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INTERFINE CHEMICALS | ANALYTICAL SCIENCES | BIOCHROMATOGRAPHY | BIOSCIENCE INNOVATION

PURIFLASH® 450 - User Manual

ITM - 2012/10/31

Ultra Performance Flash Purification™

Crossover flash / prep-LC

Lab Scale

✓ Flash columns up to F800 format

✓ Prep-LC columns up to 80mm id - 15µm

PURIFLASH® 450

250 ml/min @ up to 50 bar

INTERFINE CHEMICALS

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Summary

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1 > General description

The PURIFLASH® 450 system is a modern instrument designed for Flash chromatography which allows to withdraw mobile phases from four containers of solvents, form a gradient, inject liquid or solid samples and provide the solution to a chromatography column.

A detector measures the absorbance and gives a signal called chromatogram which is visualized with the built-in computer and the control software “INTERCHIM® Software” installed. Then fractions can be collected with the fraction collector.

The characteristics of a PURIFLASH® 450 are:

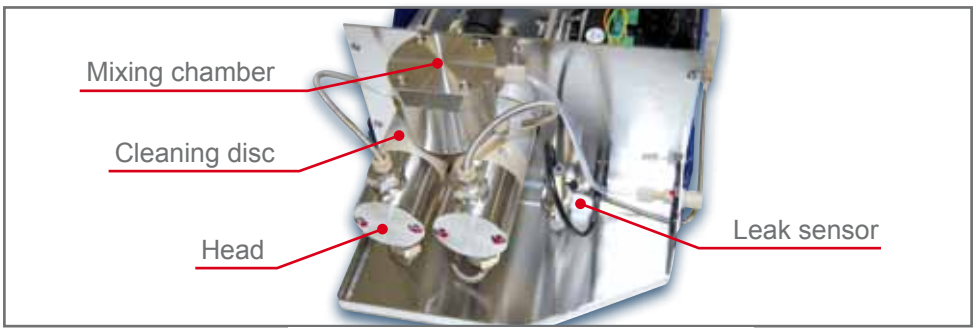
- ✓ **Flow rate:** Up to 250mL/min
- ✓ **Pressure:** Max. 50 bar (725 psi)
- ✓ **Gradient:** Quaternary + Air purge
- ✓ **Column size:**
  From F4 to F1600 format - according to column trademark
- ✓ **Automatic injection valve module:** Liquid or solid injection
- ✓ **UV Detection:**
  Spectrophotometer dual-wavelength (DAD technology, range: 200-600nm)
- ✓ **Collection:** Several types of racks available.

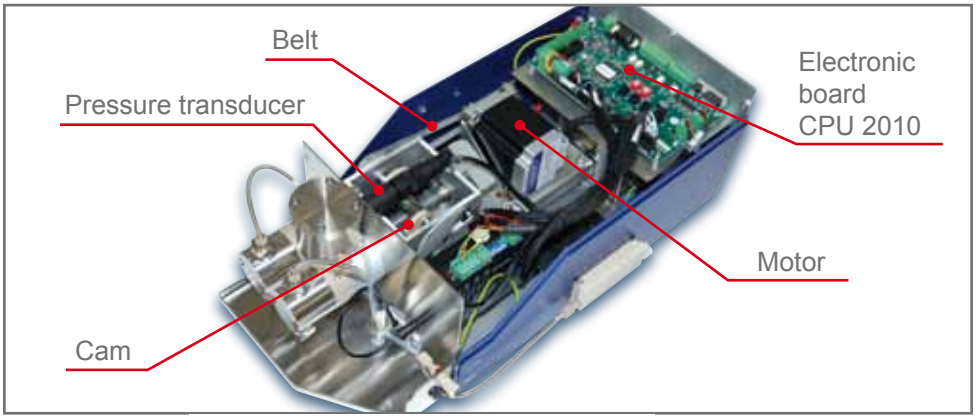
The complete system consists of following modules:

The 2-head pump:

As mentioned above, the pump can deliver mobile phase at flow rates up to two hundred and fifty millilitres per minute with low residual pulsation. It is a high performance double-piston pump (reciprocal movement). Thanks to a system “pulleys + belt”, a stepper motor drives two special cams on which lean the two pistons. Their motion generates a cycle and then creates the suction.

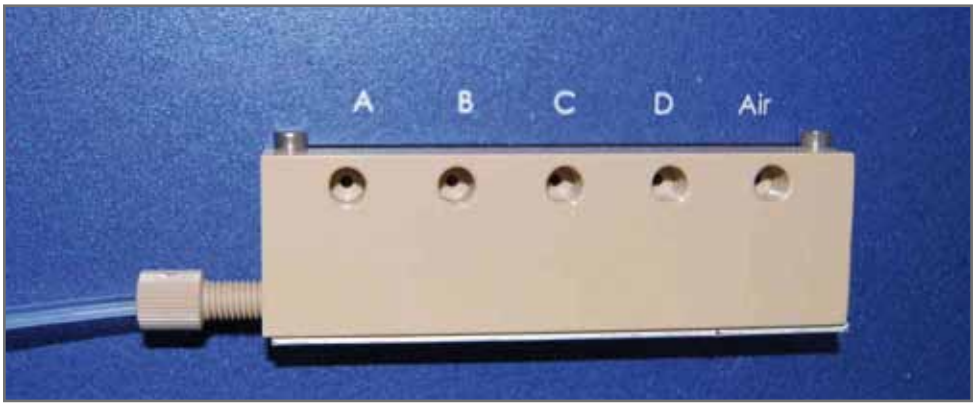
A static mixing chamber at the outlet ensures a suitable mixing of solvents whatever the working flow rate, it is associated with a pressure transducer.



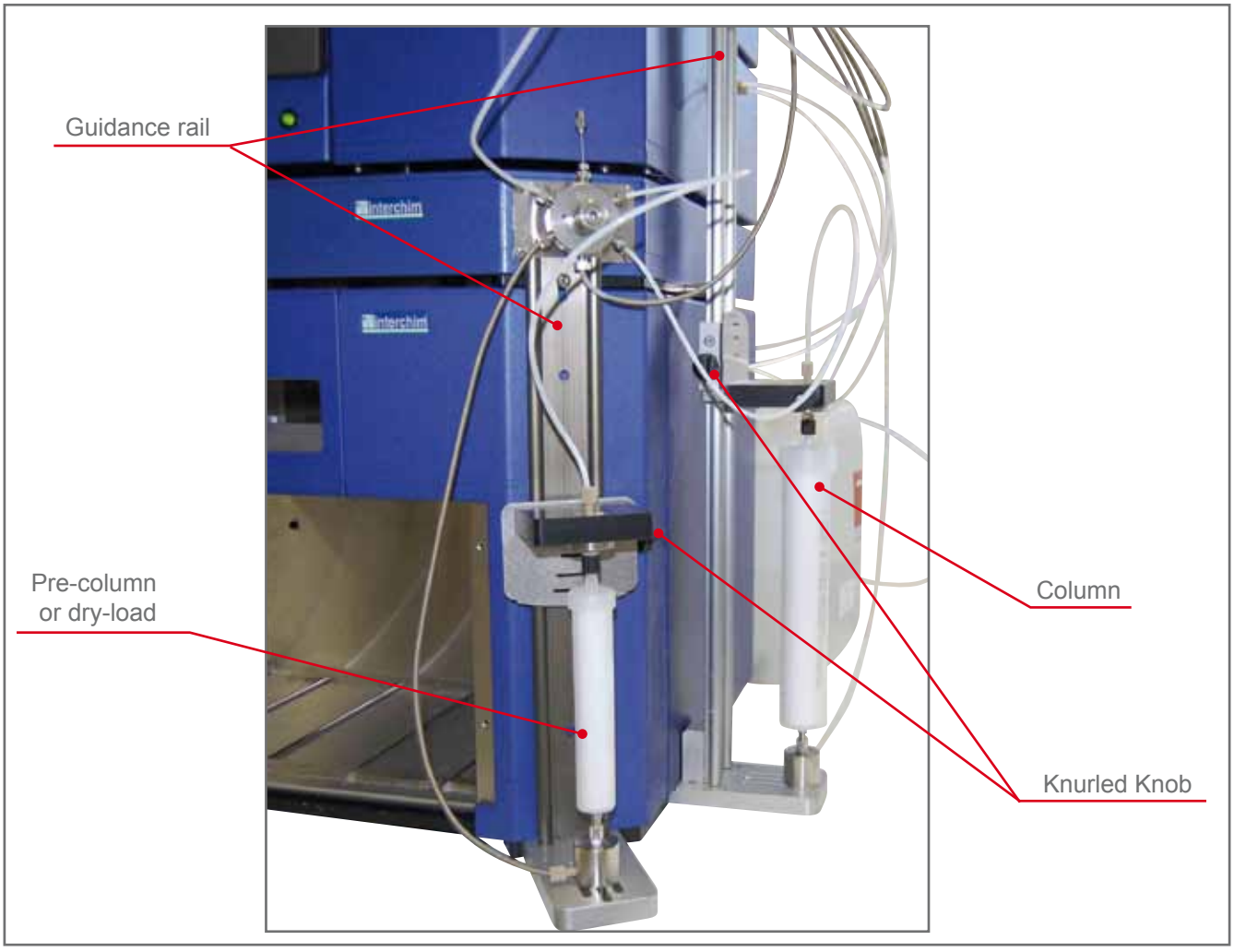


Moreover, an optic sensor can detect leakages in the pump drain pan. The pumping is then interrupted and the user informed via the control software.

The 4-ways suction valve allows to perform quaternary elution gradients. A fifth way can be used for Air Purge.



The injection unit and columns holder system:
This device gives the possibility to inject sample automatically (liquid or solid via dry-load) via 6-ways electric valve directly to the chromatography column installed.



The adjustable height holder of the large black POM holder allows to adapt all types of columns (from 4g to 1600g) and pre-column (from 4g to 300g). A knurled knob can block this holder on the vertical guidance rail. The bottom union is fixed.

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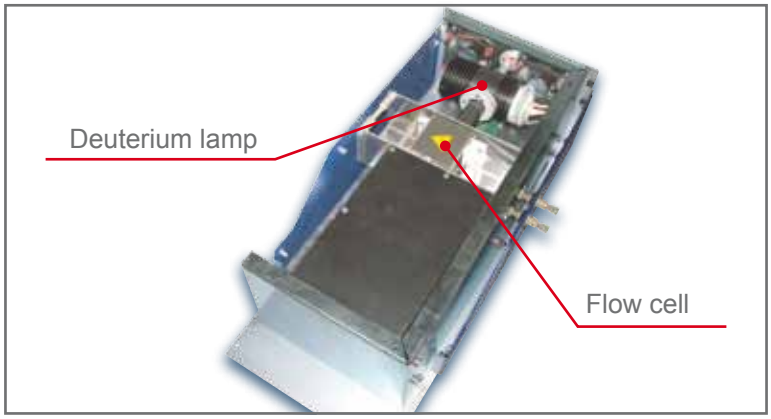
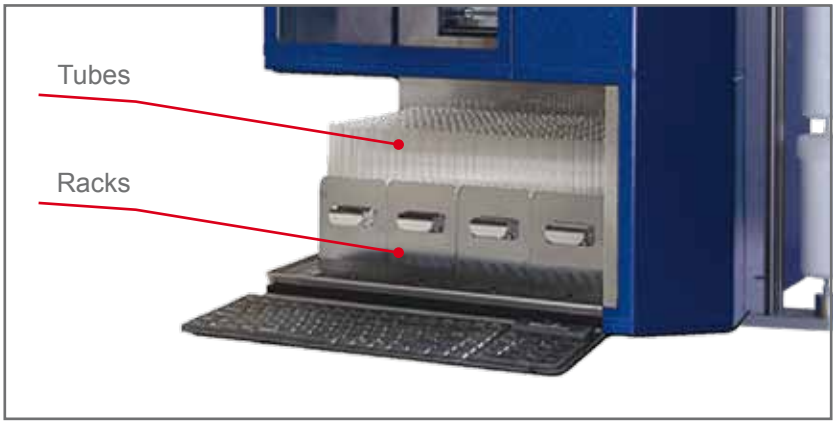
The UV diode array detector:
This instrument measures the amount of light absorbed by a liquid passing through the cell at a given wavelength. It is equipped with a deuterium lamp. The two wavelengths available and the SCAN function are selected within a large range, from 200 to 600nm or from190 to 840nm (in option) - P/N: GO9630.

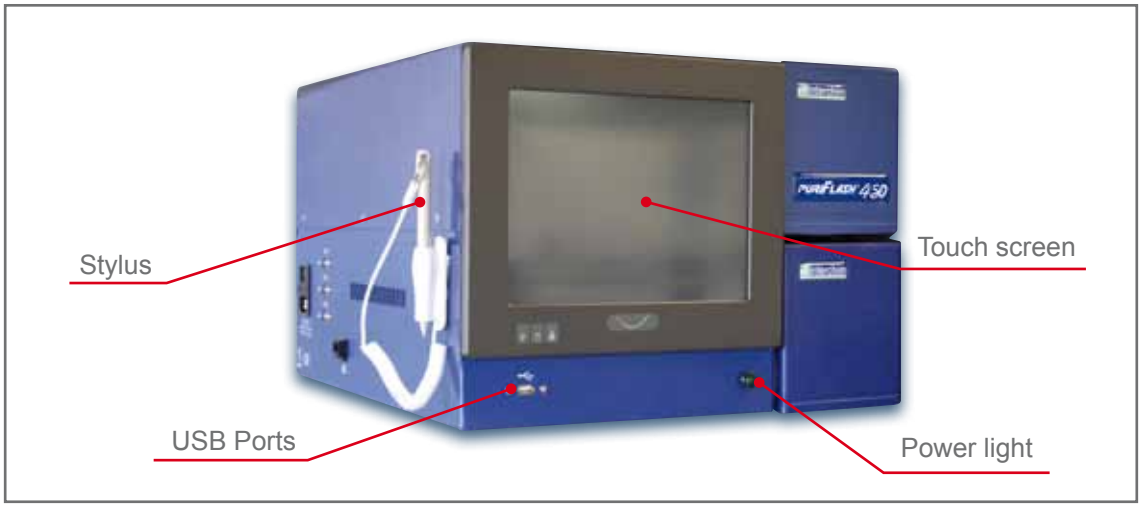


The fraction collector:
The fraction collector is placed downstream of the detector. After the detection of the signal (chromatogram), the results obtained at the outlet of the column (peaks) can be directed to tubes disposed on racks. A built-in 3-way valve allows to choose between the collection or the rejection of the liquid.



The collector is provided with three stainless steel racks for 18 mm diameter tubes as standard. That represents in all 176 tubes and a volume of 5.6 Litres.

The computer and its touch screen:
The system is controlled by the central processing unit via a touch screen, which replaces the keyboard and the mouse. The operator uses the control software and can create methods to run the instrument.



This module contains the main ON/OFF switch and centralizes the connection for data and power supply to the other modules.

Four USB connectors are also available, 1 in front of the system under the screen and 3 to the left hand side (cable maximum length = 2m).

The external connections:
Some others external connectors allow to plug in additional devices like second detector or options (Réf: HV1200: Multi Com 2 Ports Box). The maximum length of all external cables connected to the system is 2 metres.

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2 > Packing list

Standard system PURIFLASH® 450

Item:

✓ **PURIFLASH® 450 system composed of:**
- Pump module,
- 6-Ways electric valve module,
- Pre-column holder,
- Column holder module,
- Detector module,
- Fraction collector module,
- Computer & power supply module.

✓ **Tubing with fittings (ETFE - OD = 1/8”):**
- Suction (1.50m - ID = 2.4mm - x4) ~ with 20cm spring ~
- Gradient valve outlet to Tee Pump inlet (27cm - ID = 2.4mm) (present on the system)
- Pump outlet to Valve (port n° 4) (46cm - ID = 1.6mm) + Spring = 39cm
- Valve (port n° 3) to Column Holder inlet (60cm - ID = 1.6mm)
- Valve (port n° 5) to Pre-column Holder inlet (38cm - ID = 1.6mm) + Spring = 32cm
- Pre-column Holder outlet to Valve (port n° 2) (56cm - ID = 1.6mm) + Spring = 50cm
- Valve (port n° 6) - Waste outlet (100cm - ID = 1.6mm)
- Valve (port n° 1) - Stainless Steel Adapter for injection
- Column holder outlet to Detector inlet (73cm - ID = 1.6mm)
- Detector outlet to Fraction collector inlet (37cm - ID = 1.6mm)
- Waste outlet (1.50m - ID = 1.6mm)
- Pressure test OQ (PEEK-70cm - 1/16” - ID = 0.5mm)

✓ **Rack set “PF4390” for 18mm diameter tubes (4 racks)**

✓ **Semi-prep and prep adaptation kit (P/N: GO2400)**

✓ **PEEK union 10-32 female (P/N: NR0860)**

✓ **Solvent Tray with a drainage system**
- Serial communication cables (3 x Sub-D9 male/female - 1 x Sub-D9 female/female)
- Distribution power cables (3 x main voltage supply - 1 x 24V)

✓ **Fittings for cleaning discs connections (2 long nuts + 2 ferrules)**

✓ **Binding column**

✓ **General power cable (model according to the destination country)**

✓ **USB key (including the file of installation ‘.exe’ of the freeware ‘Interchim® Software Demo)**

✓ **Stylus & Keyboard**

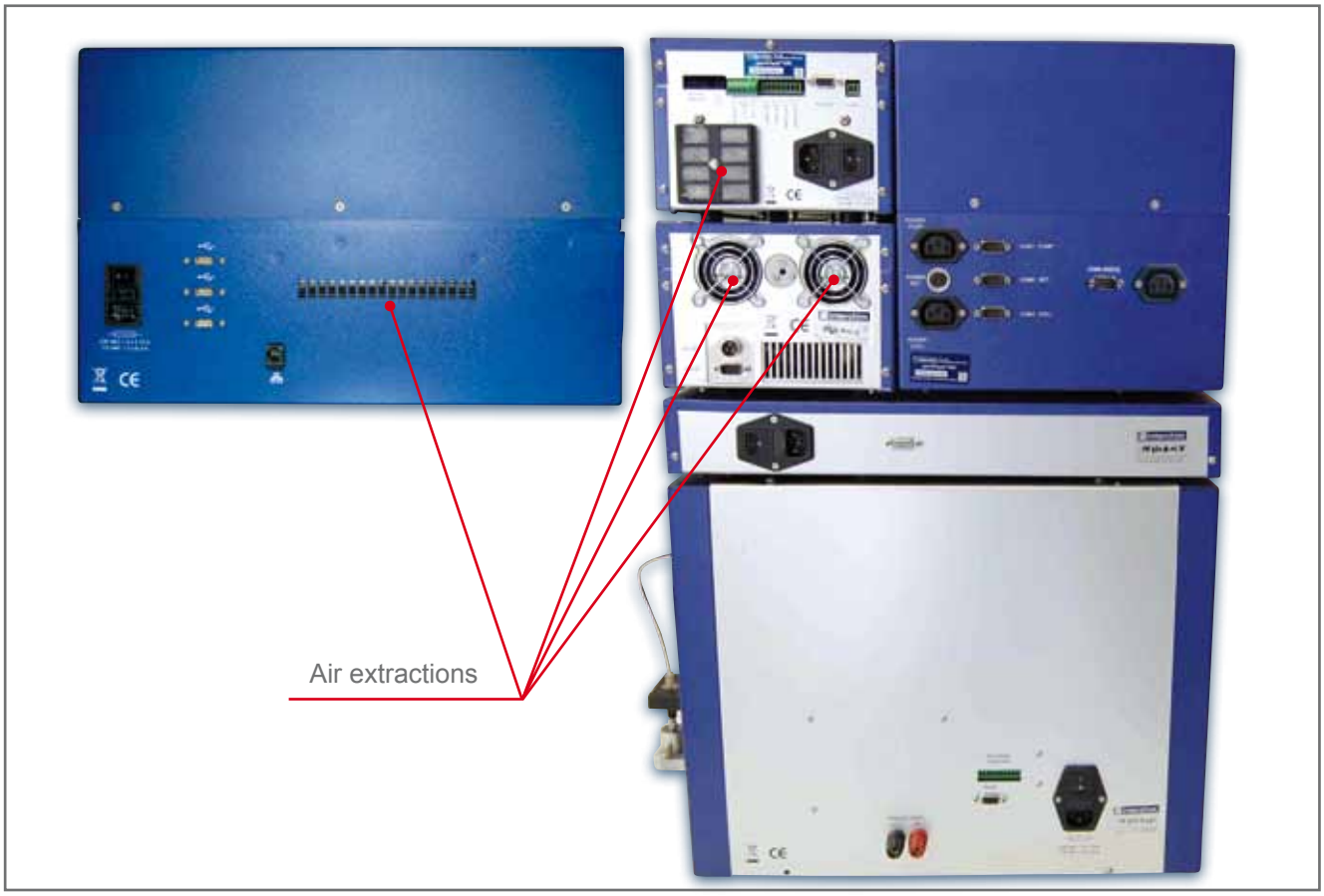
✓ **Columns starting kit (2x PF-15SIHP/25G, 2x PF-30SIHP/25G, 2x PF-50SIHP/25G)**

✓ **Documentation:**
- User Manual for PURIFLASH® 450 system
- Instruction Manual for “Interchim® Software”
- “Adjusting Protocol of Assembled Unit” for “Flash 06 DAD” UV detector
- PDF document : Operational Qualification and test report (“My documents”)
- Quick start for “Interchim® Software”
- Installation Qualification (x2)

3 > Installation

3.1 Assembling the system

Select a suitable location by ensuring adequate air-space (~15cm around the system) to provide ventilation of the controller, the pump, the detector cooling fans. Its total weight is approximately 66kg.



✓ **Assemble the system in the following order:**

- Fraction collector: ~ 25kg
- 6-Ways Electric Valve: 5kg
- Unit control: ~ 15kg
- Detector: ~ 7kg
- Pump: ~ 8kg
- Pre-column Holder: 2kg
- Column Holder: ~ 3kg
- Solvent tray: ~ 1kg

✓ **Put then the stainless steel solvent tray supplied on top to dispose solvents (up to five).**
They cover the totality of the system with a drainage system and their design avoids any leakage risk.

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✓ **Fix the column holder and pre-column holder as below:**

Column holder

- Insert the column holder at the bottom of the collector.
- Put the binding column and the screw on the middle of the column holder.

Pre-column holder

- Insert the pre-column holder at the bottom of the collector.
- Put the screw at the top of the pre-column holder.

3.2 Install the tubing and prepare the containers

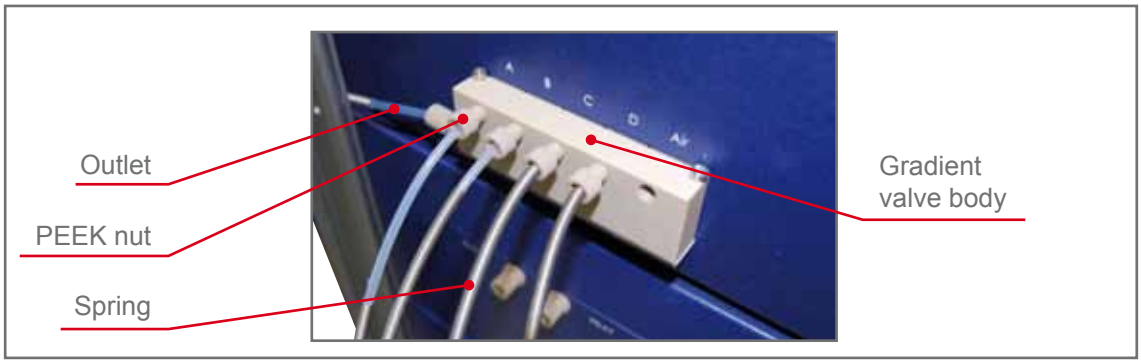
The tubes situated outside the housing are delivered apart in order to avoid all deterioration during transfer, they are already equipped with the suitable fittings (nut + ferrule) to connect them easily to the system. Regarding the main circuit, two sizes of tube are used:
1/8" - ID = 2.4mm for suction
1/8" - ID = 1.6mm for others.

Follow the instructions below to correctly install the tubing:

Suction:
Provide yourself with the four “Suction tubes” (l=1.5m, 1/8” - ID=2.4mm) supplied, they are more brittle than others so take care not to bend them.

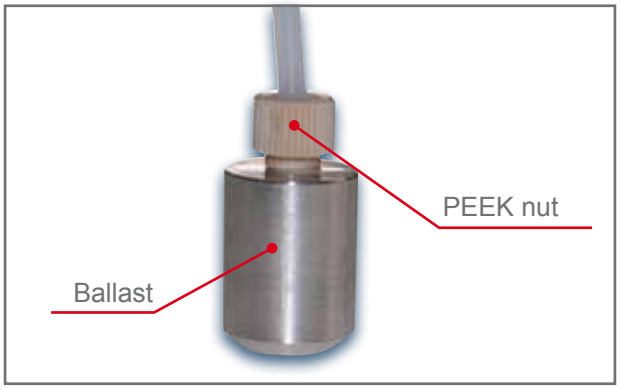
For the tube “A”, take the extremity where there is a fitting with a long spring and put the ferrule in the PEEK body of the suction valve. Screw the PEEK nut, tighten it hand-tight and position properly the long spring.

Renew the same operation for “B”, “C” and “D” as indicated on the photo. The “Air” inlet stays free.



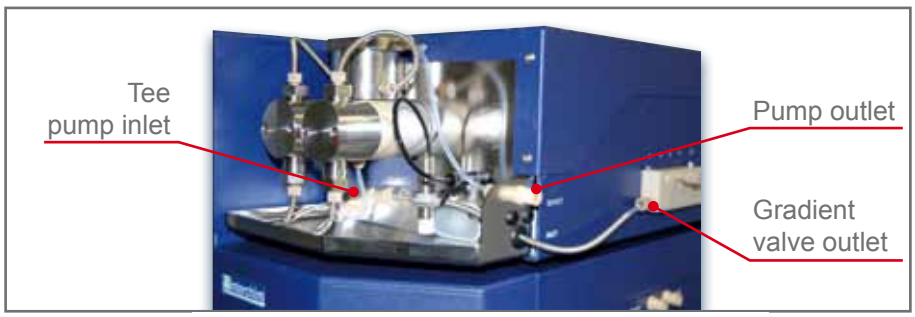
CAUTION: Don’t put the ETFE plug in the valve “air”.

To ensure the pumping continuity of the solvents and avoid the air entry in the hydraulic circuit, the others extremities can be equipped with ballasts (in option, P/N: DZ7360). It consists in fact to put a fitting (nut + set ferrule) and screw it in a stainless steel piece which serve of weight to maintain the tubes at the bottom of the containers.



Position the solvents containers on the solvent tray for instance, and put the ballasted tubes into them.

Gradient valve:
The gradient valve to Tee Pump inlet tube is already connected into the pump (l= 27cm - 1/8” ID= 2.4mm) as shown below :



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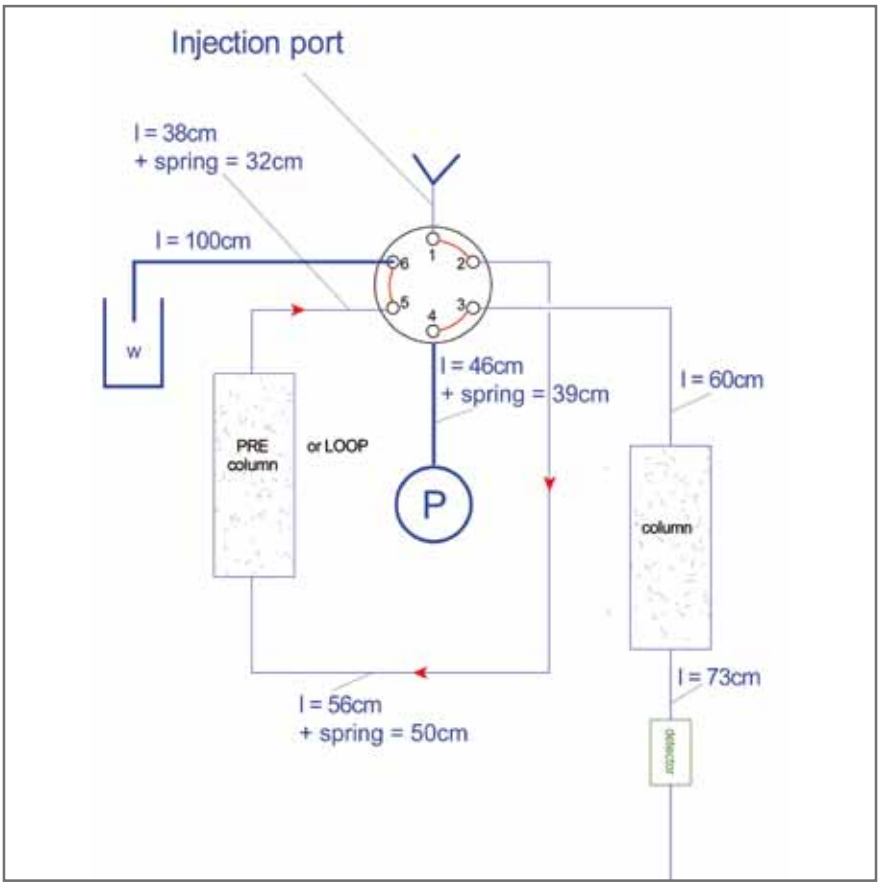
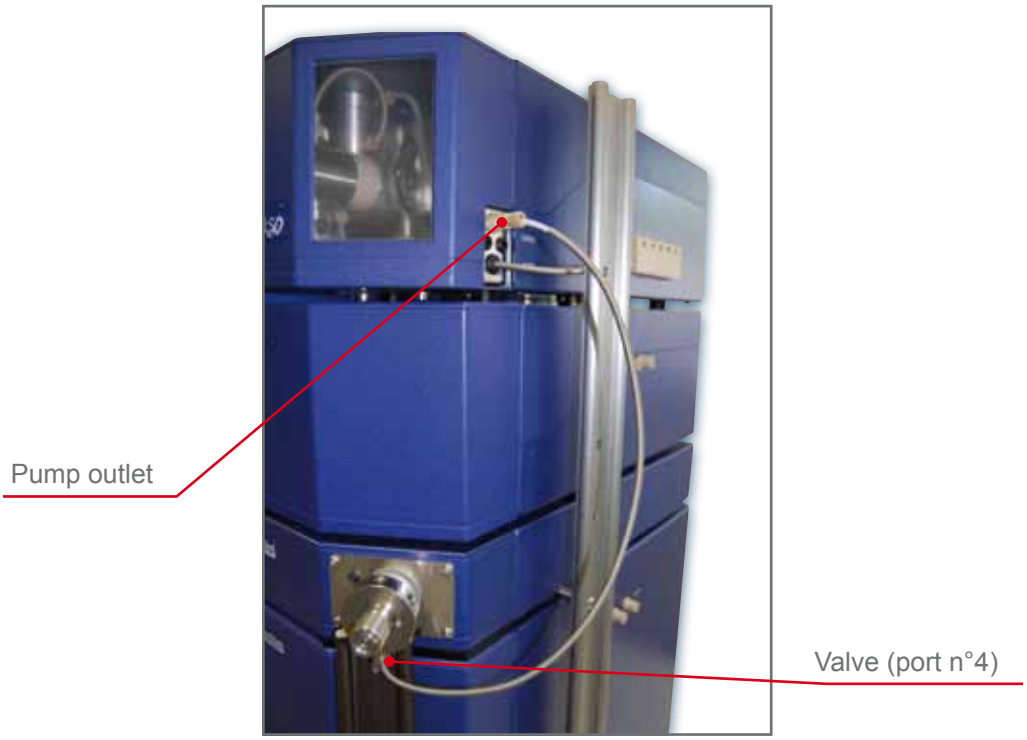
6-Ways electric valve fluidic connection:
The fluidic connection on the 6-ways electric valve module is explained below:

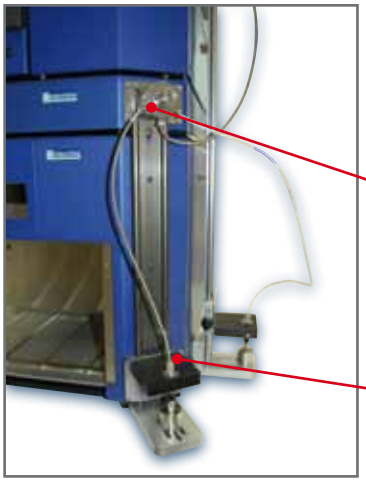


Pump to valve (port n°4):
Using the 46cm x 1.6mm ID tube insert one end into the pump outlet and the other end into the valve n°4 of the 6-ways electric valve. Position the tubing as shown below and tighten each fitting:



Valve (port n°3) to column holder:
Using the 60cm x 1.6mm ID tube insert one end into the valve n°3 of the 6-ways electric valve and the other end into the column holder intlet. Position the tubing as shown below and tighten each fitting:

Valve (port n°5) to pre-column holder:
Using the 38cm x 1.6mm ID tube insert one end into the valve n°5 of the 6-ways electric valve and the other end into the pre-column holder inlet. Position the tubing as shown below and tighten each fitting:



Pre-column holder to valve (port n°2):
Using the 56cm x 1.6mm ID tube insert one end into the Pre-column holder outlet and the other end into the valve n°2 of the 6-ways electric valve. Position the tubing as shown below and tighten each fitting:

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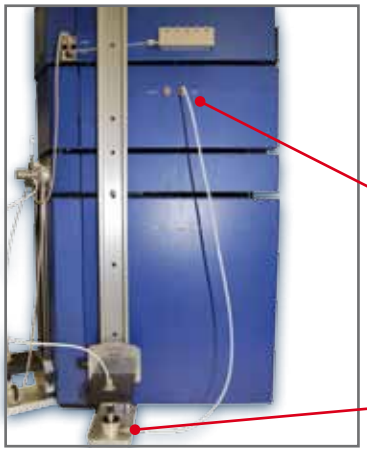
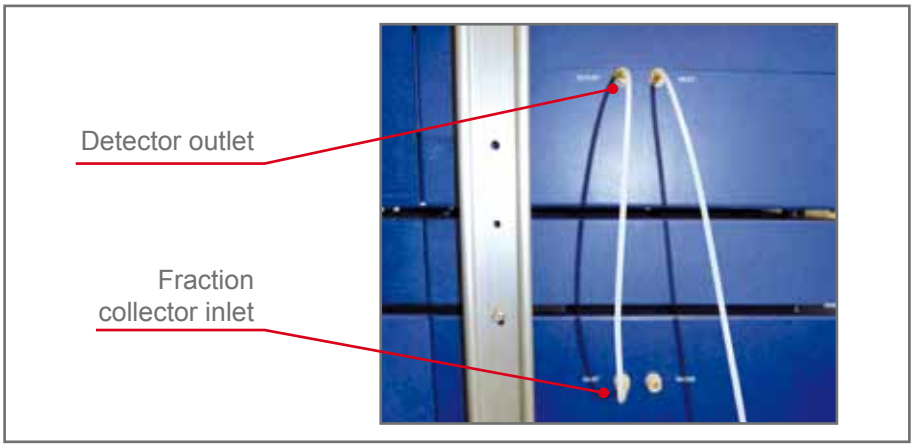
Valve (port n°1):
Screw the Stainless Steel adapter for injection into the port n°1 of the 6-ways electric valve and tighten:

Valve (port n°6):
Using the 1m x 1.6mm tube attach the end with the fitting into the valve n°6 of the 6-ways electric valve and tighten. On the other end, insert into an appropriate waste bottle.

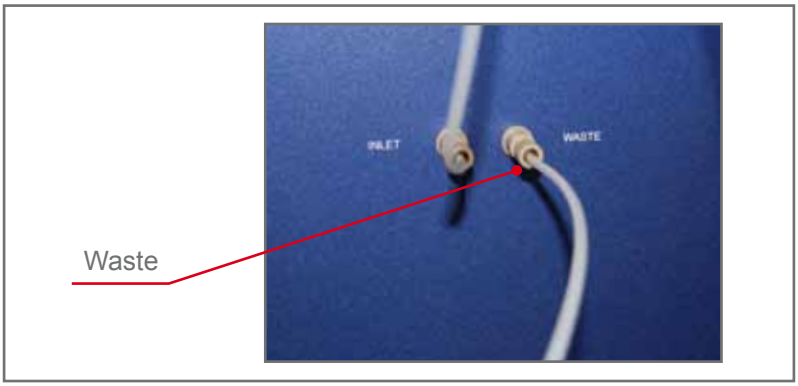
Column holder to detector:
Using the 73cm x 1.6mm ID tube insert one end into the column holder outlet of the stainless steel bulkhead union 90° and the other end into the detector inlet. Position the tubing as shown below and tighten each fitting:



Detector to fraction collector:
Using the 37cm x 1.6mm ID tube insert one end into the detector outlet and the other end into the fraction collector inlet. Seat the ferrules and hand tighten each fitting:



Waste:
Using the 1.5m x 1.6mm tube attach the end with the fitting into the fraction collector waste port and hand tighten. On the other end, insert into an appropriate waste bottle.



3.3 Set up the column, the pre-column, the dry-load and the loop

A large range of columns can be used on the column holder, columns packed with normal or reverse phase, with an external diameter up to 120mm.
The “Extension kit for Large columns (P/N: DU9671)” is supplied with this device, this overall dimension can go up to 120mm.
On the pre-column holder, dry-load and pre-column (4g up to 300g) can be used.
A large range of stainless Steel loop injection(from 100µL to 100mL or more) can be used on the 6-ways electric valve.

Set up the column:

- 1 -
Unscrew lightly the knurled knob in order to allow its vertical movement.

- 2 -
Unlock the black ring of the fitting “Adapter PEEK Luer lock male to ¼-28 male” located on the column holder.

- 3 -
Move up the large black POM holder on the vertical guidance rail and place the bottom fitting of the column on the “Adapter ETFE or Stainless steel Luer lock female to ¼-28 male” located on the stainless steel bulkhead union 90°.

- 4 -
Move down the large black POM holder and lock again the black ring of the fitting “Adapter PEEK Luer lock male to ¼-28 male” to the top fitting of the column.

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Set up the dry-load and pre-column:
To inject solid sample, make dry loading injection, or use the pre-column, you have the possibility to use a column of which the maximum dimensions are 27cm in height and 70mm for external diameter. Install it as follows:

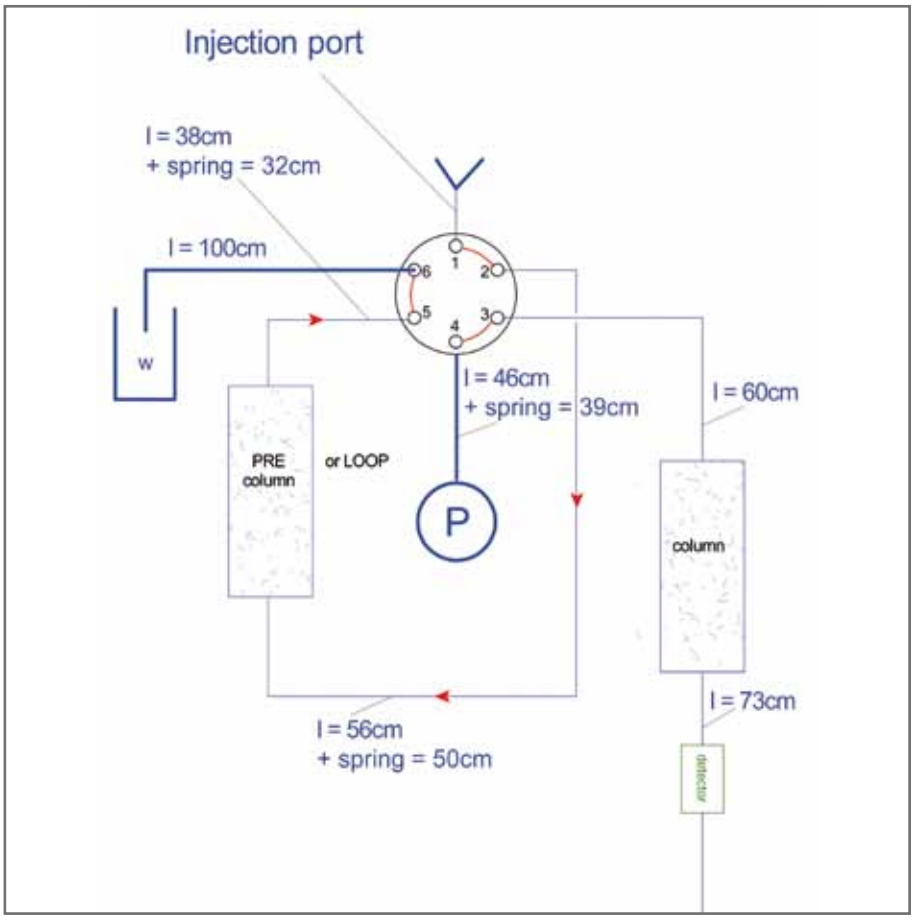
- 1 -
Unscrew lightly the knurled knob of the holder in order to allow its vertical movement.

- 2 -
Unlock the black ring of the fitting “Adapter PEEK Luer lock male to ¼-28 male” of the pre-column holder.

- 3 -
Move up the large black POM holder on the vertical guidance rail and place the bottom fitting of the dry-load or pre-column on the “Adapter ETFE or Stainless steel Luer lock female to ¼-28 male” located on the stainless steel bulkhead union 90°.

- 4 -
Move down the large black POM holder and lock again the blazzack ring of the fitting “Adapter PEEK Luer lock male to ¼-28 male” to the top fitting of the dry-load.

Set up the loop:



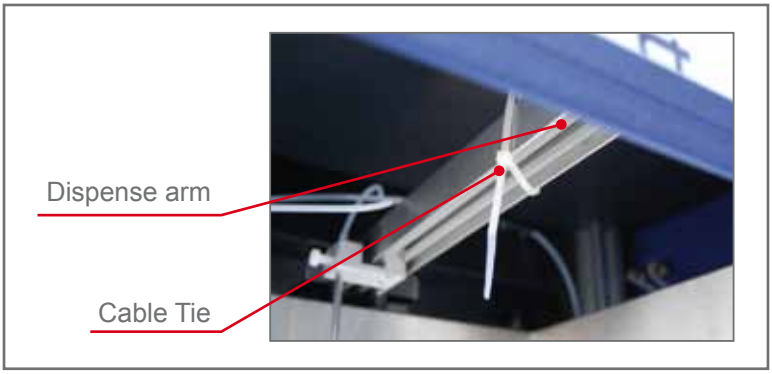
Connect the loop into the 6-ways electric valve between the port n°2 and n°5 as shown below and thighten with wrench ¼”-5/16”:

3.4 Prepare the fractions collection

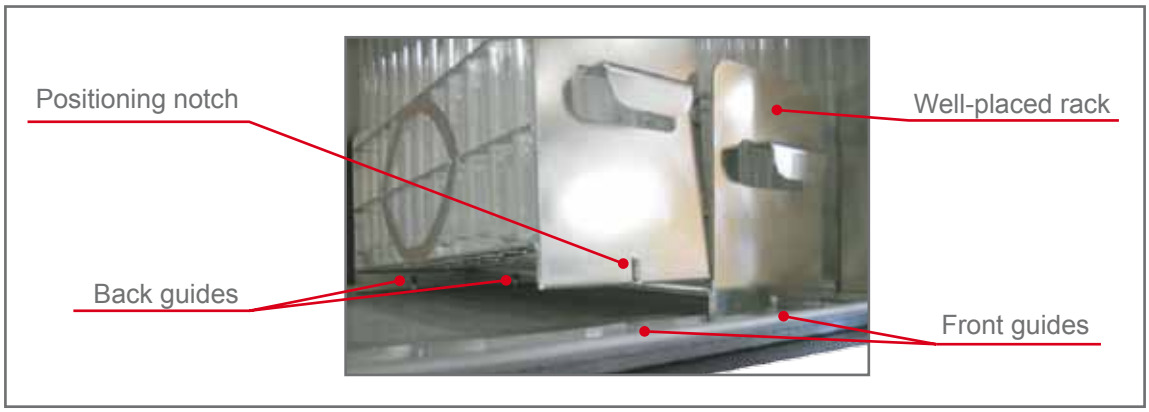
According to the type of collection required (small or big volumes, short or long fractionation, etc…), the equipments to install are different.

The standard rack set (18x150mm) supplied is “PF4390”, composed of four racks for 176 tubes in all, it allows a total collection volume of 5.6 Litres with 180 mm high tubes.

CAUTION: Before any action, take a diagonal plier and carefully cut the cable tie which holds the arm during the transfer.



Place first the tubes in the holes and put then the racks on the tray. Thanks to notches machined on racks and positioning guides already mounted on the system, their emplacement is easy and necessarily proper.



You can also equip your collector with an optional Enhancement tube device for 13x100m (P/N: DW3360). It is designed for elevating the racks with small height tubes. Its installation is simple too because you have just to emplace it on the collector tray using positioning guides.

Several models of rack set are available, find a detailed list on “APPENDIX 1”.

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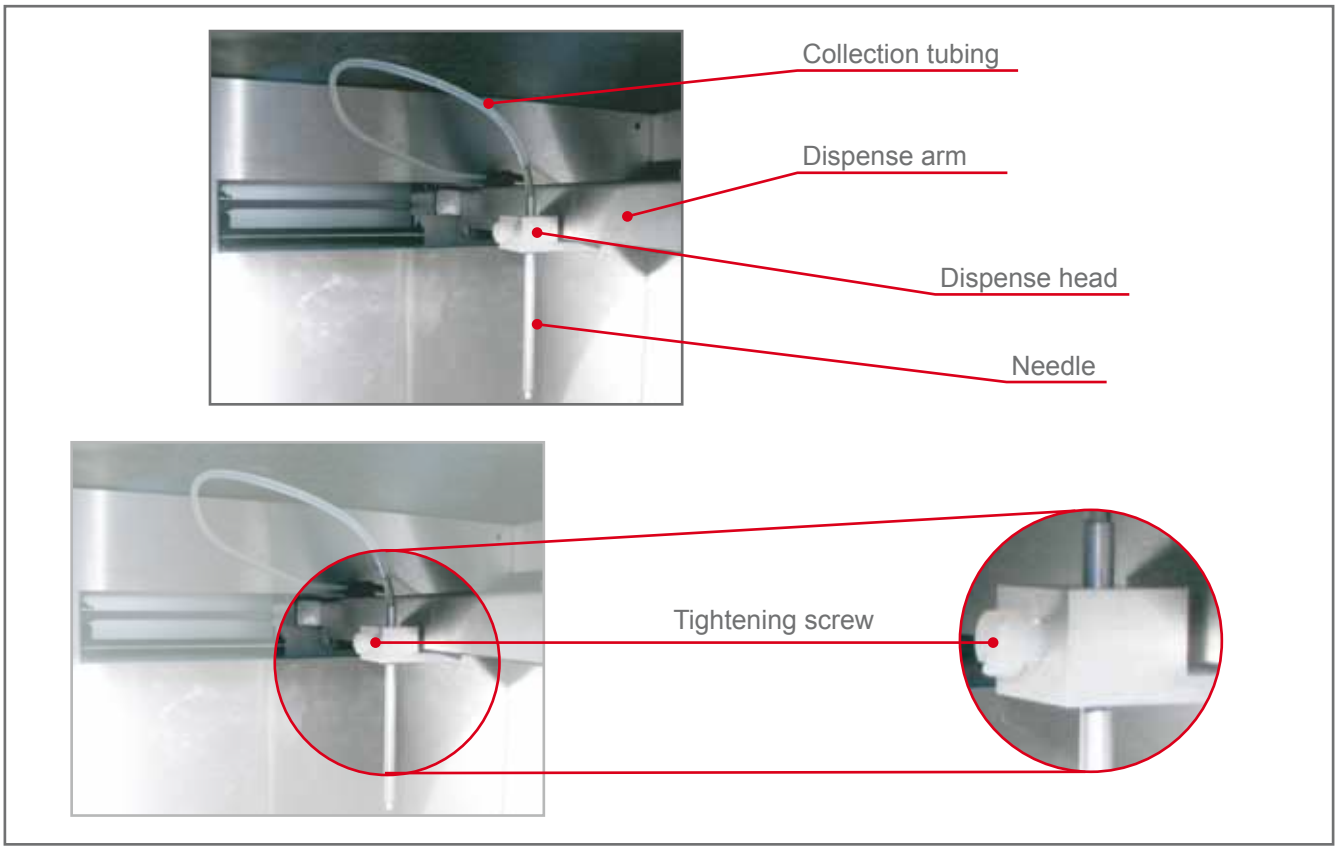
It is important to maintain appropriate spacing of the dispensing needle above the tubes. A space of 5-25mm between the end of the needle to the top of the tube is recommended.

To adjust the needle height turn off the system, remove the racks and gently move the arm into an easy to access position. Do not use the needle to relocate the arm as bending and mis-alignment may occur. Loosen the set screw and adjust the height of the needle and then tighten the set screw. When the system is turned on the arm will return to its «home» position.



3.5 Position the stylus

The stylus is supplied to control the system via computer touch screen. A fixed holder allows to easily put away it when it is not used and its extensible cord (linked to the holder) gives the suitable length.

Stick the stylus holder just as you like in order to profit at best of its features (i.e. to the left side of the system as showed on this picture).

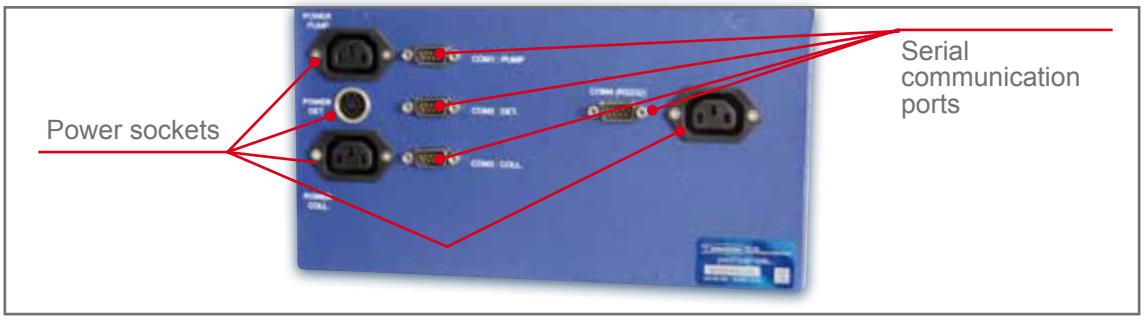
3.6 Make the connections (electrical and data transmission)

The complete system is supplied with appropriate fuses and is ready to operate at the line voltage of the shipping destination.

The Computer module serves as the primary point for power distribution and data collection. The ports on the modules are labelled to ensure proper connections. Using the cables provided connect each module to the unit control.

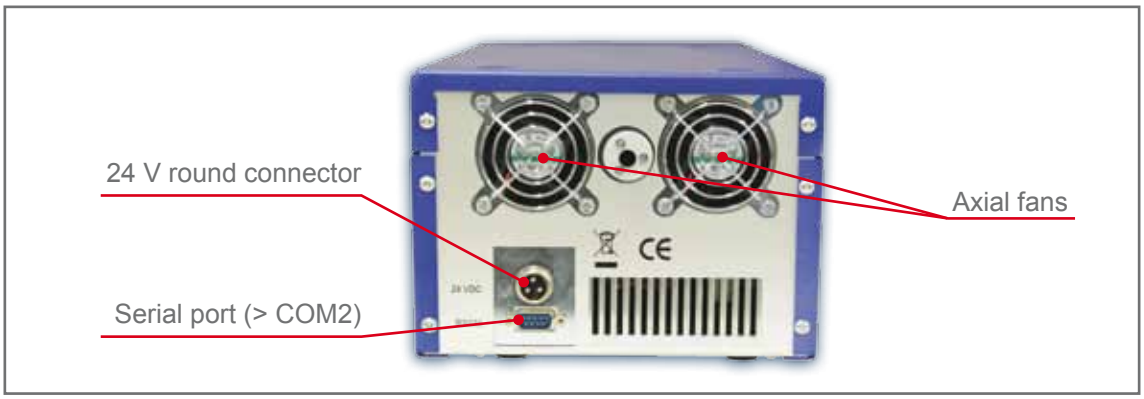
Unit control:

Back panel of the unit control



Detector:

Back panel of the detector

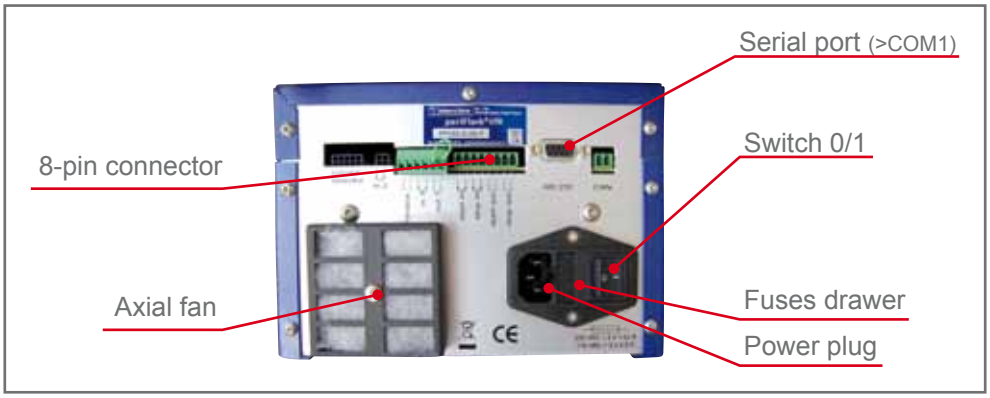


Take first the special cable for 24 V supply and screw the round male connector in the suitable socket (label “DET.”) of the unit control. Screw the other end (round female connector) in the back panel of the detector.

Link the unit control (label “COM2: DETECTOR”) and the detector module using the Sub-D9 female/female cable supplied. Do not forget to set the connectors by fastening the two fixing screws.

Pump:

Back panel of the pump



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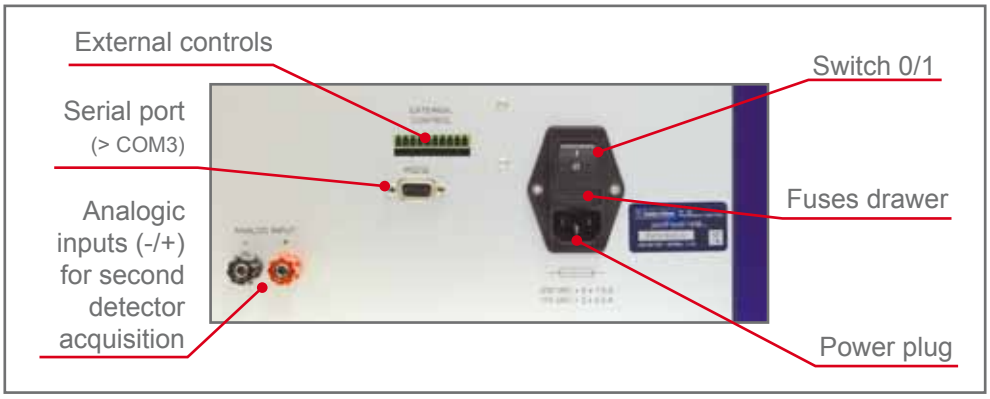
Take the power cable for main voltage supply and connect it at the same time in the plugs of the unit control (label “PUMP”) and in the sockets of the pump module.

Link the unit control (label “COM1: PUMP”) and the pump module using the Sub-D9 male/female cable supplied. Do not forget to set the connectors by fastening the two fixing screws.

Back panel of the fraction collector



Take the power cable for main voltage supply and connect it at the same time in the plugs of the unit control (label “COLL.”) and in the sockets of the pump module.

Link the unit control (label “COM3: COLLECTOR”) and the collector module using the Sub-D9 male/female cable supplied. Do not forget to set the connectors by fastening the two fixing screws.

6-ways electric valve module :

Back panel of the 6-ways electric valve

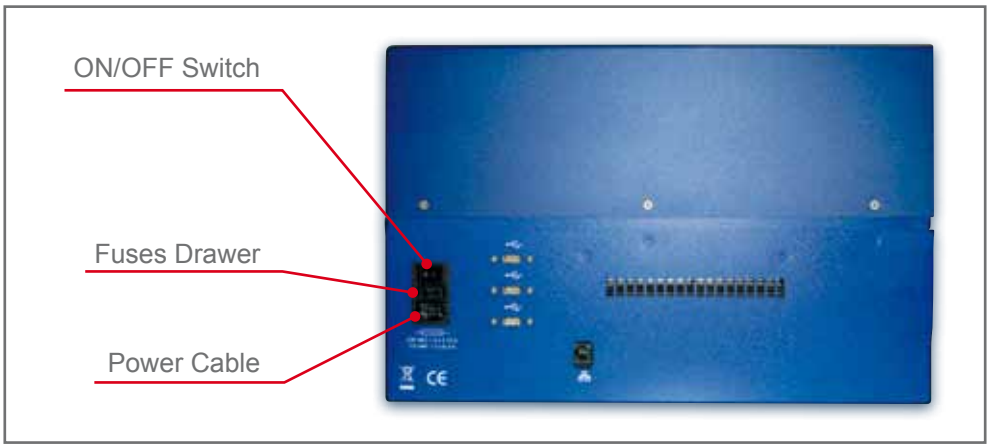
Take the power cable for main voltage supply and connect it at the same time in the plugs of the unit control and in the sockets of the pump module.

Link the unit control (“COM4”) and the pump module using the Sub-D9 male/female cable supplied. Do not forget to set the connectors by fastening the two fixing screws.

Plug the AC power cable supplied in the general switch located to the left side of the system, and after to the mains, knowing that the connector depends also on the destination country (comply with country regulations in effect).

For American system: 110-120 VAC; 50-60 Hz; 6.2 A (delay action fuses 2 x 6.3 A)

For European system: 220-240 VAC; 50-60 Hz; 3.1 A (delay action fuses 2 x 3.15 A)

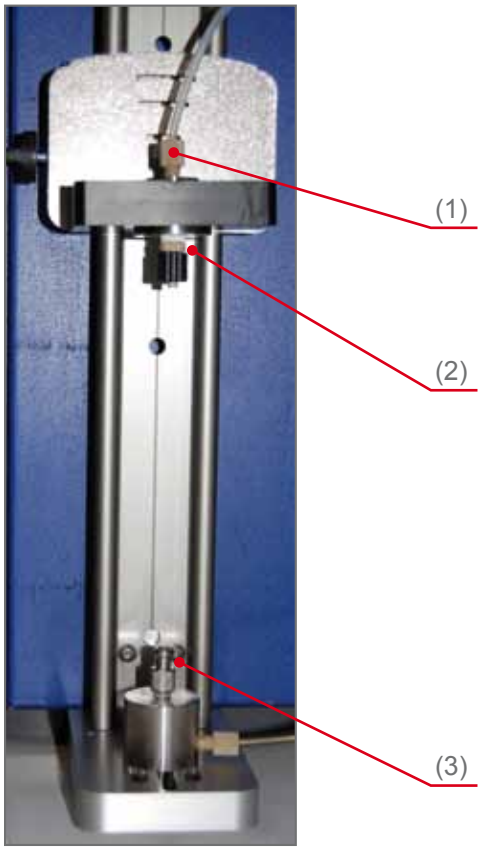


Check that all the ON/OFF switches of secondary modules (pump, detector, collector) are on “I” and switch on the unit with the main ON/OFF switch.

3.7 Semi-prep and prep adaptation kit

IMPORTANT: Before installing the semi-prep kit, you must clean the system and the loop (by clicking on the loop in the software) with Isopropanol, then with the less polar solvent.

1. Unscrew peek ¼-28 Long Nut (1), Luer male (with lock) to 1/4-28 male (2) and Stainless Steel Luer female to 1/4-28 male (3)



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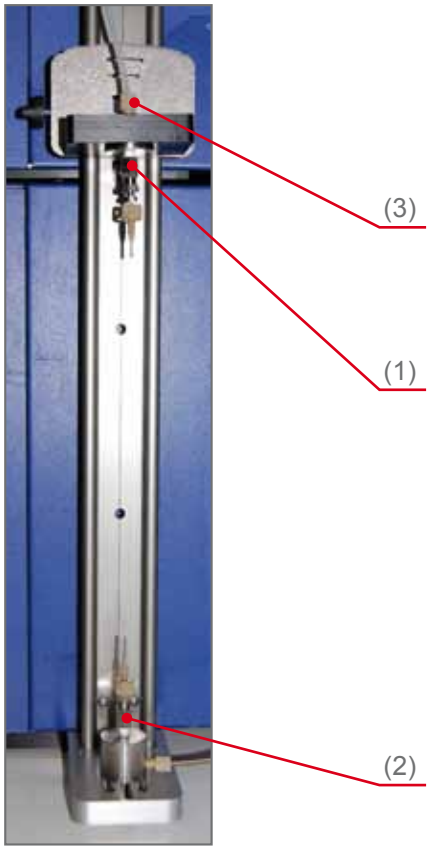
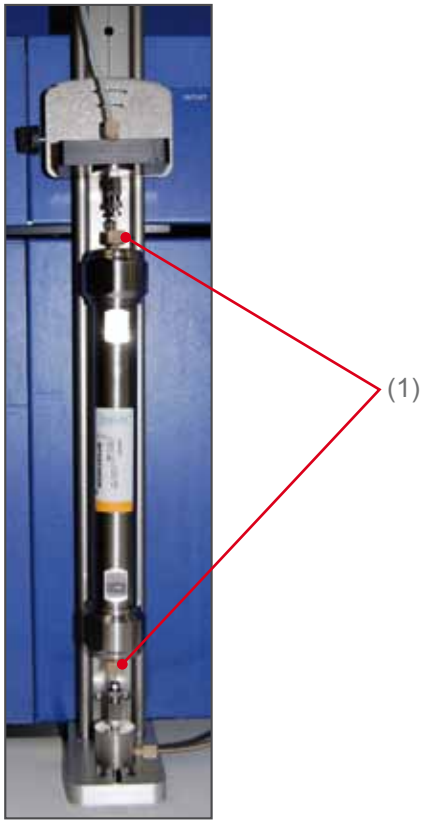
2. Replace by semi-prep adapter inlet (1) (Screw the inlet adapter on half of the thread) & oulet (2) column, and screw peek ¼-28 Long Nut (3),



3. Put the semi-prep column: push the Stainless Steel tubing in the column and screw the PEEK fitting (1)



Note:
There is a specific adapter for the prep column.
Operation is the same than for the prep column connection.

CAUTION: To purge the system in semi-prep configuration, remove the column and install the PEEK union 10-32 female (P/N: NR0860)

3.8 Options and accessories

1. “Solvents level sensors 5-1 (Global)” (P/N: FSP720) or “Solvents level sensors 5-5 (Separated)” (P/N: FSP730)
2. “Bar code reader” (P/N: GO2380)
3. “Enhancement tube device for 13 x 100mm tubes” (P/N: DW3360)
4. “Video camera + TLC plates holder” (P/N: GO2390)
5. “Fume enclosure” (P/N: PF4350)
6. “Quad system” (P/N: PF4360)
7. “2nd acquisition channel” (P/N: PF4320)
8. “FLASH- ELSD” (P/N: FI0320)
9. “Funnel rack set 1 unit” (P/N : FJ4331) or “Funnel rack set 4 units” (P/N: FJ4330)
10. “ Safety solvent caps kit” (4 units) (P/N: DV2760)
11. “Safety waste cap (with container 5L + filter” (P/N: IO6930)) or “Safety waste cap (with container 20L + filter” (P/N: JO4500))
12. “Drainage system of the tray collector” (P/N: DZ7790)
13. “2 columns selection (switching valve)” (P/N: LO6600)
14. “Backflush valve” (P/N: LO6610)
15. “2 columns selection (switching valve) + Backflush valve” (P/N: LO6620)
16. “2nd fraction collector coupled” (P/N: JV0950)
17. “RI IOTA 2” (P/N: FSQ600)
18. “Mass Spectrometer + interface” (P/N: JO1090)
19. “CarouXel” (P/N: JO3750)
20. “Autosampler” (P/N: LO8850)
21. “Ballasting kit” (P/N: DZ7360)
22. “Stainless steel loops”
23. “Racks set”

Designation / Items:

1. Solvent level sensors 5-1 (global)
- Communication interface 5-1 + cable
- Sensors + cables (x 5)
- Straps (80cm) (x 5)
- Removable cable ties (x 5)
- Power adapter
- Hardware
- Installation procedure

1. Solvent level sensors 5-5 (separated)
- Communication interface 5-5 + cable
- Sensors + cables (x 5)
- Straps (80cm) (x 5)
- Removable cable ties (x 5)
- Power adapter
- Hardware
- Installation procedure

2. Bar code reader
- Reader with USB connection
- Bracket
- Hardware
- Installation procedure

3. Enhancement tube device for 13x100mm tubes

4. Video camera + TLC plates holder
- Webcam (with USB connection)
- Bracket
- CD for Webcam drivers installation
- TLC plates holder
- Hardware
- Installation procedure

5. Fume enclosure
- Side panel
- Transparent door
- 5 screws
- Collar
- Magnetic flap
- Hardware
- Installation procedure

6. Quad system
- Module for 4 additional columns installation
- Inlet tubing with stainless steel fitting set (1/8” - ID = 1.6 mm - 1.50m)

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- Outlet tubing (1/8" - ID = 1.6 mm - 1.50m)
- PEEK ¼-28 long nut for 1/8" tubing (x3)
- ETFE ferrule for 1/8" tubing (x 3)
- CD for TRP converter drivers installation
- External control cable
- USB cable
- Power cable
  (model according to the destination country)
- Hardware
- Installation procedure

7. 2nd Acquisition channel
- Module USB-1408FS + USB cable
- USB key for drivers installation

8. FLASH-ELSD
- FLASH-ELSD
- 1V Output cable
- Power cable
- Splitter box with micro-needle (option)
- ETFE Tubing (1/16'', ID= 0.25mm) ;
  Splitter Outlet - ELSD Inlet : length = 30cm,
  fitting 10-32 Male (P/N: 780771)
  (connected to Splitter box)
- ETFE Tubing (1/8'', ID= 1.6mm);
  Splitter Outlet - UV Inlet : length = 72cm
  + Adapter ¼-28F à 10-32M (P/N: 737664)
  + spring 20cm (P/N: PFS800) (connected
  to Splitter box)
- ETFE Tubing (1/8'', ID= 1.6mm) ;
  Column Outlet - Splitter Inlet: length = 72cm +
  Adapter ¼-28F à 10-32M (P/N: 737664)
  (connected to Splitter box)
- Manometer (P/N: FJ6720) (option)
- 2 red or white tubing to connect the gas
  (6mm OD, 2 meter + 1 meter and fitting)
- 1 PEEK fitting 10-32 Male, fitting Inlet ELSD
  (P/N: 780771)
- Adapter 1/4''-28Female - 1/4''-28 Female Nylon
  (P/N:187210) (only for the puriFlash® SPOT II
- Union PEEK 10-32M-1/4-28F (P/N: 737664)
  + Internal reducer 1/16''-1/8'' (P/N: 229980)
  (only for semi-prep and prep configuration on
  puriFlash® 4100, puriFlash® 4250-250,
  puriFlash® 4250-40),
- Installation procedure

9. Funnel rack set 1 unit or Funnel rack set 4 units

10. Safety solvent caps kit (4 units)

**11. Safety waste cap (with container 5L + filter)
or Safety waste cap (with container 20L + filter)**

12. Drainage System of the tray collector

13. 2 columns selection (switching valve)
- Switching valve
- ETFE tubing
- Installation procedure

14. Backflush valve
- Backflush valve
- ETFE tubing
- Installation procedure

**15. 2 columns selection (switching valve)
+ Backflush valve**
- 2 valves
- ETFE tubing
- Installation procedure

16. 2nd fraction collector coupled
- Fraction collector
- General power cable
- Serial communication cable (Sub-09 male/female)
- Tubing with 2 fitings and 2 ferrules
  (l = 3m - 1/8" - ID = 1.6mm)

17. RI IOTA 2
- 1V Output cable
- Power cable
- ETFE Tubing (1/16" - ID = 1mm); RI outlet (fitting
  10-32 Male; P/N: 780770) - UV inlet (fitting and
  ferrule for 1/16" tubing; P/N: 167155 and AB8790);
  length = 70cm
- Adapter 1/4"-28 Female - 1/4V-28 Female Nylon
  (P/N: 187210) (only for the puriFlash® SPOT II)
- User's Manuel
- Installation procedure

18. Mass spectrometer + interface

19. CarouXel
- Power cable
- RS 232 cable
- Installation procedure

20. Autosampler
- Power cable
- RS 232 cable
- User's manuel
- Installation procedure

21. Ballasting kit for 1/8" tubing (5 units)

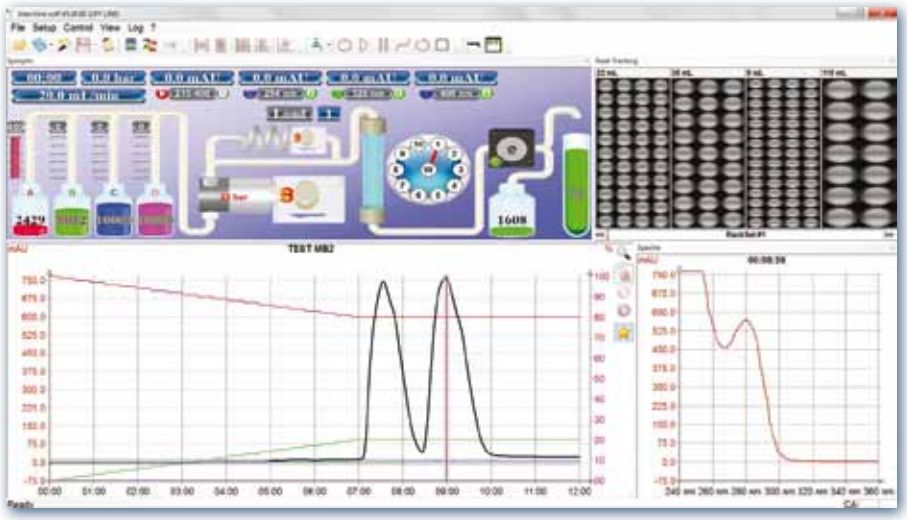
22. Stainless steel loops
9 different loops (100µL, 250µL, 500µL, 1mL, 2mL, 5mL, 10mL, 20mL, 40mL)

23. Racks set
13x100mm (P/N: PF4370), 16x150mm (P/N: PF4380), 18x150mm (P/N: PF4390), 21x150mm (P/N: PF4410), 25x150mm (P/N: PF4420), 28x180mm (P/N: PF4430), 29.5x200mm (P/N: PF4440)
Plateform rack for bottles (P/N: LV5200)

4 > Operation

4.1 Control the system

When all the installations and connections are made, switch on the PURIFLASH® 450. After few seconds and the initialisations of different instruments, the control software “Interchim® Software” automatically starts. Note the good starting (no message “Communication Error”), is necessary for the correct working of the system.



Once the user interface opened, several graphic elements allow to see in real time the state of the instruments and the evolution of the working parameters. The application has been developped with the aim of being convivial and intuitive. Refer to the “Instruction Manual” supplied for more explanations on the software use.

Use the stylus on the tactile screen to create methods in the software and control the system.

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4.2 Make a liquid injection

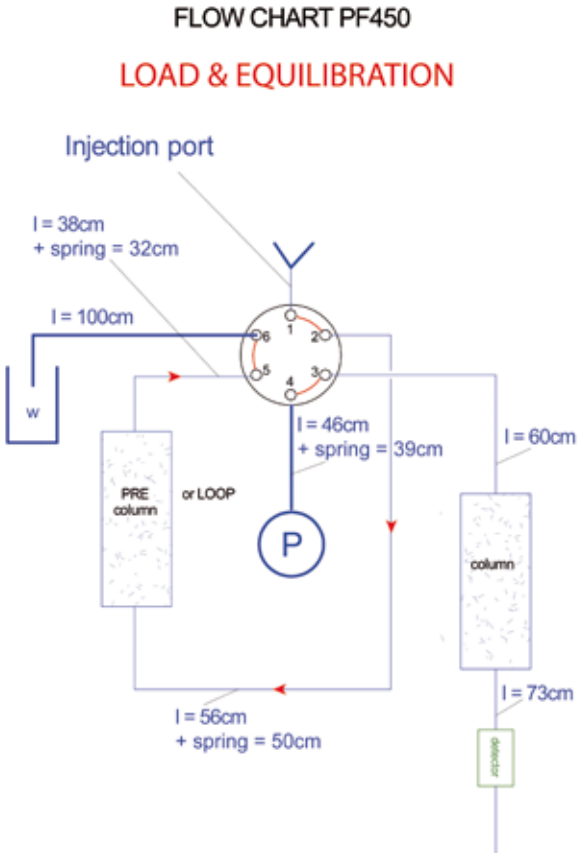
The liquid injection is done by the automatic injection valve module with the loop, the volume is predefined (from 100µL to 40mL or more).

The loading and injection can be done at any time during a method, when the pump runs or not.

Here is the procedure:

✓ The 6-way electric valve is on the “LOAD” position during a method creation and column equilibration.

✓ Fill a syringe with the volume of sample chosen and place it in the “Adapter Stainless steel for injection” (port n° 1). Keep the syringe on this adapter to avoid the leak of the sample.



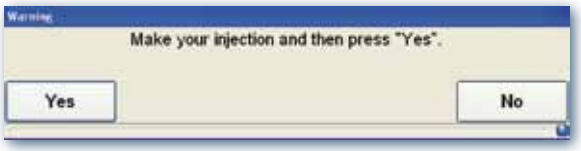
✓ Fill the loop with the content of the syringe. If the quantity injected is greater than the capacity of the loop, the surplus flows in the “waste” tube (port n° 6).

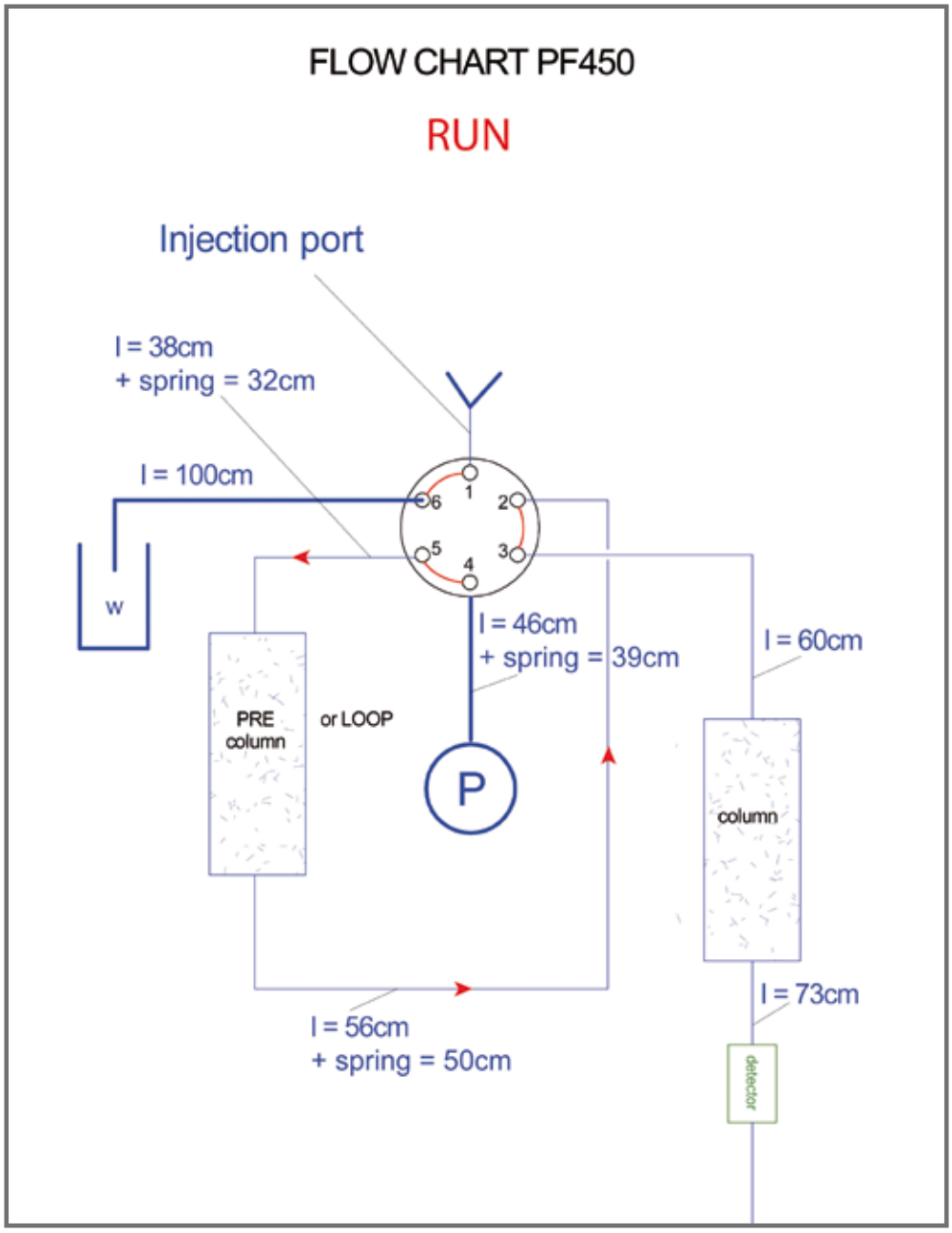
In the panel “Settings” of the edited method, select :

✓ “Equilibration” in the section “Injection Mode”. According to the type of the column, a time and a flow rate are selected by default. They depend on the column parameters, but you can modifiy them if needed.

✓ “Loop injection” for the injection by the loop.

After having launched the method (= “RUN”), the equilibration phase starts. That allows to pack the column with the solvents used. At the end of the time (or at a click on “START”), the 6-ways electric valve switches on “run” position, the sample is pushed in the chromatography column by the solvents pumped and the method starts.





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4.3 Make a solid injection

The solid injection is done by the automatic injection valve module.

The solid injection is done via a dry-load in which the solid sample has been previously deposited. The dry-load is emplaced directly on the pre-column holder.

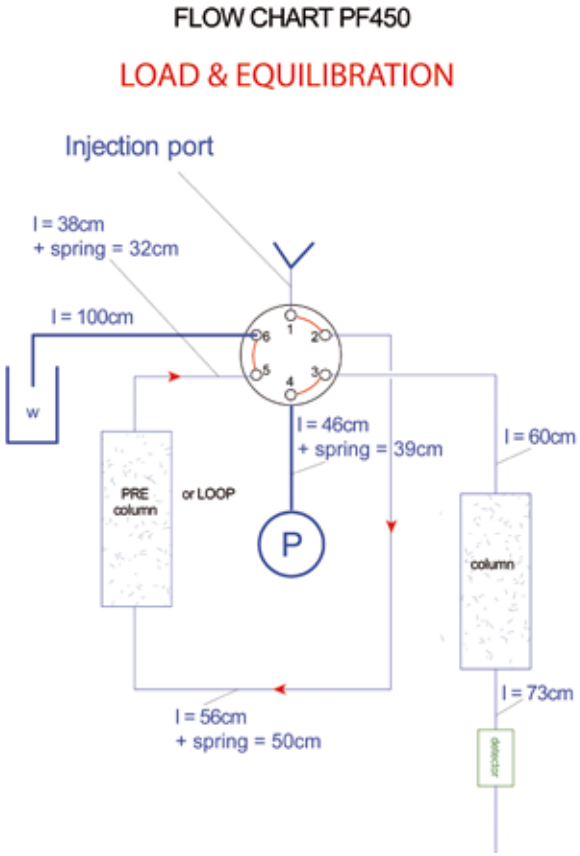
The loading and injection can be done at any time during a method, when the pump runs or not.

Here is the procedure :

✓ The 6-way electric valve is on the “LOAD” position during a method creation and equilibration of column.

✓ Place the dry-load on the pre-column holder as shown below:

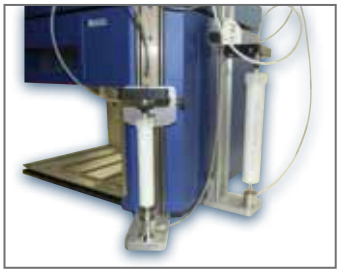
1. Unlock the black ring of the fitting “Adapter PEEK Luer lock male to ¼-28 male” of the pre-column holder.
2. Move up the large black POM holder on the vertical guidance rail and place the bottom fitting of the dry-load or pre-column on the “Adapter ETFE or Stainless steel Luer lock female to ¼-28 male” located on the stainless steel bulkhead union 90°.
3. Move down the large black POM holder and lock again the black ring of the fitting “Adapter PEEK Luer lock male to ¼-28 male” to the top fitting of the dry-load.



 1.

 2.

 3.

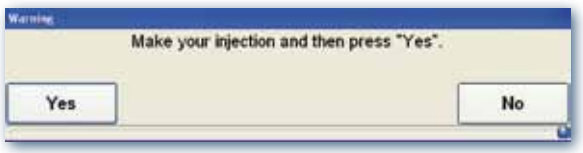


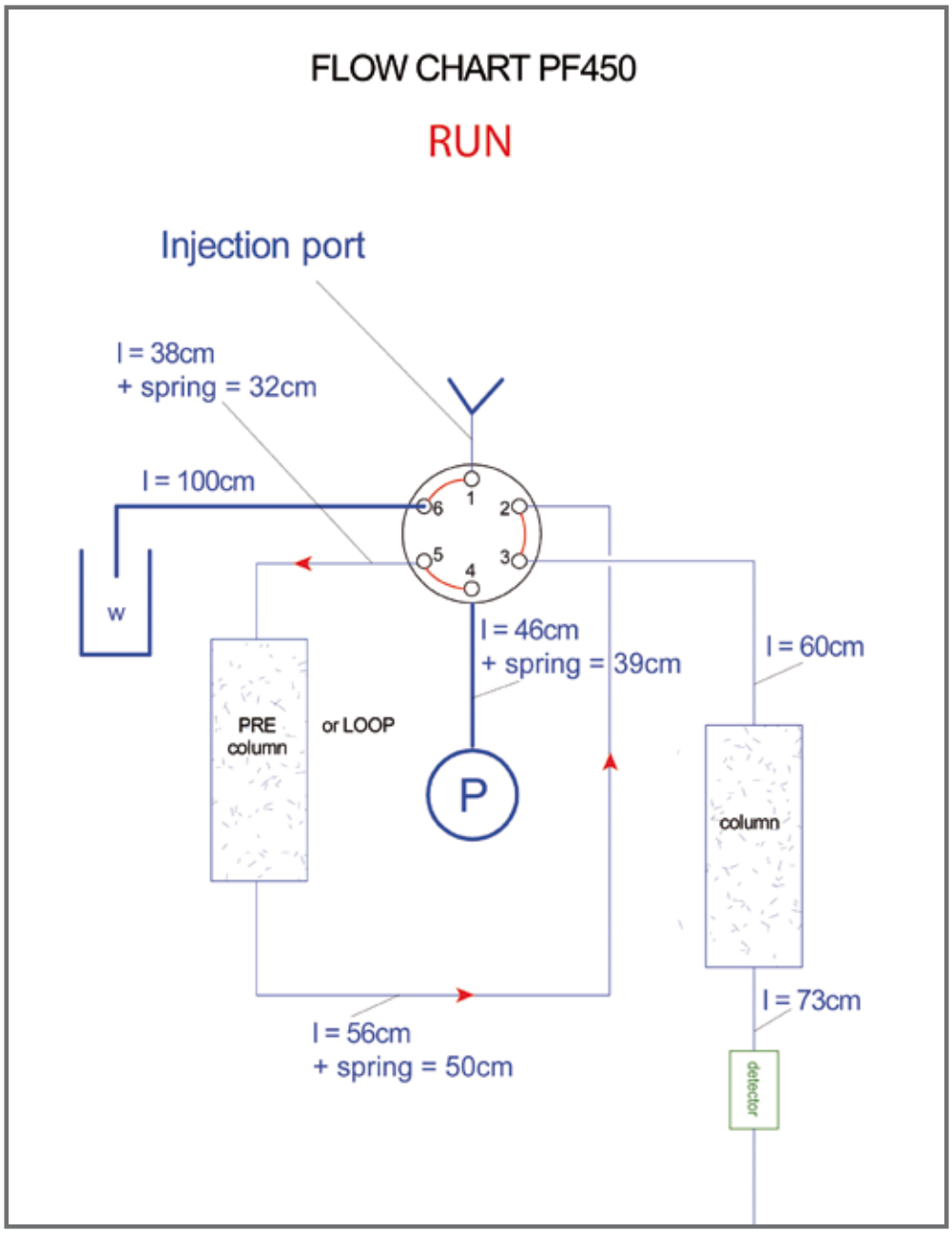
In the panel “Settings” of the method edited, select:

✓ “Equilibration” in the section “Injection Mode”. According to the type of the column, a time and a flow rate are selected by default. They depend on the column parameters, but you can modifiy them if needed.

✓ “Loop injection” for the injection by the solid deposit.

After having launched the method (= “RUN”), the equilibration phase starts. That allows to pack the column with the solvents used. At the end of the time (or at a click on “START”), the 6-ways electric valve switches on “run” position, the sample in the dry-load is pushed in the chromatography column by the solvents pumped and the method starts.





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5 > Safety regulations

This equipment is built according to the E.U. security standards. However, risks and dangers could remain if the system is used in a different way from which it is intended or if it is used by untrained personnel.
The PURIFLASH® 450 should only be used by laboratory trained or experienced persons. The user should inform the distributor in case of problems and safety-related matters that occur during the use of the instrument.

Alerts you to potential hazardous situations that could result in serious injury or damage of the system.

This system is designed for chromatographic purposes. It must be operated using appropriate solvents and within specified ranges for pressure, flows and temperatures as described in this manual. If it is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

When handling potentially hazardous solvents and samples, it is important to follow standard laboratory safety procedures. Common chemicals used in the laboratory can be toxic, corrosive, flammable or a combination of these properties.

A list of all safety aspects is outside the scope of this manual but the following points should be considered:

✓ Ensure adequate ventilation,
✓ Wear eye protection,
✓ Wear gloves when handling chemicals,
✓ Ensure all liquid containers are secure,
✓ No smocking or naked flames,
✓ Clean-up all spillages…

Eye damage could occur from particles or chemicals. Use proper eye protection.

If a line ruptures or a valve opens accidentally under pressure, a potentially hazardous spray of liquid might be generated by the pump. Never open a solvent line or valve under pressure. Stop the pump first and let the pressure drops to zero. Wear protection glasses.

Hazardous voltages are present inside the instrument. Disconnect from main power before removing screw-attached panels.

Removal of protective panels may only be performed by an authorized person. When it is necessary to use a non-original power cord plug, make sure the replacement cord adheres to the color-coding and polarity described in the manual and local building safety codes. Replace blown fuses with fuses of the size and rating stipulated in the manual. Replace faulty or frayed power cords immediately with the same type and rating. Make sure that voltage sources and line voltage match the value for which the instrument is wired.

To ensure your own safety, thus of your co-workers, and safe operation of the equipment, observe the following instructions:

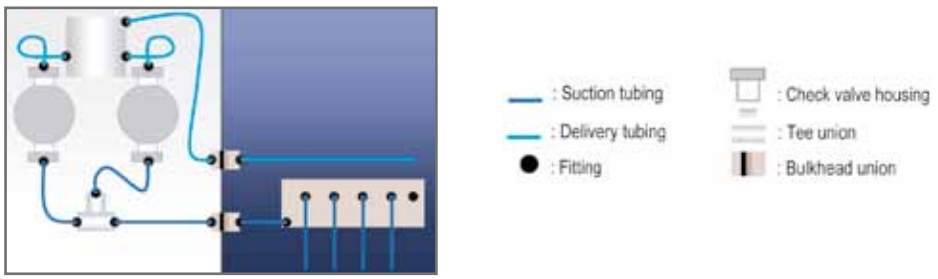
✓ Use a 3-wire mains socket with ground connection, grounding is necessary to ensure operator safety and proper operation.
✓ Take care of inflammable solvents.
✓ Store the system after having passed a clean solvent in the hydraulic circuit when not in use. Do not leave buffer in the system, it may cause blockages and damage the seals on start-up.
✓ Before moving the instrument, the external connections have to be disconnected, the hydraulic circuit rinsed and the inlets/outlets corked. The instrument must be carefully carried in its original box.

6 > Maintenance

6.1 Introduction

This chapter describes actions that should be performed on a routine basis to ensure long term safe and trouble free operation of the system. The frequency of the maintenance activities is dependent on the nature of the application (the solvents used, the quantity of the mobile phase delivered by the pump, the level of cleanliness of the facility, etc...). The pump has been designed for reliability and needs very little routine maintenance when operated correctly.

The following figure represents the liquid connections of the pump:



Reduced accuracy of the pump may be due to seal wear or to a fault in the check valves. This section provides information and procedures about how to replace consumable parts and how to maintain the instrument.
The removal of protective panels may only be performed by an authorized person.

6.2 Removing a pump head

When disassembling or reassembling the pump, make sure that each component is clean and take care that the system is assembled in a clean environment.

Remove it if you need to replace its seal (details hereafter).

1. Purge the pump head with a suitable solvent or alcohol (1-propanol or 2-propanol).
2. Switch off the module and disconnect it from the electrical supply.
3. Remove the plastic cover to gain access to the pump heads.
4. Disconnect the Suction and Delivery tubing and fittings.
5. Remove the two screws (Allen wrench 3mm). Carefully unscrew, alternating from one to the other.

6. Carefully remove the pump head. The piston and the seal are now visible.

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6.3 Replacing a seal

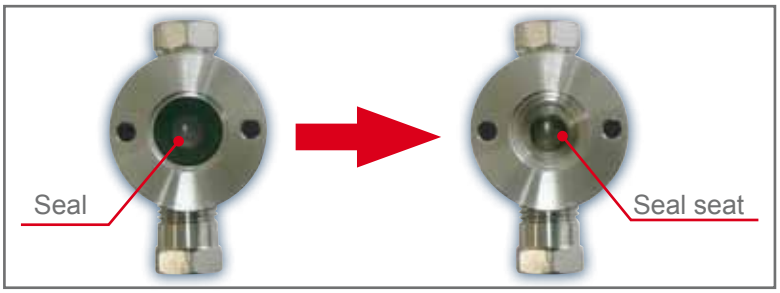
Piston seal

There are in all four seals, one of every head and one of every cleaning disc. You can exchange them by removing the pump heads and cleaning disc as explained previously.

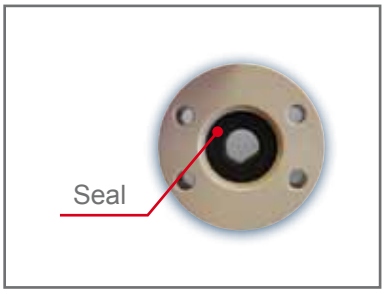
1. Remove the seal using a small screwdriver. Be sure to avoid scoring any part of the pump head and the cleaning disc as a scratch will prevent proper sealing.

If the seat is scored, it is necessary to replace the head or the cleaning disc and these are not under warranty.

Head (back views)



Cleaning disc (back views)

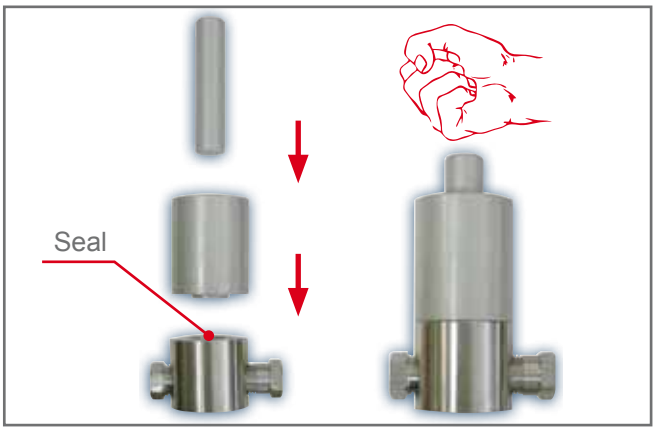


2. Thoroughly clean the seal seat with alcohol to remove possible seal particles and plunge the new seal in propanol-2 for lubrication.

3. Place the new seal into the pump head or the cleaning disc and provide yourself with a special tool sold with the first set of seals (P/N: PFS040).

4. Position the part “A” on the head and slip the part “B” into “A”. Then, hit gently with the fist on the part “B”.

Tool (2 Parts)



5. Remove the tool and note that the seal is well-placed in the pump head or in the cleaning disc.

6. Finally replace the cleaning disc and the head on the piston and put its two fixing screws with care, alternating from one to the other.

7. Connect the Suction and Delivery tubing and fittings.

Note :
The life time of the seals is dependent on the flow rate, pressure, type of liquids used and temperature but mostly on the cleanliness of the mobile phase and sample. The presence of micro-particles will cause accelerated wear and tear of the seals. Similarly any dried buffer particles on the piston will damage the seal.

6.4 Cleaning / replacing a check valve

Check valve

Abnormal pressure fluctuation or the observation of pump noise on the data system is usually due to check valve problems. The noise is regular in nature and is due to pressure and flow variation. Pump accuracy is also compromised. Details on check valve repairs are given below.

There are four check valves, two per head, one for each inlet (model 10mm, P/N: PFS930) and one four each outlet (model 8mm, P/N: PFS920). If they become dirty, they will not open and close correctly for a long time.

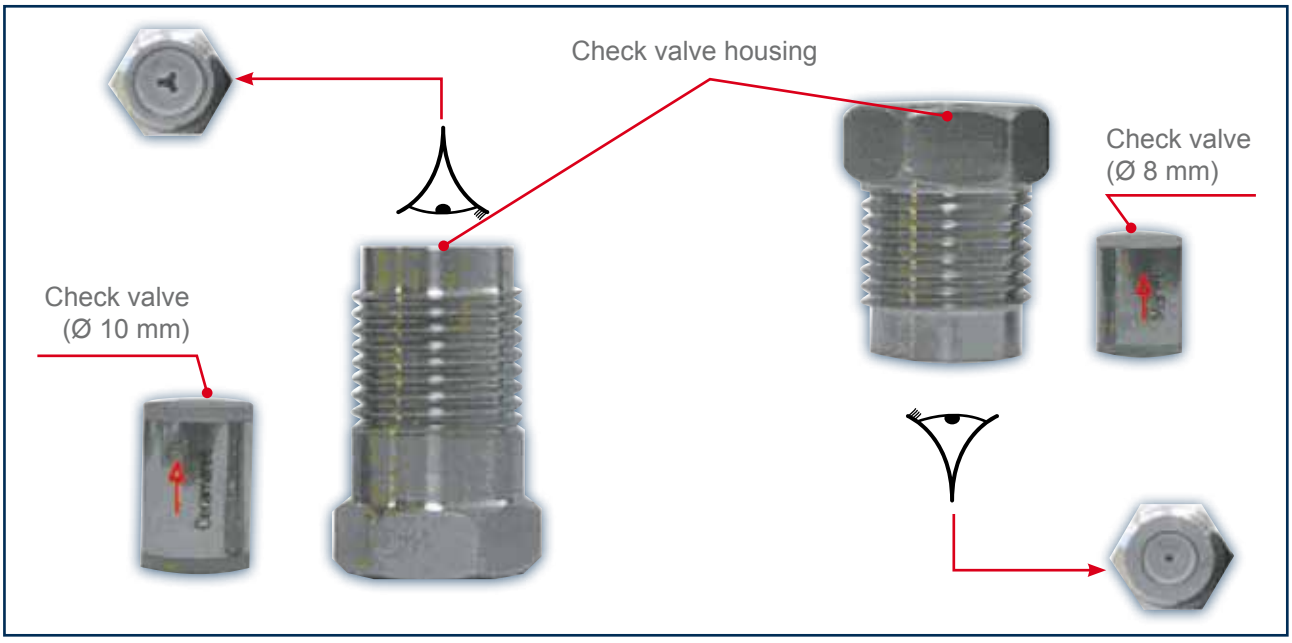
1. Purge the pump head with a suitable solvent or alcohol (1-propanol or 2-propanol).
2. Switch off the module and disconnect it from the electrical supply.
3. Remove the plastic cover to gain access to the pump heads.
4. Disconnect the Suction and Delivery tubing and fittings.
5. Unscrew the check valve housing using a spanner 17mm.
6. Clean the check valves or provide yourself with news.

The cleaning allows to remove the particles present in the valves by placing them in an ultrasonic bath with methanol or acetone during approximately five minutes.

Ensure that the arrow is directed downwards during the cleaning. Else damage to the surface quality or the ball and the seat will occur.

7. Replace the check valves. Whether it is for the inlet (10 mm) or the outlet (8mm), **make sure the arrow is always directed upwards**.

Inlet (Suction) **Outlet (Delivery)**



8. Hard-tighten the valve housing in the head until hearing a little crunch which means that the new check valve is enough tight and the imperviousness properly done. This noise corresponds to the collapsing of the top and bottom membranes.
9. Connect the Suction and Delivery tubing and fittings.

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6.5 Replacing the detector deuterium lamp

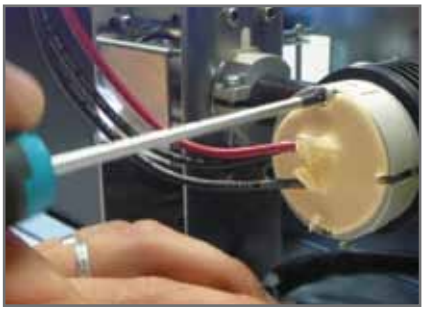
Deuterium lamp

1. Purge the system with a suitable solvent, with then alcohol, and with air.
2. Switch off the system and disconnect it from the electrical supply. It will be reconnected only when the panel will be installed back in its place.
3. Let the lamp cools down fifteen minutes after switching it off.
4. Remove tubing and connections from the detector module and remove it from the whole system (you must first remove the pump module).
5. Position the detector module on its side in order to view the bottom and unscrew the three M3 cylindrical-head screws indicated below using an Allen wrench (2.5mm). Take care not to lose M4 flat washers.

6. Put the detector in the upright position and take off the front plastic cover.
7. Then unscrew the two M4 domed-head screws located on the back of the module using an Allen wrench (3mm) and take off the top sheet cover.

8. Loosen the screw on the socket of light tube behind the cell compartment using T-20 Torx adapter. Turn the lamp socket to the horizontal position and tighten the same screw to fix it again.

9. Take the lamp power supply cables and disconnect the 3-pin white connector. Loosen and remove the two screws which hold the lamp using T-10 Torx adapter.



10. Remove the lamp from the lamp socket and provide yourself with a new one. Never touch quartz bulb of the lamp with bare fingers to avoid damages causing faulty working of the detector.



11. Carefully insert the new lamp assuring that it is correctly positioned.
Should you touch the glass of the lamp accidentally, clean it thoroughly with a lint free cloth and alcohol.
12. Screw it in securely and connect the plug in the 3-pin white socket.
13. Reassemble the unit by making the same steps but in the reverse order.

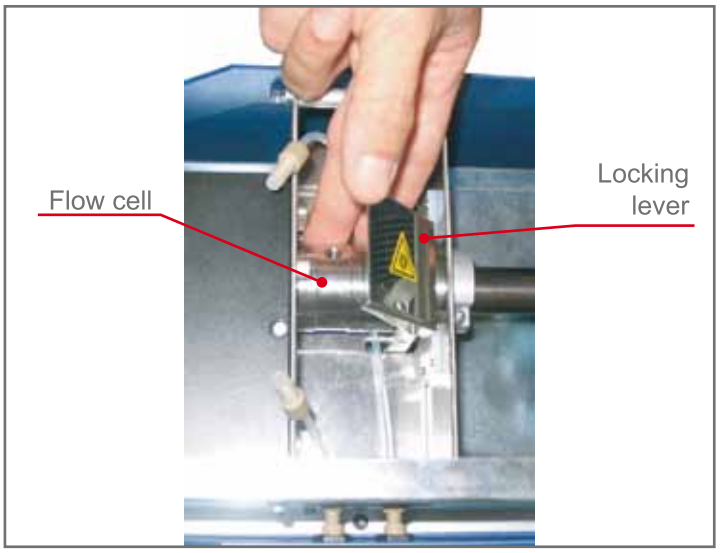
After the lamp replacement, recalibration and zeroing of the counter of operating hours must be carried out (cf. Service Info#39).

6.6 Cleaning the detector flow cell

Flow cell

A “contaminated” cell in lowered light transmission may increase noise level and make difficulties at zeroing. The simplest cleaning method is flushing dismantled cell with suitable solvents. The cell must be taken out from the instrument before washing.

1. Follow the instructions 1 to 7 described in the previous chapter "6.5 Replacing detector deuterium lamp" in order to properly disassemble the system.
2. Disconnect the outlet tubing from the cell (PEEK nuts).
3. Remove easily the cell from the system by tilting the locking lever, placing one hand under the cell to prevent it from falling to the bottom and tilting the locking lever with the other hand.
4. Select the solvent type according to character of contamination by a series of mutually miscible solvents. It is possible to use both organic and inorganic solvents and diluted solutions of acids.



5 - Flush the cell with pure solvent and rinse extensively.

6 - Reassemble the module by carrying out the same steps but in the reverse order.

After the operation, check cell cleanness purging the system and verify there is no baseline drift.

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6.7 Cleaning the 6-ways electric valve / replacing the rotor

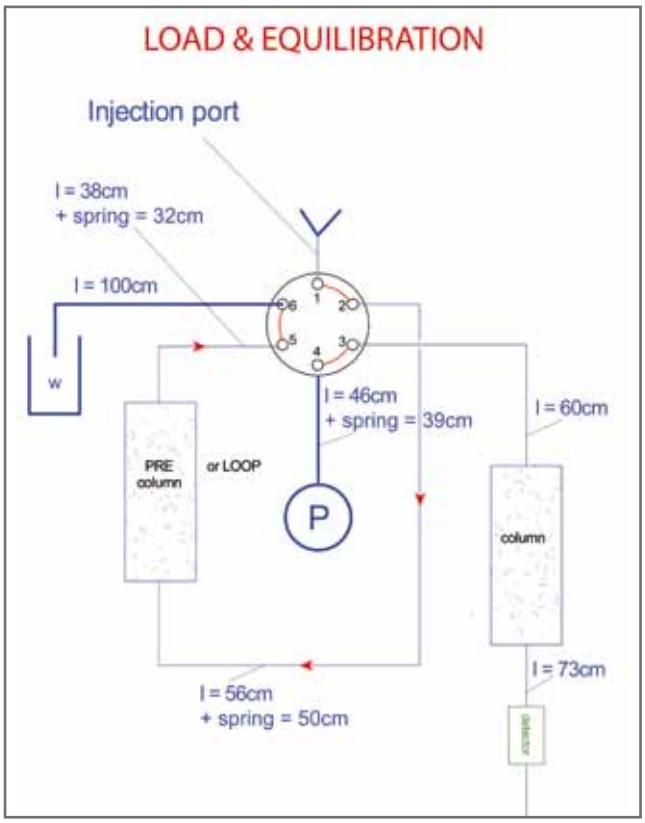
The cleaning allows to remove the particles present in the valve by following the instructions below:

Cleaning the 6-ways electric valve:

1. Switch on the system
2. Purge the system with a suitable solvent or alcohol (1-propanol or 2-propanol) during approximatively three minutes.

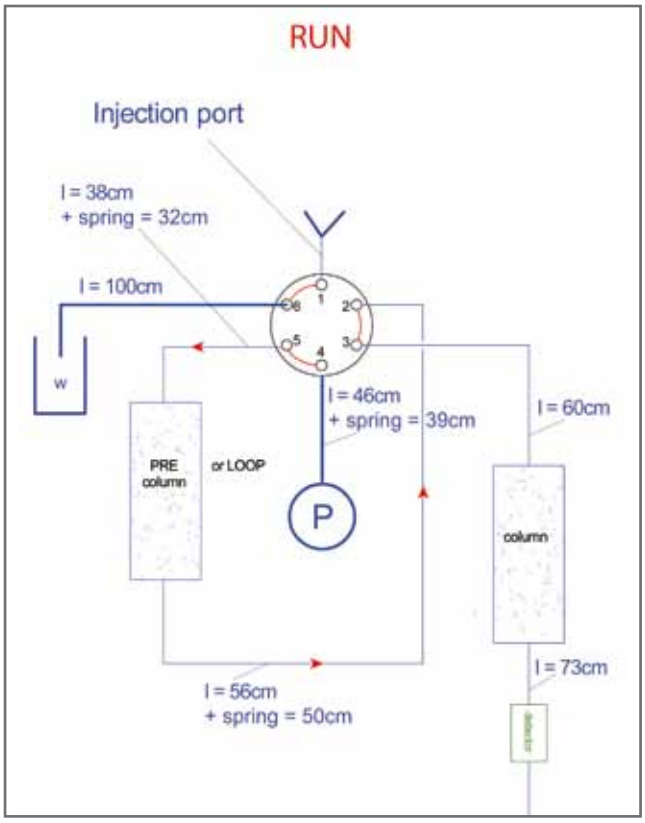
The 6-way electric valve is on the “LOAD” position during a purge.

>>>>>>>>>



3. Click on the loop in the software to switch the position of the 6-ways electric valve and clean the “RUN” position (containing the loop or the solid deposit).

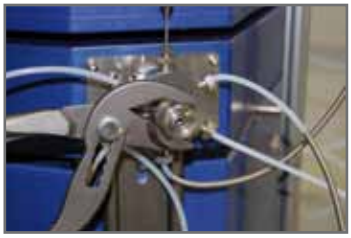
>>>>>>>>>



4. Stop the purge.

Disassembling the valve :

1. Purge the system with a suitable solvent or alcohol (1-propanol or 2-propanol) during approximatively three minutes.
2. Purge the system with air during one minute
3. Switch off the system.
4. Unscrew the screw which maintains the valve body (use a allen wrench English 9/64), unscrew **partially** the pre-load assembly with a plier.

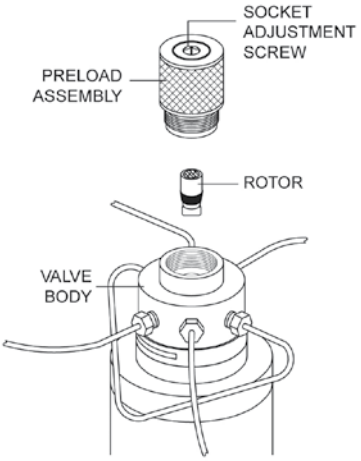


5. Remove the valve body and finish to unscrew the pre-load assembly.

6. Remove the rotor from the valve body as shown below:

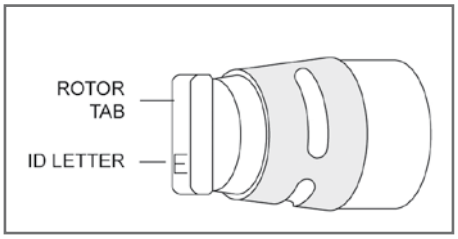
Another easier possibility to remove the rotor:
Use a pencil-type magnet, available from Valco or any electronic components supplier, unscrew completely the entire knurled pre-load assembly and remove the rotor with a pencil-type magnet. Switch on the system (In this case, don't pay attention to parts 4 and 5).

CAUTION: Do not tamper with the preset socket adjustment screw.



CAUTION: Any contact between the interior of the valve body and the metal of the rotor or any tool used is likely to cause damage.

Once the rotor is removed, note the orientation of the rotor tab, which is marked with an ID letter denoting the type of seal material.



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Cleaning the valve body:

1. Wet a cotton swab with a solvent which is compatible with the chromatographic system. Isopropyl alcohol is recommended.
2. Gently swab the polished interior of the valve to remove any loose residue.
3. Blow with clean compressed gas to remove any lint left by the swab.
4. Visually inspect the interior of the valve body. The conical surface should appear highly polished. If any scratches are visible between the ports or anywhere which might suggest a potential leakage path or wear source, the valve should be returned to the factory for regrinding and polishing.

Cleaning the rotor:

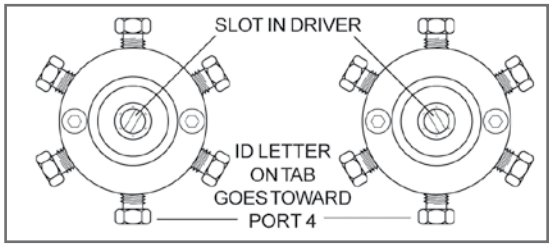
1. Carefully grasp the rotor on either end and briefly immerse it in solvent. If it is difficult to grip the rotor securely, hemostats or needle-nosed pliers may be helpful. Grip the tab end, being careful not to mar the metal or touch the polymer.
2. Gently wipe the polymer with a clean tissue.
3. Blow with clean compressed gas to remove any lint left by the tissue.
4. Visually inspect the rotor. If it shows any scratches and/or a narrowing of the flow passages, replacement is necessary.

Assembly new or used rotor:

1. Place the valve body and orient it so that it properly engages in the mechanism.

The valve body is correctly placed when the adapter injection port is turned toward the top.

Another easier possibility to remove the rotor:
If you have a pencil-type magnet, don't pay attention to parts 1 and go directly to parts 2.



2. Insert the clean or new rotor into the valve body, again being careful that the tab doesn't touch the polished interior of the valve body. Make sure the rotor tab is fully inserted into the slot in the driver (see figure below).

3. Replace the knurled pre-load assembly, tightening it into the valve body by hand just beyond the point where it touches the rotor and put the screw which maintains the valve body (use a allen wrench English 9/64)

4. Cycle the valve 3 times to seat the sealing surfaces, leaving the valve fully.

5. Tighten the pre-load assembly in quarter-turn increments, cycling the valve 5 times with solvent, to seat the sealing surfaces. Remake this step until you have no leak.

CAUTION: Make certain that the valve is never left partially actuated. It should always be in either its fully clockwise or fully counterclockwise position.

7 > Preventive measures
Upkeep schedule

By considering the use of clean solvents and all precautions already mentioned in the chapter "6 > Maintenance", here is a table which regroup the recommended actions in order to assuring a good working of the system:

Operation	Frequency
Pump	
Check the suitable tightening of fittings (strongly hand tight) and the proper state of tubing (not bended).	Weekly (or when inaccuracy flow rates, solvents leaks or air bubbles are observed)
Replace the tubing and associated fittings.	Yearly (or when damaged parts are observed)
Clean and rinse the gradient valve with suitable solution.	As often as possible (specially after having pumped aqueous solvents or strong buffers)
Replace seals and backup rings.	Yearly
Clean the check valves.	Quarterly
Replace the check valves.	Yearly (or when abnormal pressure / flow rate fluctuation or noisy baseline are observed)
Clean the piston rods.	Quarterly (or when pump head is disassembled)
Detector	
Check the efficiency of the deuterium lamp.	Quarterly (or when higher noise levels or decreased sensitivity are observed)
Replace the deuterium lamp.	When its efficiency is unreliable
Clean the flow cell.	Quarterly
General	
Verify the cleanliness of all liquid containers.	Daily
Check the suitable tightening of fittings (strongly hand tight) and the proper state of tubing (not bended).	Weekly (or when inaccuracy flow rates, solvents leaks or air bubbles are observed)
Clean the injection valves and all parts in contact with solvents or samples with suitable solutions. Rinse abundantly using a mixing of water and alcohol.	As often as possible (specially after having pumped aqueous solvents or strong buffers)
Check the tangential fan working to maintain a good air recycling inside the different modules.	Monthly

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8 > Warranty

8.1 Generalities

Interchim® guarantees the PURIFLASH® 450 for one year for parts and labour at the discretion of Interchim® in normal conditions of use and installation from the date of signing of the installation report by the service provider approved by Interchim® to install the machine and by the customer.

The PURIFLASH® 450 device is guaranteed against material and manufacturing defaults in normal conditions of use by approved professionals and within the technical characteristics compatible with the functions defined in the user manual.

I - Terms and conditions of the guarantee:

✓ The device is only guaranteed if installed by a service provider approved by Interchim®.
✓ The guarantee covers the supply of parts found defective by Interchim® free-of-charge, as a minimum, within the limits of the parts listed in part 8.2.
✓ The device must have been used in normal operating conditions and in accordance with the instructions.
✓ The device must have been used with the consumables recommended by Interchim®.
✓ Exhaustive list of original parts covered by the guarantee. (part 8.2)

II - Guarantee exclusions:

✓ The guarantee will not cover devices installed by the customer or by a service provider not approved by Interchim®.
✓ The guarantee will not cover equipment used in a manner which is non-compliant with the provisions in the instructions.
✓ The guarantee will not cover equipment subject to interventions, repairs or modifications by personnel without Interchim® approval.
✓ The guarantee will not cover:
- parts modified or changed by the customer or the service provider without Interchim®'s approval.
- parts damaged by this modification,
- parts not recommended by Interchim®,
- parts subject to wear and consumables.

✓ The guarantee will not cover any parts not listed in part 8.2.
✓ The guarantee will not cover electrical and/or electronic and/or IT incidents caused by external factors.
✓ The guarantee will not cover damage caused to the software or hardware due to contamination by an IT virus.
✓ The guarantee will not cover damage or failures caused by impact and/or bad weather.
✓ The guarantee will be cancelled in case of damage caused by abnormal mechanical forces applied to the device and exceeding the limits defined in the user guide.
✓ The guarantee will be cancelled in case of corrosion to the device due to solvent leakage or samples.
✓ The guarantee will be cancelled in case of corrosion to electronic components caused by highly corrosive gas.
✓ The guarantee will not cover damage or failures caused by assembly, dismantling, modification or transport after initial installation.
✓ The guarantee will be cancelled in case of failure or damage due to non-compliance with the closing and shutdown procedure for the device.
✓ The guarantee will be cancelled in case of failure or damage due to wrong installation
✓ The guarantee will be cancelled in case of failure or damage due to wrong AC power supply
✓ The guarantee will be cancelled in case of failure or damage due to mechanical force to the unit
✓ The guarantee will be cancelled in case of failure or damage due to acts of nature
✓ The guarantee will be cancelled in case of failure or damage due to non-compliance with safety procedures.
✓ The customer is liable for transport risks.

In case of damage during transport, the beneficiary must issue all reserves to the transport firm before accepting the delivery of the device.

✓ The guarantee will not cover damage caused in accidents, external events, contingencies or force majeure, due to negligence, or a lack of surveillance by the customer or due to non-compliance with safety rules.
✓ The guarantee will not cover damage if the maintenance procedures recommended by the manufacturer are not complied with.
✓ Interchim® will not guarantee the results of the use of the PURIFLASH® 450.

8.2 Limited warranty of consumable parts

Item	Part Number	Warranty period
Fittings, unions & tubing		
TEFZEL ferrule with Stainless steel lock ring for 1/8” tubing	GV1690	3 months
PEEK 1/4” - 28 short nut for 1/8” tubing for GV1690	GV1700	
PEEK 1/4” - 28 long nut for 1/8” tubing for GV1690	GV1710	
Stainless steel ferrule for 1/8” tubing	GV1720	
Stainless steel nut for 1/8” tubing	GV1730	
PTFE Plug 1/4” - 28 for gradient valve	PFS720	
ETFE Plug 1/4” - 28	PFS730	
Adapter PEEK Luer Lock Male to 1/4” - 28 Female (option)	PFS740	
Quick-stop luer check valve (option)	PFS750	
Kel’F mounting stud (option)	PFS760	
Adapter Luer Lock Male to 1/4” - 28 Male PEEK	PFS770	
Adapter ETFE Luer Lock Female to 1/4” - 28 Male	PFS780	
Adapter Stainless Steel Luer Lock Female to 1/4” - 28 Male	GV1680	
Adapter Stainless Steel for injection	IO7060	
Back pressure regulator 20psi (1.4 bar)	FO3980	
PEEK tee union for 1/8” tubing	PFS710	
Stainless steel bulkhead union 90°	PFS370	
PEEK union 10-32 female	NR0860	
Suction tube (ETFE - 1.50m - 1/8” - ID = 2.4mm) + PEEK nut + TEFZEL ferrule + spring (20cm) (x 4) (V2)	IO6960	
Tube Gradient valve to Tee pump inlet (ETFE - 28cm - 1/8” ID=2.4mm) + 2 PEEK nuts + 2 TEFZEL Ferrules + spring (20cm) (V2)	IO6980	
Tube valve (port n°3) to Column holder inlet (ETFE - 60cm - 1/8” - ID=1.6mm) + 1 PEEK nut + 1 ETFE Ferrule + 1 SS nut + 1 SS Ferrule	IO7000	
Tube valve (port n°5) to Pre-column holder inlet (ETFE - 38cm - 1/8” - ID=1.6mm) + 1 PEEK nut + 1 ETFE Ferrule + 1 SS nut + 1 SS Ferrule + spring (32cm)	IO7010	
Tube Pre-column holder outlet to valve (port n°2) (ETFE - 56cm - 1/8” - ID=1.6mm) + 1 PEEK nut + 1 ETFE Ferrule + 1 SS nut + 1 SS Ferrule + spring (50cm)	IO7020	
Tube valve (port n°6) to waste (ETFE - 100cm - 1/8” - ID=1.6mm) + 1 SS nut + 1 SS Ferrule	IO7030	
Tube Column holder outlet to detector inlet (ETFE - 73cm - 1/8” - ID=1.6mm) + 2 PEEK nuts + 2 ETFE Ferrules	IO7050	
Tube Detector outlet to collector inlet (ETFE - 37cm - 1/8” - ID=1.6mm) + 2 PEEK nuts + 2 TEFZEL Ferrules	IO7040	
Waste outlet tube (ETFE - 1.50m - 1/8” - ID = 1.6mm) + PEEK nut + ETFE ferrule	PFS870	

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Item	Part Number	Warranty period
Fittings, unions & tubing (suite)		
Tube Collection valve to collection needle (ETFE - 1m - 1/8" - ID=1.6mm)+1 PEEK nut + 1 TEFZEL Ferrule + spring + pipe	PFS880	3 months
> Terms of use : - Normal tightening of the fittings - Use of clean solvents and clean containers - Good positioning according to the instructions given in this manual **> Damages not covered :** - Damaged thread due to unsuitable tightening - Blocked passage due to uncleanliness of installation or unsuitable mobile phase - Bended or cut tube due to unsuitable positioning		
Valves		
Quaternary Gradient valve + Air purge (CPU 2010)	HO2530	6 months
Collection 3-way valve	PFS910	
6-ways electric valve 2 positions (valve body+rotor)	GO9040	
> Terms of use : - Normal tightening of the fittings - Use of clean solvents and clean containers - Follow up of the preventive maintenance actions **> Damages not covered :** - Damaged thread or crushed internal part due to unsuitable tightening - Blocked passage due to uncleanliness of installation or unsuitable mobile phase		
Pump		
Check valve 8mm	PFS920	6 months
Check valve 10mm	PFS930	6 months
Piston 8.5 x 65 + kit	PFS080	1 year
Seal 8.5mm	PFS940	6 months
> Terms of use : - Use of clean solvents and clean containers - Follow up of the preventive maintenance - Respect precisely the maintenance procedures **> Damages not covered :** - Damaged piece due to unsuitable use, assembly or replacement - Blocked passage due to uncleanliness of installation or unsuitable mobile phase		
Detector		
Flow cell (0.3mm)	PFS960	1 year
Deuterium lamp	PFS970	6 months or 1000 hours
> Terms of use : - Use of clean solvents and clean containers - Respect precisely the maintenance procedures **> Damages not covered :** - Damaged piece due to wrong use or replacement or inappropriate solvent pumping - Blocked passage due to uncleanliness of installation or unsuitable mobile phase		

9 > List of spare parts + Blow-up views

Item	Part Number	N°
Fittings, unions & tubing		
TEFZEL ferrule with Stainless steel lock ring for 1/8” tubing	GV1690	
PEEK 1/4” - 28 short nut for 1/8” tubing for GV1690	GV1700	
PEEK 1/4” - 28 long nut for 1/8” tubing for GV1690	GV1710	
Stainless steel ferrule for 1/8” tubing	GV1720	
Stainless steel nut for 1/8” tubing	GV1730	
ETFE Plug 1/4” - 28	PFS730	
Adapter PEEK Luer Lock Male to 1/4” - 28 Female (option)	PFS740	
Quick-stop luer check valve (option)	PFS750	
Kel’F mounting stud (option)	PFS760	
Adapter Luer Lock Male to 1/4” - 28 Male PEEK	PFS770	
Adapter ETFE Luer Lock Female to 1/4” - 28 Male or	PFS780	
Adapter Stainless Steel Luer Lock Female to 1/4” - 28 Male	GV1680	
Adapter Stainless Steel for injection	IO7060	
Back pressure regulator 20psi (1.4 bar) (option)	FO3980	
PEEK tee union for 1/8” tubing	PFS710	
Suction tube (ETFE - 1.50m - 1/8” - ID = 2.4mm) + PEEK nut + TEFZEL ferrule + spring (20cm) (x 4) (V2)	IO6960	
Tube Gradient valve to Tee pump inlet (ETFE - 28cm - 1/8” ID = 2.4mm) + 2 PEEK nuts + 2 TEFZEL Ferrules + spring (20cm) (V2)	IO6980	
Tube Pump outlet to valve (port n°4) (ETFE - 46cm - 1/8” - ID = 1.6mm) + 1 PEEK nut + 1 TEFZEL Ferrule + 1 SS nut + 1 SS Ferrule + spring (39cm)	IO6990	
Tube valve (port n°3) to Column holder inlet (ETFE - 60cm - 1/8” - ID = 1.6mm) + 1 PEEK nut + 1 TEFZEL Ferrule + 1 SS nut + 1 SS Ferrule	IO7000	
Tube valve (port n°5) to Pre-column holder inlet (ETFE - 38cm - 1/8” - ID = 1.6mm) + 1 PEEK nut + 1 TEFZEL Ferrule + 1 SS nut + 1 SS Ferrule + spring (32cm)	IO7010	
Tube Pre-column holder outlet to valve (port n°2) (ETFE - 56cm - 1/8” - ID = 1.6mm) + 1 PEEK nut + 1 TEFZEL Ferrule + 1 SS nut + 1 SS Ferrule + spring (50cm)	IO7020	
Tube valve (port n°6) to waste (ETFE - 100cm - 1/8” - ID = 1.6mm) + 1 SS nut + 1 SS Ferrule	IO7030	
Tube Column holder outlet to detector inlet (ETFE - 73cm - 1/8” - ID = 1.6mm) + 2 PEEK nuts + 2 TEFZEL Ferrules	IO7050	
Tube Detector outlet to collector inlet (ETFE - 37cm - 1/8” - ID = 1.6mm) + 2 PEEK nuts + 2 TEFZEL Ferrules	IO7040	
Waste outlet tube (ETFE - 1.50m - 1/8” - ID = 1.6mm)+ PEEK nut + ETFE ferrule	PFS870	

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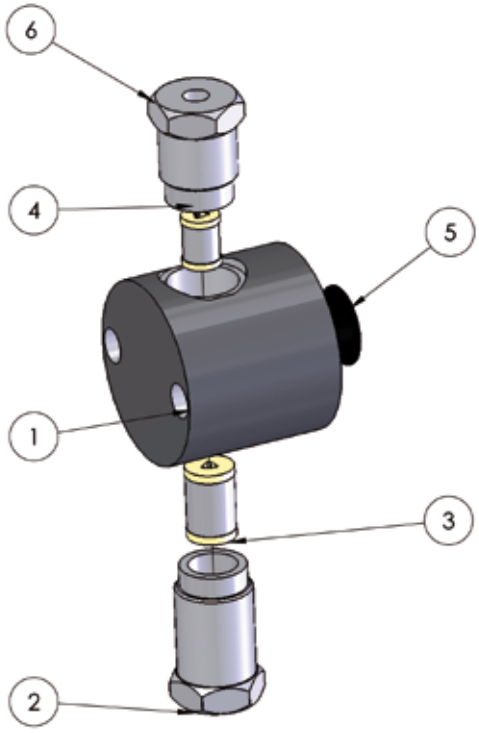
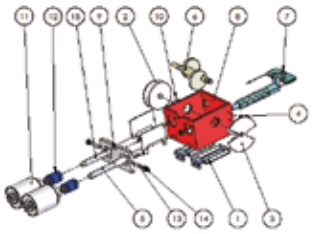
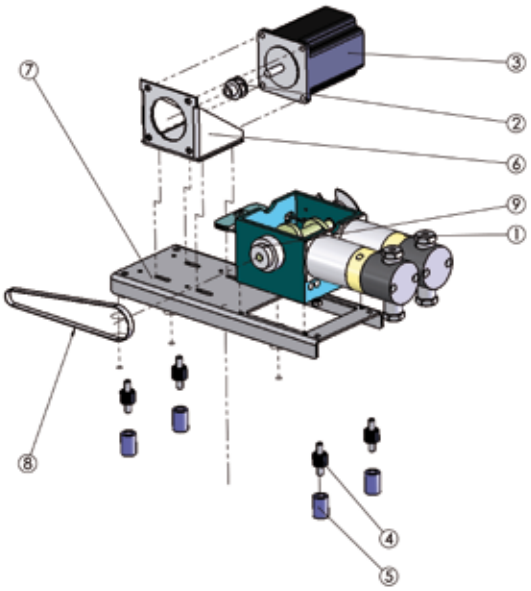
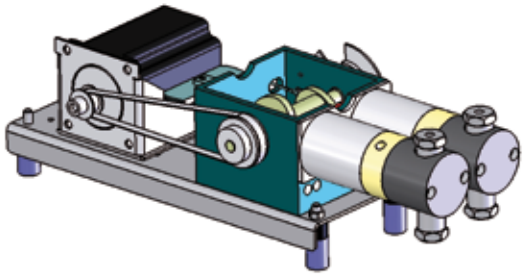
Item	Part Number	N°
Tube Collection valve to collection needle (ETFE - 1m - 1/8" - ID = 1.6mm) + 1 PEEK nut + 1 TEFZEL Ferrule + spring + pipe	PFS880	
Spring for tubes 5cm	PFS800	
Spring for suction tubes 20cm	PFT030	
Valves		
Quaternary Gradient valve + Air purge (CPU2010)	HO2530	
Collection 3-way valve	PFS910	
6-ways electric valve 2 positions (valve body + rotor)	GO9040	
Electronic boards		
Electronic board CPU2010	IO2950	
Electronic board Collector	PFS500	
System "Flex" for collector connections	PFS490	
Pump		
		
Check valve 8mm	PFS920	4
Check valve housing 8mm	PFS020	6
Check valve 10mm	PFS930	3
Check valve housing 10mm	PFS010	2
Seal 8.5mm	PFS940	5
Head	PFS030	1
Tool for insertion of seals D 8.5mm	PFS040	

Item	Part Number	N°
Pump (suite)		



Piston 8.5 x 65 + kit (if cleaning disc)	PFS080	5
Cleaning discs (x 2)	IO2970	
Head support + bearing	IO4720	11 + 12
Head support reinforcement	IO4740	9
Camshaft + 2 Cams	IO4750	6
Compression spring	PFS100	
Pump opto-sensor (+ cable)	PFS180	4
Opto-sensor disc	PFS190	3
Camshaft holder + parts	IO4760	8 + 10
Balancer + kit	FO4170	7
Balancer cable	FO4190	





Belt	IO4770	8
Pulley big (camshaft)	IO4780	9
Pulley small (motor)	IO4790	2

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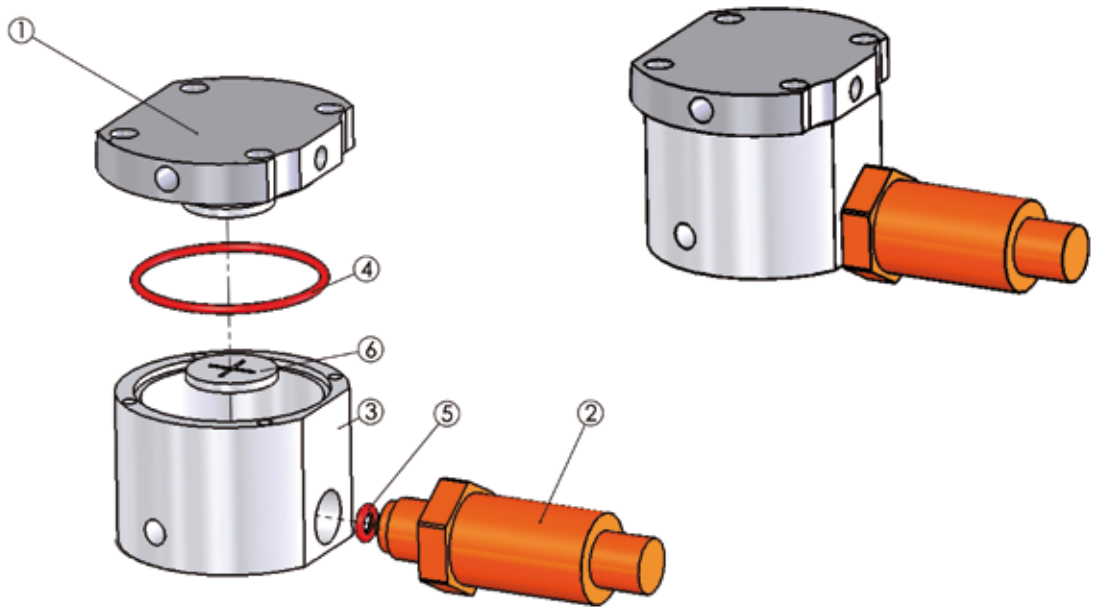
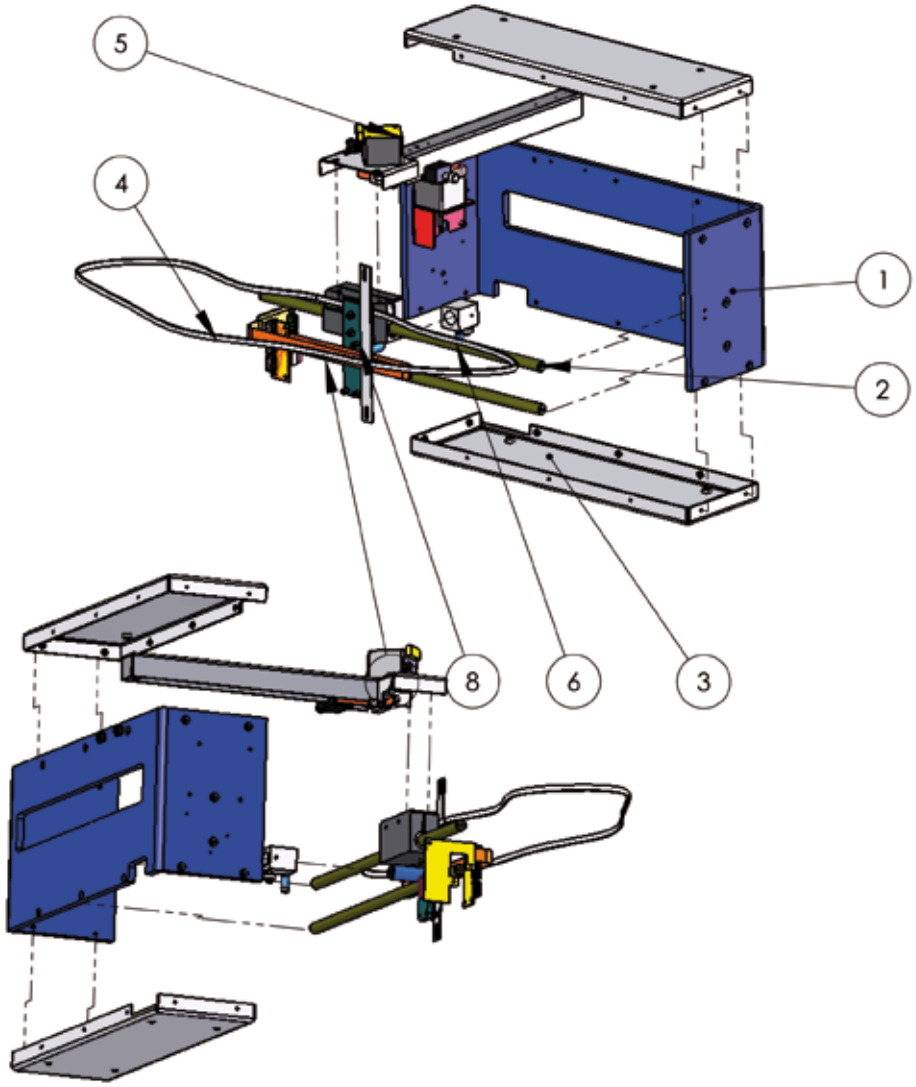
Item	Part Number	N°
Pump (suite)		
Motor (Black)	IO1940	3
Motor holder	PFS210	6
Motor driver (Motor black)	IO1950	
Axial fan + kit	PFS320	
AC Power supply 230/24V 60W	PFS290	
Support sheet	PFS220	7
Absorber	PFS230	4
Pump/Collector fuses 2.5 A-110V (x 2)	PFS990	
Pump/Collector fuses 1.6 A-220V (x 2)	PFS980	



Mixing chamber	PFS240	1 + 3
Seal for mixing chamber	PFS250	4
Frit 20µm for mixing chamber (x 2)	PFS260	6
Pressure transducer seal	PFS270	5
Pressure transducer + cable	PFS280	2
Leakage sensor	PFS300	
Detector		
Flow cell (0.3mm)	PFS960	
Deuterium lamp	PFS970	
Axial Fan	PFT050	
Power Board	GV3320	
Detector fuse 500mA - 250V	LV7070	

Item	Part Number	N°
Fraction collector		



Positioning guide for racks	PFS400	
Fraction collector motor X-axis + cable	PFS410	
Fraction collector motor Y-axis + cable	PFS420	**5**
X-axis belt	PFS430	**4**
Y-axis belt	PFS440	
Pulleys (1 motor + 1 receptor)	PFS450	
Collector opto-sensor X-axis	PFS460	
Collector opto-sensor Y-axis	PFS470	
ON/OFF switch with EMI filter	PFS330	
AC Power supply 230/24V 50W	PFS480	
Pump/Collector fuses 2.5A - 110V (x 2)	PFS990	
Pump/Collector fuses 1.6A - 220V (x 2)	PFS980	
Black POM for column holder fixed (x 2) + screws	IO2960	

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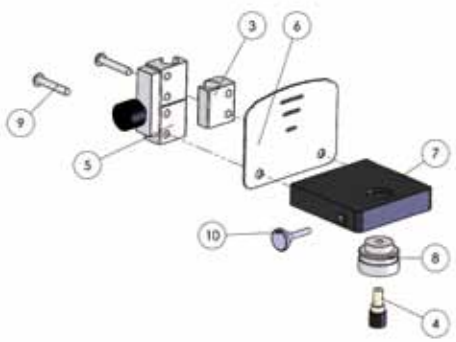
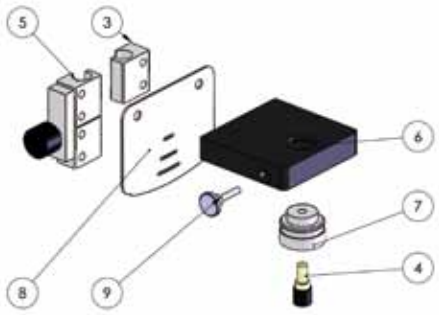
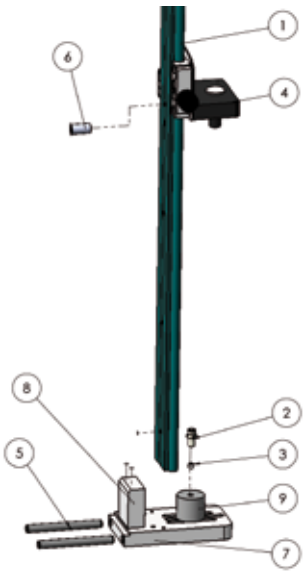
Item	Part Number	N°
Column holder		
		
TEFZEL ferrule with Stainless steel lock ring for 1/8” tubing	GV1690	
PEEK 1/4” - 28 long nut for 1/8” tubing for GV1690	GV1710	
Adapter Luer Lock Male to 1/4” - 28 Male PEEK	PFS770	4
Guidance part for large black POM holder	FO4400	3 + 5
Stainless steel union for flash configuration	FV6560	8
Large black POM injection holder + grub screw	IO4960	7 + 10
		
Stainless Steel bulkhead union 90°	PFS370	9
Adapter ETFE Luer Lock Female to 1/4” - 28 Male or	PFS780	2
Adapter Stainless Steel Luer Lock Female to 1/4” - 28 Male	GV1680	2
PEEK Ring (Outlet column holder)	IO2690	3
Binding column	IO2700	6

Item	Part Number	N°
Pre-column holder		
		
TEFZEL ferrule with Stainless steel lock ring for 1/8” tubing	GV1690	
PEEK 1/4” - 28 long nut for 1/8” tubing for GV1690	GV1710	
Adapter Luer Lock Male to 1/4” - 28 Male PEEK	PFS770	**4**
Guidance part for large black POM holder	FO4400	**3 + 5**
Stainless steel union for flash configuration	FV6560	**7**
Large black POM holder + grub screw	IO4960	**6 + 9**
		
Semi-prep and Prep adaptation kit	RAA190	
Stainless Steel bulkhead union 90°	PFS370	**5**
Adapter ETFE Luer Lock Female to 1/4” - 28 Male or	PFS780	**2**
Adapter Stainless Steel Luer Lock Female to ¼ - 28 Male	GV1680	**2**
PEEK Ring (Outlet column holder)	IO2690	**3**
Screw pre-column holder	IO9140	**6**

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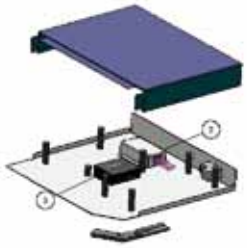
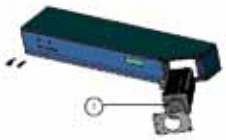
Item	Part Number	N°
6-Ways electric valve		
 		
6-Ways electric valve 2 positions (valve body+ rotor)	GO9040	1
6-Ways electric valve 2 positions Alimentation (V1)	IO4970	2
6-Ways electric valve 2 positions Driver (V1)	IO7070	3
6-Ways electric valve 2 positions Rotor	IO9130	
Pump/Collector fuses 1.6A-220V (x2)	PFS980	
Pump/Collector fuses 2.5A-110V (x2)	PFS990	
General		
Central Processing Unit + Touch screen	PFS520	
USB hub	PFS530	
USB extension cord (l = 0.5cm)	PFS540	
Stylus	FK2400	
AC power supply 230/24V 150W	PFS550	
UC axial fan (V2)	LV9380	
Multi-stage performance EMI filter	PFS570	
General ON/OFF switch	PFS590	
General fuses (x 2) 3.15 A - 220V	PFT010	
General fuses (x 2) 6.3 A - 110V	PFT100	
Serial communication cable male/female	PFS600	
Serial communication cable female/female	PFS610	
Distribution power cable male/female (for main voltage)	PFS620	
Distribution power cable male/female (for 24V)	PFS630	
Power cord FR	PFS640	
Power cord UK	PFS650	
Power cord US	PFS660	

10 > Specifications

- ✓ **Model name:** PURIFLASH® 450 system
- ✓ **Serial number:** XXXX-X-XX
- ✓ **Flow rate range:** 1 to 250ml/min
- ✓ **Flow rate performance:** 1% accuracy (with H_2O degassed at 20°C)
  Repeatability better than 0.5%
- ✓ **Gradient former:** Linear response from 2 to 98%
- ✓ **Injection:** Automatic, liquid or solid injection
- ✓ **System protection:** Software, Pressures Min/Max adjustable, Leakage detection
- ✓ **Maximum pressure:** 50 bar (725 psi)
- ✓ **Control:** via PC software "INTERCHIM® SOFTWARE VX.X"
- ✓ **Storage:** up to 32 methods in software memory (plus 160Go of hard disk memory)
- ✓ **AC mains supply voltage:** 220-240 VAC; 50-60Hz or 110-120VAC; 50-60Hz
- ✓ **Electrical protection:** Delayed action fuse 3.15A or 6.3A
- ✓ **Power distribution:** TT or TN power system only, transient over-voltages according to installation category II, Class 1 equipment, requires mains socket plug with protective earth terminal.
- ✓ **IP Code:** IP20
- ✓ **Dimensions:** 540 x 770 x 480mm (Width x Height x Depth without connection)
- ✓ **Weight:** 66kg
- ✓ **Temperature:** 5 to 40°C
- ✓ **Others:** Indoor use, Altitude up to 2000m, Pollution degree 2, Noise level < 35dB.

► Appendix 1 : Rack sets available

As mentioned in the chapter **3.4 Prepare the fractions collection**, several racks are usable with the fraction collector. Here is a recapitulative list indicating their designation, the features of tubes used and the total capacity of the rack set :

SHORT RACKS (a rack set includes 4 racks)					
Designation	**Tubes size**	**Tubes volume**	**Tubes by rack**	**Tubes by rack set**	**Total volume**
PF4390	18 x 150mm	25mL	44	176	4.4L
	18 x 180mm	32mL	44	176	5.6L
PF4370	13 x 100mm	9mL	60	240	2.1L
PF4380	16 x 150mm	22mL	44	176	3.8L
PF4410	21 x 150mm	35mL	27	108	3.7L
PF4420	25 x 150mm	60mL	16	64	3.8L
PF4430	28 x 150mm	75mL	14	56	4.2L
PF4440	29.5 x 200mm	110mL	14	56	6.1L

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► Service report ◄

☐ Installation	☐ End of warranty visit	☐ Warranty
☐ Repair	☐ Maintenance	☐ Out of warranty

System description: .....

S/N: ..... Module: .....

Service action: .....

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.....

.....

P/N and description of defective spare part: .....

.....

Any further action required: .....

.....

Date:..... Name:..... Signature:

► Service report ◄

☐ Installation	☐ End of warranty visit	☐ Warranty
☐ Repair	☐ Maintenance	☐ Out of warranty

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S/N: ..... Module: .....

Service action: .....

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P/N and description of defective spare part: .....

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Any further action required: .....

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Date:..... Name:..... Signature:

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S/N: ..... Module: .....

Service action: .....

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Service action: .....

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P/N and description of defective spare part: .....

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Date:..... Name:..... Signature:

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Service action: .....

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Service action: .....

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P/N and description of defective spare part: .....

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Any further action required: .....

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S/N: ..... Module: .....

Service action: .....

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P/N and description of defective spare part: .....

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S/N: ..... Module: .....

Service action: .....

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Date:..... Name:..... Signature:

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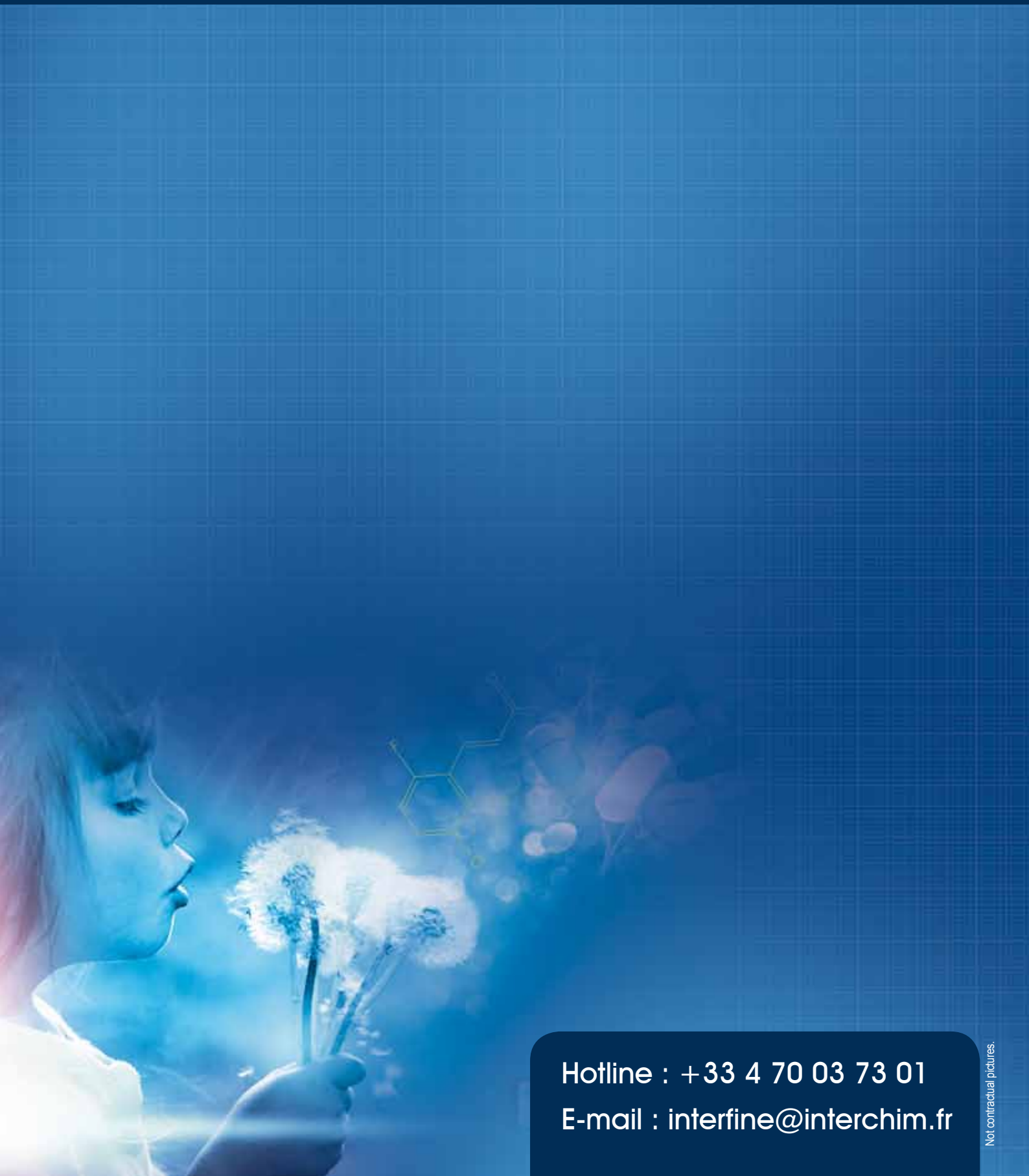

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E-mail : interfine@interchim.fr