keyboard for gradient programming
SEPARTRIX PP03SM B	PP03S B pump, flow rate 1 ml/min. – 800 ml/min., 150 bar (2100 PSI), master pump for binary high pressure gradient, second keyboard for gradient programming
SEPARTRIX PP03SM C	PP03S C pump, flow rate 2 ml/min. – 1600 ml/min., 70 bar (800 PSI), master pump for binary high pressure gradient, second keyboard for gradient programming
SEPARTRIX PP03SS A	PP03SS A pump, flow rate 0,5 ml/min. – 400 ml/min., 250 bar (3500 PSI), slave pump for binary gradient, no display, no keyboard
SEPARTRIX PP03SS B	PP03SS B pump, flow rate 1 ml/min. – 800 ml/min., 150 bar (2100 PSI), slave pump for binary gradient, no display, no keyboard
SEPARTRIX PP03SS C	PP03SS C pump, flow rate 2 ml/min. – 1600 ml/min., 70 bar (800 PSI), slave pump for binary gradient, no display, no keyboard

SEPARTRIX PP03 **pumps with asynchronous motors are available in variants Ex (ExG), where mechanical part – gearbox, cambox and pistons head with ATEX (T4) motor - is separated from remote box with frequency changer and electronic part of the pump. Remote box has to be placed out of the explosion environment place.**

hydracell G03, G04, G10

PISTON MEMBRANE PUMPS

The piston-diaphragm pumps ***Hydracell*** with multimembrane head provide smooth pulseless flow in a wide range of flow rates and delivery pressure with high repeatability and accuracy and are ideal for dosing mobile phase into large preparative units.

Hydracell G03 is the piston-diaphragm pump with anti cavitation system "Kell-Cell". Special system of channels equalizing pressure on both sides of the membrane, which prevents cavitation damage of the pump. Stainless steel head and sturdy construction ensure long life and minimal maintenance costs, as well as double hydraulically balanced diaphragm and sealing free piston design. Checking the oil level stops the engine when the level drops to prevent mixing of oil into the mobile phase in the case of destruction of some of the membranes.

- Smooth pulse less flow
- Anti-cavitation system Kell-Cell
- "Heavy Duty" design
- Hydraulically balanced diaphragm on both sides
- Wide range of flows and delivery extrusion heights
- Repeatability and high accuracy - ideal for dosing
- Piston sealing free design - minimal maintenance costs

Wanner ***Hydracell*** G10 with cam are used for different types of applications, usually involving liquids recycling. They provide smooth pulse less flow in a wide range of flow rates and pressures with high repeatability and accuracy and are ideal for dosing. Checking the oil level in the pump, followed by stopping the engine when the level drops, to prevent mixing of oil into the mobile phase in the case of destruction of some of the membranes.

- Smooth pulse less flow
- Anti-cavitation system Kell-Cell
- "Heavy Duty" design
- Hydraulically balanced diaphragm on both sides
- Wide range of flows and delivery extrusion heights
- Repeatability and high accuracy - ideal for dosing
- Piston sealing free design - minimal maintenance costs

The pumps are equipped with heads made of stainless steel (AISI 316). They are suitable for temperatures up to 70° C and are supplied with engine, clutch and durable metal frame for installation in industry. Both G03 and G10 pumps can be supplied also in a version for hazardous areas according to ATEX Ex de II T4.

Wanner ***Hydracell*** G04 are used for high flow, high pressure application. They also can be used in higher temperature range. They are the piston-diaphragm pumps with anti cavitation system "Kell-Cell". Special system of channels equalizing pressure on both sides of the membrane, which prevents cavitation damage of the pump. Stainless steel head and sturdy construction ensure long life and minimal maintenance costs, as well as double hydraulically balanced diaphragm and sealing free piston design.

PRESSURE FILTERS on pump output

Pressure filters are closed pressure vessels made of two flanges with a frit (filter) between input and output. They are quite similar to prep chromatography columns in fact. *Separfil* XXX/YYY units are designed with a filter frit made either of stainless steel (3 µm pore size) or of non woven polypropylene fabric (10 µm pore size). Frit (filter) sealing is made of UHMWPE. Pressure filters make good service to save input column frit as samples under separation are a source of solid or gel particles. XXX numbers specify frit diameter and YYY number maximal pressure for filter use.

Type	Max. flow l/min.	Max. pressure bar	Note
HYDRACELL G-03-X	11,3	69	
HYDRACELL G-03-E	8,3	83	
HYDRACELL G-03-S	6,8	83	
HYDRACELL G-10-X	29	70	
HYDRACELL G-10-I	14,9	70	
HYDRACELL G-04 X	11,3	170	
HYDRACELL G-04-E	7,8	170	
HYDRACELL G-04-S	6,1	170	

GRADIENT FORMING DEVICES

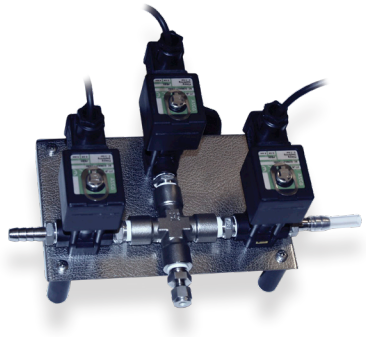
separmix P

PROGRAMMING UNITS

Separmix P is a low pressure gradient programming unit situated in a stainless steel box with graphic display and membrane keyboard on oblique front panel. It is used in combination with a set of solenoid valves ***Separmix V*** to form a low pressure gradient of mobile phase on the pump input. Gradient program consist of 10 linear steps for two or three liquids. Programming unit SEPARMIX is connected by cable to each gradient valve. Remote control of the instrument is possible.with larger valves.

separmix V

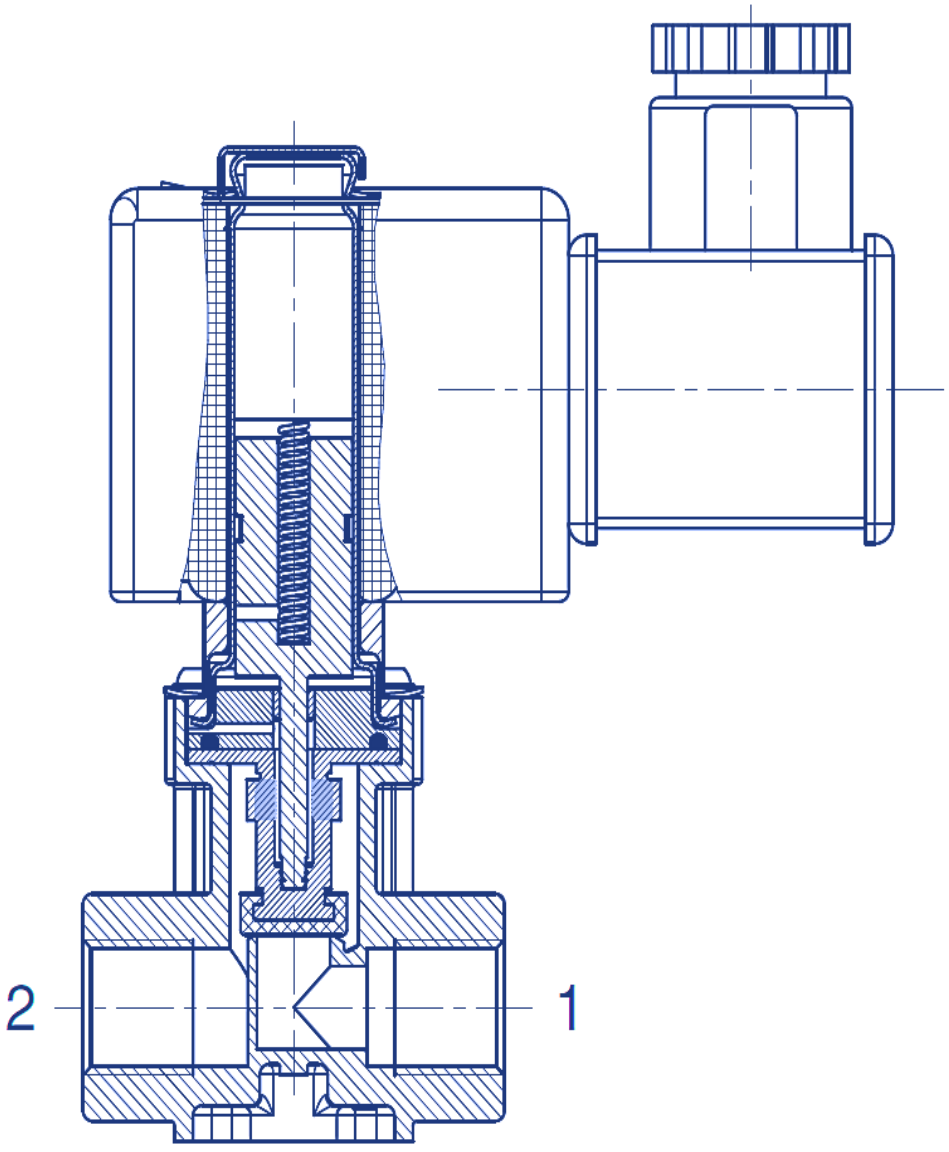
GRADIENT VALVES



Separmix V is a series of gradient valves different sizes for low pressure gradient forming. They are designed to be controlled either from a pump ***Separtrix PP03*** (G) or from a single programming unit Separmix PX. Special solenoid valves can be used for the control of even aggressive liquids in the pharmaceutical, chemical and biochemical industries. Valves suited for all applications in which the fluids must not come into contact with the magnetic metal kern of the solenoid valve are available as an option. Each set of valves is completed by manifolds on the input and output to allow the connection to the liquid reservoirs on one side and to the chromatography pump on the opposite side. The manifold with valves is situated on a stainless steel plate. Plates are equipped either with legs, or can be connested directly to the pump PP03 from its left side.

There are three dimensions of gradient mixer valves sets depending on maximal flow rate. Maximum liquid viscosity to be used with mentioned valves systems is 40 cSt (mm2/s) and temperature range -10 °C to +90 °C. Material in contact with fluid are: stainless steel, PTFE and UHMWPE. Maximal input pressure is 2 bars

Type	Flow rate ml/min.	Valves number	Note
SEPARMIX V3S	10 - 1000	3	
SEPARMIX V3M	100 - 3000	3	
SEPARMIX V3L	500 - 6000	3	



Gradient valve with sealed electromagnetic kern.

DETECTORS FOR PREP CHROMATOGRAPHY

photometric UV-VIS *detectors*

FOR PREPARATIVE CHROMATOGRAPHY

Ecom (Prague CR) manufactures UV-VIS detectors which can be used in prerp chromatography. They are equipped with diode array and htus monitor more wavelengths to verify purity of analyzed samples or to be used in situations when some substances absorb on different wavelengths. There are alternatives with remote cells available too (for large scale systems).

All detectors can be controlled manually by keyboard and display but also using RS232, USB or LAN and proper software ,Clarity, Ecomac). At the back panel are available four analog outputs and connector for I/O logical input and output signals.

The unit's DAD (diode array detector) design offers many advantages:

- online scan of whole spectrum with speed up to 20 Hz which allows to create 3D picture.
- lamp work hours are counted using the built-in counter for both deuterium and halogen lamps.
- he cell is easy to replace from the side of the detector.
- easy service and diagnostic using display and keyboard or by service SW.

Type	Specification
TOY18DAD 400 H Two Channel UV Detector	Stand alone PDA detector measures at two wavelengths simultaneously in range 200 - 400 nm with possibility to see current scan.
TOY18DAD 400 H Four Channel UV Detector	Stand alone PDA detector measures at two wavelengths simultaneously in range 200 - 400 nm with possibility to see current scan.
TOY18DAD 400 H Scanning Channel UV Detector	Stand alone PDA Scanning detector measures at four wavelengths simultaneously in range 200 - 400 nm or sends scan with speed up to 20 Hz which allows to create 3D picture
TOY18DAD 400 V Scanning UV Detector	An UV (UV-VIS) diode array detector, which allow measuring absorbance of four wavelengths simultaneously in one cell just as measuring of whole spectrum (scan).
TOY18DAD 400 VEX Scanning UV Detector	UV (UV VIS) diode array detectors, which allow measuring absorbance of four wavelengths simultaneously in external cell connected by optical cables, just as measuring of whole spectrum (scan).
TOY18DAD 600 H Two Channel UV Detector	Stand alone PDA detector measures at two wavelengths simultaneously in range 200 - 600 nm with possibility to see current scan.
TOY18DAD 600 H Four Channel UV Detector	Stand alone PDA detector measures at two wavelengths simultaneously in range 200 - 600 nm with possibility to see current scan.
TOY18DAD 600 H Scanning Channel UV Detector	Stand alone PDA Scanning detector measures at four wavelengths simultaneously in range 200 - 600 nm or sends scan with speed up to 20 Hz which allows to create 3D picture.
TOY18DAD 600 V Scanning UV Detector	An UV (UV-VIS) diode array detector, which allow measuring absorbance of four wavelengths simultaneously in one cell just as measuring of whole spectrum (scan).in range 200 – 600 nm
TOY18DAD 600 VEX Scanning UV Detector	UV (UV VIS) diode array detectors, which allow measuring absorbance of four wavelengths simultaneously in external cell connected by optical cables, just as measuring of whole spectrum (scan) in range 200 – 600 nm
TOY18DAD 800 H Two Channel UV Detector	Stand alone PDA detector measures at two wavelengths simultaneously in range 200 - 800nm with possibility to see current scan.
TOY18DAD 800 H Four Channel UV Detector	Stand alone PDA detector measures at two wavelengths simultaneously in range 200 - 800 nm with possibility to see current scan.
TOY18DAD 800 H Scanning Channel UV Detector	Stand alone PDA Scanning detector measures at four wavelengths simultaneously in range 200 - 800 nm or sends scan with speed up to 20 Hz which allows to create 3D picture.
TOY18DAD 800 V Scanning UV Detector	An UV (UV-VIS) diode array detector, which allow measuring absorbance of four wavelengths simultaneously in one cell just as measuring of whole spectrum (scan) in range 200 – 800 nm

refractometric *detectors*

FOR PREPARATIVE CHROMATOGRAPHY

RI2012 is an analytical RI detector, but with bypass can be used for PLC too. It offers high sensitivity, stability and reproducibility for optimal RI detection. The optical system is now better insulated against temperature changes and with programmable temperature settings ensures a stable baseline and an optimal signal / noise ratio. The auto-zero, purge, polarity, temperature and frequency of data output are externally controllable by USB and RS232 Port. RID system status such as temperature and total voltage can be externally retrieved by RS232 or USB. For preparative chromatography detector has to be used with automatic bypass unit.

Specification	Value
Detection Method	Deflection
Refractive Index Range	1,00 to 1,75
Flow Rate	0,2 - 3,0 ml/min.
Flow Cell Volume	9 µl, 45° angle
Max. Flow Cell Pressure	6 kg/cm2
Dead Volume	Into cell 24 µl
Linearity Range	0-1000 µl RIU
Noise Level	5 x 109 RIU
Autozero Range	Full Range
Drift with 1ml H2O/min.	< 1 mV/hour
Purge Valve	yes
Integrator Output	+/- 10 mV / 100 mV / 1Volt
Recorder Output	+/- 10 mV / 100 mV / 1Volt
Recorder Offset	0 mV/ 10 mV/ 100 mV
Recorder Range	8 steps (1:8) - (16:1)
Marker	Yes / No
Digital Interface	RS232 bidirectional, Purge, Autozero, Start, Stop
Digital Output	TTL: Intensity Alarm
Digital Input	TTL: Purge, Autozero, Start/Marker
Temperature Setting	Ambient, 35°C to 55°C in 1°C steps, Thermal Fuse 75°C
Time Constant	RAW (0,0 sec), Fast (0,4sec), Medium (0,8 sec), Slow (1,6 sec)
Power Source	AC 100-120/220-240V, 50/60 Hz, 50VA
Dimensions in cm	220mm x 350mm x 155mm (W x D x H)
Weight	12 kg

cells

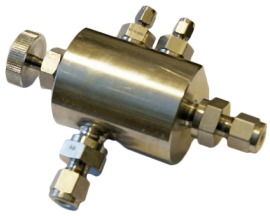
FOR PHOTOMETRIC DETECTORS

Preparative ***cells*** for Ecom photometric detectors can be divided into two groups. Standard inner cells are situated inside the detector unit and connection with the column is made by stainless steel or PTFE made tubing. External cells are situated on the column output and are connected to the detector by optical fiber cables.

Type	Optical length mm	Cell volume µl	Flow rate ml/min.	Connection
PLCC 3L	0,3	80	3000	3/16", 5/16"- 24
	1,9 – 2,1	100		
	3,7 – 3,9	120		
PLCC 04	0,4	40	200	1/16" x 1mm
	1,3 – 1,4	55		
	2,3 – 2,4	70		
PLCC 05	0,3 – 0,4	40	500	1/8" x 1/16"
	1,3 – 1,4	55		
	2,3 – 2,4	70		
PLCC 14	0,1 +/- 0,05	40	500	1/8" or 1/16", 1/4"- 28
	1,3 – 1,4	55		
	2,3 – 2,4	70		
PLCC 15	0,3 +/- 0,05	40	500	1/8" or 1/16", 1/4"- 28
	1,3 – 1,4	55		
	2,3 – 2,4	70		
PLCC 15 EX	0,3 +/- 0,05	40	500	Customer
	1,3 – 1,4	55		
	2,3 – 2,4	70		
PLCC 20 High Flow			15 000	1/2", 1/4"- 18

separpass

AUTOMATIC FLOW SPLITTING



Separpass is a device which enables to use detector cells for preparative liquid chromatography together with analytic detectors. Often older analytic detectors are available, but due the low flow rates and limited pressures on the cell cannot be used. separpass allows the small amount of liquid to flow through the detector, while a large number of phases bypasses the detector cell. An over-pressure for detector is generated by a spring force. Pressure drop for the detector can be changed by a control knob. The bypass eliminates any adjustment of the flow during separation - only on the beginning is set spring force by a rotating knob. The pressure on the detector cell can be set in the range 1 - 3 bar.

Type	Fitting on detector side	Fitting on main flow side
SEPARPASS 01	1/16”	1/8”
SEPARPASS 02	1/16”	1/4”
SEPARPASS 03	1/8”	1/2”
SEPARPASS 04	1/4”	3/4”

FRACTION COLLECTORS

separflow FFC 40

LABORATORY FRACTION COLLECTOR FOR PLC

Fraction collector ***Separflow FFC 40*** is a portable turntable carousel collector with a plate diameter of 400 mm, which is equipped with a circle of small funnels with tubing output. Liquid (total of 40 positions can be collected to different types of vessels).

Collector is designed for flow rates up to 800 ml/min. And funnels are designed such way, that liquid can not flow outside during arm movement to new position.

Control collector (keypad and backlit graphic display) is located on the sloping front panel of stainless steel cabinet staying separately. In the corousel unit is located step motor and gearbox only. Head with a transverse beam is easily removable. Own plate is made of combination of stainless steel and UHMW polyethylene with excellent chemical resistance. Electronics collectors enables simple sequential programming (may be used a maximum number of positions or less than maximum number). Move to the next position can be controlled from an external source.

separflow X-Y

FRACTION COLLECTORS FOR INDUSTRY

Separflow fraction collectors can be delivered for environments with danger of explosion according ATEX. Electronic part of the system has to be situated on remote place out of the critical zone.

Fraction collectors ***Separflow FC X-Y*** are designed to capture fractions in prep liquid chromatography. However, they can be used in other facilities where programmed collecting of liquid volume is required. It is designed for liquids, which are resistant to stainless steel, PTFE (polytetrafluoroethylene) and UHMW polyethylene. ***Separflow FC X-Y*** typically consists of a stainless steel box of electronics with the keyboard and the display on oblique front panel and a circular segment consisted from two parts with a radial groove in between (which cross section is equivalent to a tube with I.D. X mm). The groove has side outputs to which a liquid input and Y solenoid valves (with PTFE closing elements) on output are connected. Opening various valves is programmed. The outlet valves pipes are connected by flexible hoses and are forwarded to the liquid containers of proper size. Collector can be controlled independently from the front panel keyboard or externally via RS232 serial port. In the external control is the keypad locked and it is possible only to display parameters. Always nevertheless works STOP button. Step time is 0,1 – 180 min. and pressure limit 2 bar.

Type	Channel I.D. mm	Fraction number	Flow rate ml/min.	Note
SEPARFLOW 5-5	5	5 + waste	50 - 1500	
SEPARFLOW 5-10	5	10 + waste	50 - 1500	
SEPARFLOW 10-5	10	5 + waste	300 - 3000	
SEPARFLOW 10-10	10	10 + waste	300 - 3000	

TEMPERATURE CONTROL

separtherm TJ

TEMPERATURE CONTROL COLUMN JACKETS

Thermostat column jackets ***Separtherm TJ*** a re universal acrylic glass jackets for heating or cooling of preparative liquid chromatography columns on temperatures between -10 °C and + 90 °C. Water from circulating device is coming to a bottom input on the side of bottom circular plate and then is moving along the column up to the upper jacket plate where is an output. ***Separtherm TJ*** jackets are designed to keep on the selected temperature the column itself. In some cases but, depending on column dimensions, mobile phase flow rate and temperature, may be necessary either to form a spiral exchanger from column input tubing sank in the jacket or to use a special exchanger to reach proper temperature inside the column.
Separtherm TJ jackets are equipped with a simple stand.

Columns TJ jackets are equipped with a simple stand

Type	Jacket tube I.D. mm	Column I.D. mm	Column length mm
SEPARTHERM TJ 50/500	110	50	600
SEPARTHERM TJ 100/500	180	100	700
SEPARTHERM TJ 150/600	230	150	700
SEPARTHERM TJ 200/800	280	200	1000

separtherm WISD

CIRCULATING BATHS

More and more application in PLC is realized by high or low temperatures. Columns can be equipped with thermostated jackets for such use and liquid for them is prepared in circulating baths. Separlab offers robust instruments covered in stainless steel boxes.

Type	Description
SEPARTHERM WCB 6	Thermostated heating bath, volume 6 l, robust circulation pump (5 l/min.), processor, foil keyboard control, graphic display, stainless steel cabinet
SEPARTHERM WCR P6	Thermostated heating and cooling bath, volume 6 l, robust circulation pump (5 l/min), cooling compressor, processor, foil keyboard control, graphic display, stainless steel cabinet

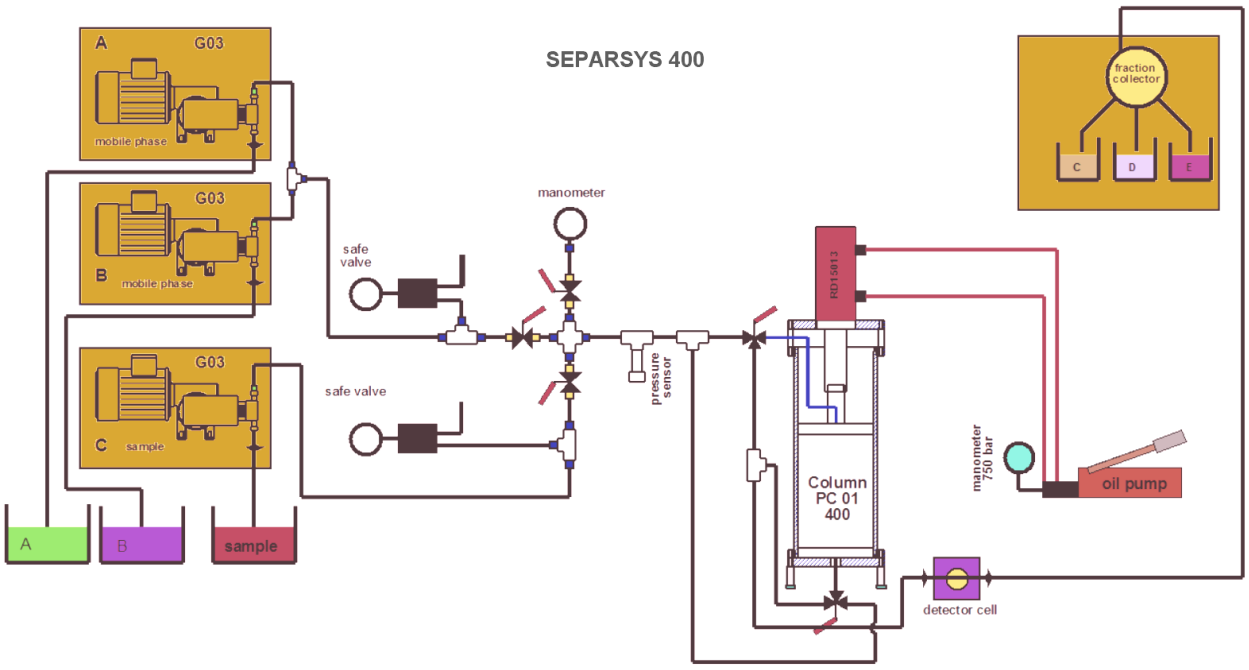
PLC INDUSTRIAL SYSTEMS

separsys HP 400, 800 FP, 300 DS

INDUSTRIAL SEPARATION UNITS - HIGH PRESSURE

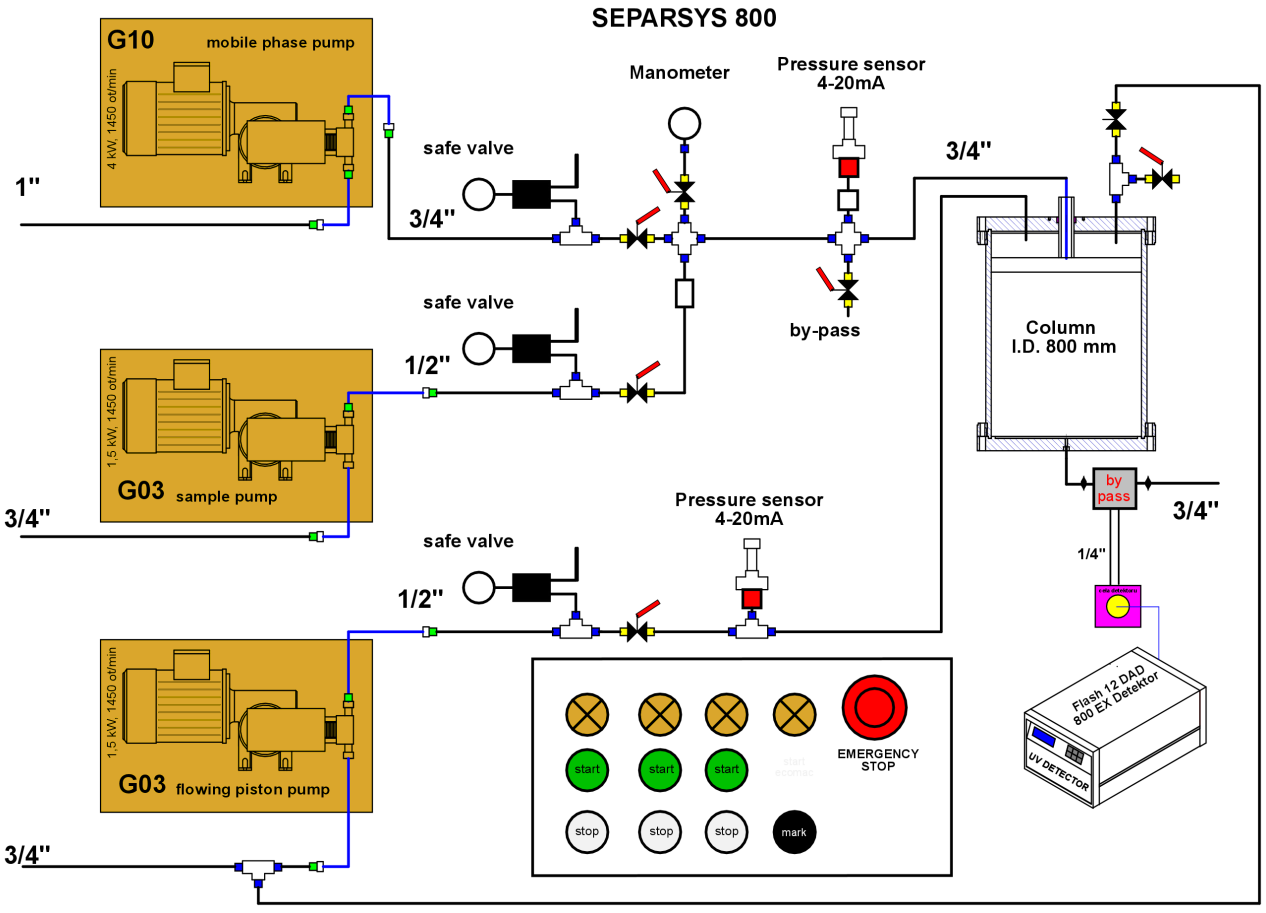
Industrial preparative chromatographs are usually tailored according user´s need. Therefore only an example of already delivered unit is introduced here. It is recommended to contact company specialists when a system specification is developed.
Separsys HP 400 is an industrial unit for liquid high efficiency, high pressure preparative chromatography. It can be used for isocratic, high pressure, high performance chromatography. It is completely controlled by modified ***ECOMAC*** software only. The unit consists of (see schematic drawing):

- high-pressure column ***Separchrom PC01*** 400 with an inside diameter 399 mm and length 1000 mm, column is packed with 15 µm spherical silica (sedimentation procedure of packing), maximum pressure 80 bar
- block of mobile phase delivery control (including bypass and flow reversing) provided with manual high-pressure ball valves and electronic pressure sensors
- to the output column fixed detector ***cell*** PLCC 15 Ex and a ***detector FLASH 06S DAD 600 EX***
- three membrane pumps ***Hydracell*** P3 (up to 8 l/min. and 70 bar each, oil level control) - two are in parallel and supply the mobile phase, the third delivers the mixture to be separated
- remote switchboard with three units of frequency converters ABB which supply power to pump motors and allow flow changes and electronic control unit separel 01
- PC computer using a modified software ***ECOMAC*** to set parameters of the separation process and to monitor both detector signal and column pressure



Separsys 800 FP is an industrial unit for liquid high efficiency, high pressure preparative chromatography. It can be used for isocratic, high pressure, high performance chromatography. It is completely controlled by modified ***ECOMAC*** software only. The unit consists of (see schematic drawing):

- new high-pressure column Separchrom PC05 800 with an inside diameter 799 mm and length 1000 mm, column is packed with 15 µ spherical silica (sedimentation procedure of packing) and equipped with a special floating piston, maximum pressure 50 bar.
- block of mobile phase delivery control (including bypass) provided with air controlled high-pressure ball valves and electronic pressure sensors.
- to the output column is connected detector cell PLCC 15 Ex through an automatic bypass system ***Separpass*** 03 (cell is in 10 m distance from the column) and a ***detector FLASH 06S DAD 600 EX***
- three membrane pumps ***Hydracell*** G3 and G10 (up to 8 l/min. and 70 bar each, oil level control, 27 l/min, 70 bar for G10) – G10 supplies the mobile phase, one G3 is injecting the sample and the second moves the column piston the third delivers the mixture to be separated.
- remote switchboard with three units of frequency converters ABB ACS 550-01-06A9-4, which supply power to pump motors and allow flow changes and electronic control unit ***separ*** 01.
- PC computer using a modified software ***ECOMAC*** to set parameters of the separation process and to monitor both detector signal and column pressure.



Separsys 300 is an industrial unit for liquid high efficiency, high pressure preparative chromatography. It can be used for isocratic, high pressure, high performance chromatography. It is completely controlled by modified ***ECOMAC*** software only. The unit consists of (see schematic drawing):

- high-pressure column ***Separchrom PC01*** 1300 with an inside diameter 299 mm and length 1300 mm, full column length piston stroke; column is packed with 10 µ spherical silica by dynamic slurry method, maximum pressure 100 bar.
- hydraulic system ***Separpress*** D100 EE 1300 having a power 100 tons and stroke 1300 mm, fed by an electric motor driven oil pump with pressure control, maxim oil pressure 200 bar.
- block of mobile phase delivery control (including bypass) provided with manual controlled high-pressure ball valves and electronic pressure sensors.
- block of flow reversion which allow to change flow direction in the column.
- to the output column is connected detector ***cell*** PLCC 15 Ex through an automatic bypass system ***Separpass*** 03 (cell is in 10 m distance from the column) and a ***detector FLASH 06S DAD 600 EX.***
- two membrane pumps ***Hydracell*** G04 (up to 8 l/min. and 120 bar each, oil level control) supply the mobile phase and the sample.
- remote switchboard with three units of frequency converters ABB, which supply power to pump motors and allow flow changes of mobile phase, sample and oil and electronic control unit separel 04.
- PC computer using a modified software ***ECOMAC*** to set parameters of the separation process and to monitor both detector signal and column pressure.

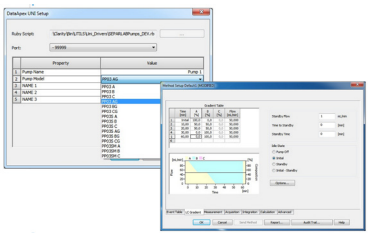
All industrial systems are delivered with ATEX certificate for hazardous environment if requested.

All industrial systems are delivered with pressure certificate for columns and whole system if requested.

SOFTWARE FOR PLC

clarity

CLARITY ADVANCED CHROMATOGRAPHY DATA STATION (CDS) WITH SOFTWARE MODULE FOR CONTROL OF ALL SEPARLAB INSTRUMENTS AND DEVICES



Clarity is a modern and universal datastation which allows to monitor detector signals (including diode detector spectra) to evaluate them, to calculate and use calibration curves and evaluate column efficiency. It perfectly process chromatography data including problematic peaks integrating. Extensions provide functions for specific separation techniques such as GPC.

Together with optional control LC module Clarity provides the possibility of complete chromatography handling system. SEPARLAB modules (pump PP 03 module and fraction collector FC module) were tested by Dataapex and they are now fully integrated in Clarity system. It is possible to program both pump flow rate and gradient composition from the PC as well as simply fill data tables for fraction collectors with five or ten outputs. Each Separlab component can be simply connected to PC through USB port. Fully valid method of each experiment is automatically saved in chromatogram file.

Clarity is fully ready to support tools for GLP / 21 CFR Part 11. Certificate of Software Validation is a document that certifies that the software was developed, tested and structurally validated following a Certificate Quality System conforming to GLP, GAMO, GMP and ISO 9001 Guidelines. The Test IQ (Installation Qualification) is an integral component of the station. This test monitors that the software has been properly installed and the results can be accessed from a printed protocol. Validator for OQ (Operational Qualification) is an optional package available for testing and validating the station. Logon with Password and User Accounts forming with selectable rights, unique user profiles are here. Password expiration and minimal length as well as electronic signature are implemented. Audit Trail of whole system, chromatograms, calibrations and sequence is possible. History of all methods and calibrations are saved as part chromatogram files. And not only this!

CLARITY DATASTATION SYSTEMS	
Specification	**Identification**
Clarity Extensible single instrument SW CFR21/GLP read	C50
Clarity Lite Simplified single instrument SW	C40
Specification Extension modules for Clarity	**Identification**
Clarity ADD-on single instrument add-on	C55
SST SW module for system suitability test	A22
GPC SW module for GPC/SEC data processing	A28
PDA SW module foe PDA data processing	A29
Specification Control modules for Clarity	**Identification**
LC control SW module for HPLC control	A24
Specification Hardware - A/D and D/A converters for clarity	**Identification**
Colibrick set external USB, 1 chanel cable	U31
Colibrick set external USB, 2 chanels cable	U32
Colibrick set external USB, 4 chanels cable	U34
Validation Kit peak generator and SW methods for OQ	CVK

ecomac

UNIVERSAL CHROMATOGRAPHIC SOFTWARE FOR CONTROL AND MONITORING

Software ***ECOMAC*** is designed with maximal effort to make easy operation of Separlab chromatographic systems with detectors made by ECOM. It is suited for both units controlling and data collecting. Equipments are connected to the PC using RS232, or USB (by means of RS232/USB converter). Software detects automatically almost of all units, so there is no need complicated communication installation:

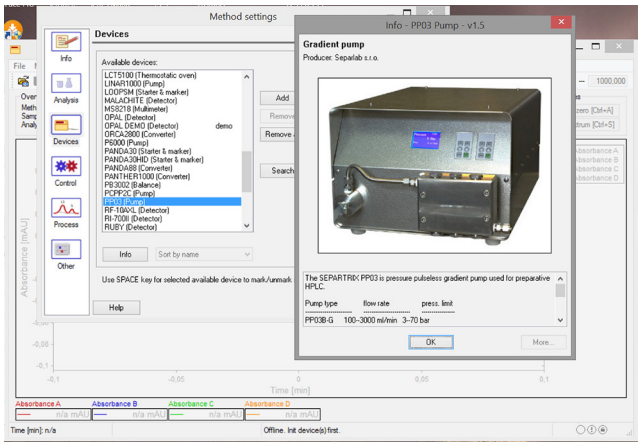
Program most important features:

- Easy installation
- Connecting using USB or RS232
- No need A/D converter
- Possibility to start up to 8 stations at the same time
- Data export in various formats
- Possibility of external start and external mark
- Secured access
- Unit controlling and data collecting from one place

On the screen we can watch parameters of all units for example detector absorbance, pump pressure and column oven temperature. It is possible to record, print and export all data. It is impossible to evaluate chromatograms and used method is not saved with chromatogram.

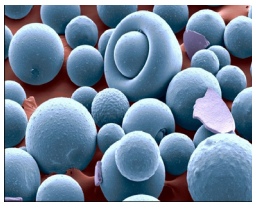
Supported formats by data export:

- Text formats: native text format, two column text format and CSW Clarity text format
- Binary: native binary CH-format, CSW (1.7) Raw format, Matlab 5.0(Octave) MAT format, AIA NETCDF



SORBENTS SEPARSPHER

separspher sorbent



Separspher is perfectly spherical highly pure silica with a high pressure resistance. Sorbents are made by standard procedures in a wide range of sizes of pores, so that both can be used for chromatography of low molecular weight and high molecular weight compounds including the SEC and GPC. Materials for reverse phase chromatography are characterized by effective endcapping. For chromatography, where the mobile phase which contains a very high percentage of water must be used RP sorbents which active layer is containing a small amount of polar groups (aqua) are delivered. Practically absolute endcapping is achieved by reaction in the gaseous phase and is used for sorbents labeled HE. These sorbents may therefore be successfully used for the SEC hydrophobic synthetic polymers. For SEC chromatography, hydrophilic polymers and biopolymers are useful materials labeled DIOL.

Sorbent	Particle diameter (µm)	Modification type
SEPARSPHER SI 70	5, 10, 15, 30	No modification
SEPARSPHER SI 100	5, 10, 15, 30	No modification
SEPARSPHER SI 200	5, 10, 15, 30	No modification
SEPARSPHER SI 300	5, 10, 15, 30	No modification
SEPARSPHER SI 100 C18	5, 10, 15, 30	Alkyl chain C18 and endcapping
SEPARSPHER SI 200 C18	5, 10, 15, 30	Alkyl chain C18 and endcapping
SEPARSPHER SI 300 C18	5, 10, 15, 30	Alkyl chain C18 and endcapping
SEPARSPHER SI 100 C18 aqua	5, 10, 15, 30	Alkyl chain C18 and polar groups
SEPARSPHER SI 200 C18 aqua	5, 10, 15, 30	Alkyl chain C18 and polar groups
SEPARSPHER SI 300 C18 aqua	5, 10, 15, 30	Alkyl chain C18 and polar groups
SEPARSPHER SI 100 C8	5, 10, 15, 30	Alkyl chain C8 and endcapping
SEPARSPHER SI 200 C8	5, 10, 15, 30	Alkyl chain C8 and endcapping
SEPARSPHER SI 300 C8	5, 10, 15, 30	Alkyl chain C8 and endcapping
SEPARSPHER SI 100 C8 aqua	5, 10, 15, 30	Alkyl chain C8 and polar groups
SEPARSPHER SI 200 C8 aqua	5, 10, 15, 30	Alkyl chain C8 and polar groups
SEPARSPHER SI 100 C18 HE	5, 10, 15, 30	Alkyl chain C18 and HE endcapping
SEPARSPHER SI 200 C18 HE	5, 10, 15, 30	Alkyl chain C18 and HE endcapping
SEPARSPHER SI 300 C18 HE	5, 10, 15, 30	Alkyl chain C18 and HE endcapping
SEPARSPHER SI 100 C8 HE	5, 10, 15, 30	Alkyl chain C8 and HE endcapping
SEPARSPHER SI 200 C8 HE	5, 10, 15, 30	Alkyl chain C8 and HE endcapping
SEPARSPHER SI 300 C8 HE	5, 10, 15, 30	Alkyl chain C8 and HE endcapping
SEPARSPHER SI 100 C4 HE	5, 10, 15, 30	Alkyl chain C4 and HE endcapping
SEPARSPHER SI 200 C4 HE	5, 10, 15, 30	Alkyl chain C4 and HE endcapping
SEPARSPHER SI 300 C4 HE	5, 10, 15, 30	Alkyl chain C4 and HE endcapping
SEPARSPHER SI 500 C4 HE	5, 10, 15, 30	Alkyl chain C4 and HE endcapping
SEPARSPHER SI 1000 C4 HE	5, 10, 15, 30	Alkyl chain C4 and HE endcapping
SEPARSPHER SI 100 AMINE	5, 10, 15, 30	Primary amino groups
SEPARSPHER SI 100 DIOL	5, 10, 15, 30	Diol groups
SEPARSPHER SI 200 DIOL	5, 10, 15, 30	Diol groups
SEPARSPHER SI 300 DIOL	5, 10, 15, 30	Diol groups
SEPARSPHER SI 500 DIOL	5, 10, 15, 30	Diol groups
SEPARSPHER SI 1000 DIOL	5, 10, 15, 30	Diol groups

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