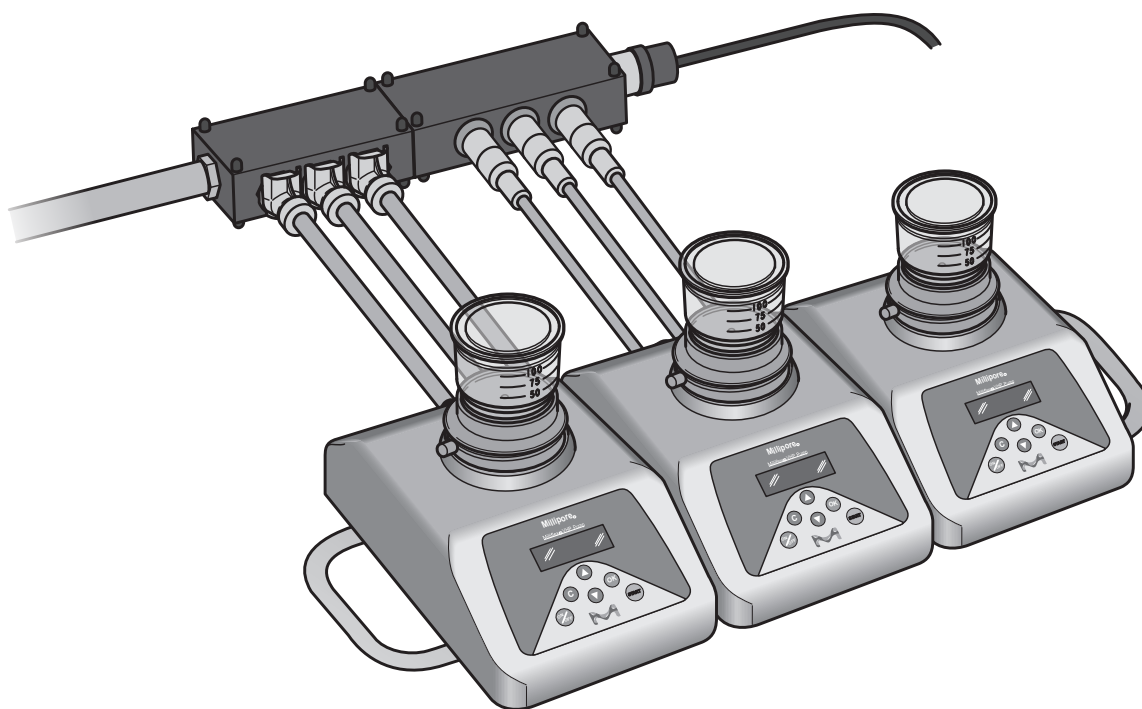




User Guide

Milliflex[®] Plus VHP Resistant Pump



The life science business of
Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in
the U.S. and Canada.

Millipore[®]

1. Notice

The information in this document is subject to change without notice and should not be construed as a commitment by Millipore SAS. Millipore SAS assumes no responsibility for any errors that may appear in this document. This manual is believed to be complete and accurate at the time of publication.

2. Application

The VHP Resistant Milliflex® PLUS Pump is designed to perform filtrations of samples inside an isolator. The pump is compatible with the isolator environment. The housing and the external parts are VHP resistant.

3. Operator and Equipment safety

All employees who will operate and/or be near the Milliflex® Plus Pump VHP must comply with the following:

- Read and understand the user guide of the pump before using this pump. Failure to follow operating instructions could result in user injury or damage to the instrument.
- Read and understand all maintenance instructions in this user guide before performing maintenance on the pump. Failure to follow instructions could result in user injury or damage to the instrument.
- Any alteration of the pump from factory specification may cause unsafe conditions, and will void the product warranty.
- Any attempt to use the pump in a manner not specified in this user guide may result in damage to the instrument, operator injury, and will void the product warranty.
- Do not attempt to open and repair the pump. Service should be performed by trained and authorized personnel only.
- Place the pump on a clean, flat, stable, horizontal surface, away from any source of excessive heat and close to an easily accessible, properly grounded power supply outlet.
- The Milliflex® Plus Pump VHP must be installed and used in a clean and dry area.
- The product is not intended to be used in explosive atmosphere.
- Do not expose the power supply to liquid. If this happens, immediately switch off and disconnect the pump from the power outlet, wipe up the liquid.
- Use only accessories and replacement parts designed for the pump. Using accessories not designed for the pump could result in user injury or damage to the instrument.
- When filtrating hazardous liquids, wear and use proper protective clothing and equipment for the handling and the disposal of the liquid to be filtrated.
- The system power cord is the main system disconnecting device, and must be easily accessible at all times.
- To avoid damaging the power cord or the outlet, it is recommended that you pull on the plug and not on the cord to unplug the system from a wall outlet or an electrical connector.
- Make sure the power cord is not a tripping hazard. Make sure that it is not gripped too tightly at the plug, the outlet or the point where it is connected to the system.
- Before use, check that the hoses are not unplugged, folded, or damaged.
- In case of skin contact with the filtrated liquid, refer to the safety datasheet of the filtrated liquid for first aid measures.
- Dispose the filtrated liquids according to local regulations.
- Do not use the Milliflex® Plus Pump VHP to filtrate flammable products.
- Before cleaning, shut down the Milliflex® Plus Pump VHP and switch off and disconnect the power supply from power source.
- Use only the power supply (model FRA072-S24-4) designed for the pump.
- The power supply must be connected to the earthing system.
- The electrical installation must comply with local standards, power supply voltage: 100–240 Volt AC, 50–60 Hz.
- Use an electrical surge protector to prevent damage to the system.
- Milliflex® Plus Pump VHP System is designed for indoor use only.
- **Use and storage temperatures**
 - The Milliflex® Plus Pump VHP and/or its accessories must be kept away from any heat source. Do not expose the system to direct sunlight or to temperatures outside the ranges of values are given below.
 - Use and storage temperatures are given below:

System operation	System storage	Altitude
10 to 40 °C	0 to 40 °C	< 2000 m

- Maximum relative humidity (storage and operation) 80% at temperatures up to 31 °C, then linear decrease to 50% RH at 40 °C.

- System dismantling—WEEE directive:

In accordance with to the European Union Directive 2012/19/EC on Waste Electric and Electronic Equipment (WEEE), the presence of this logo on the product indicates that it should not be disposed of in the normal waste stream but collected separately.



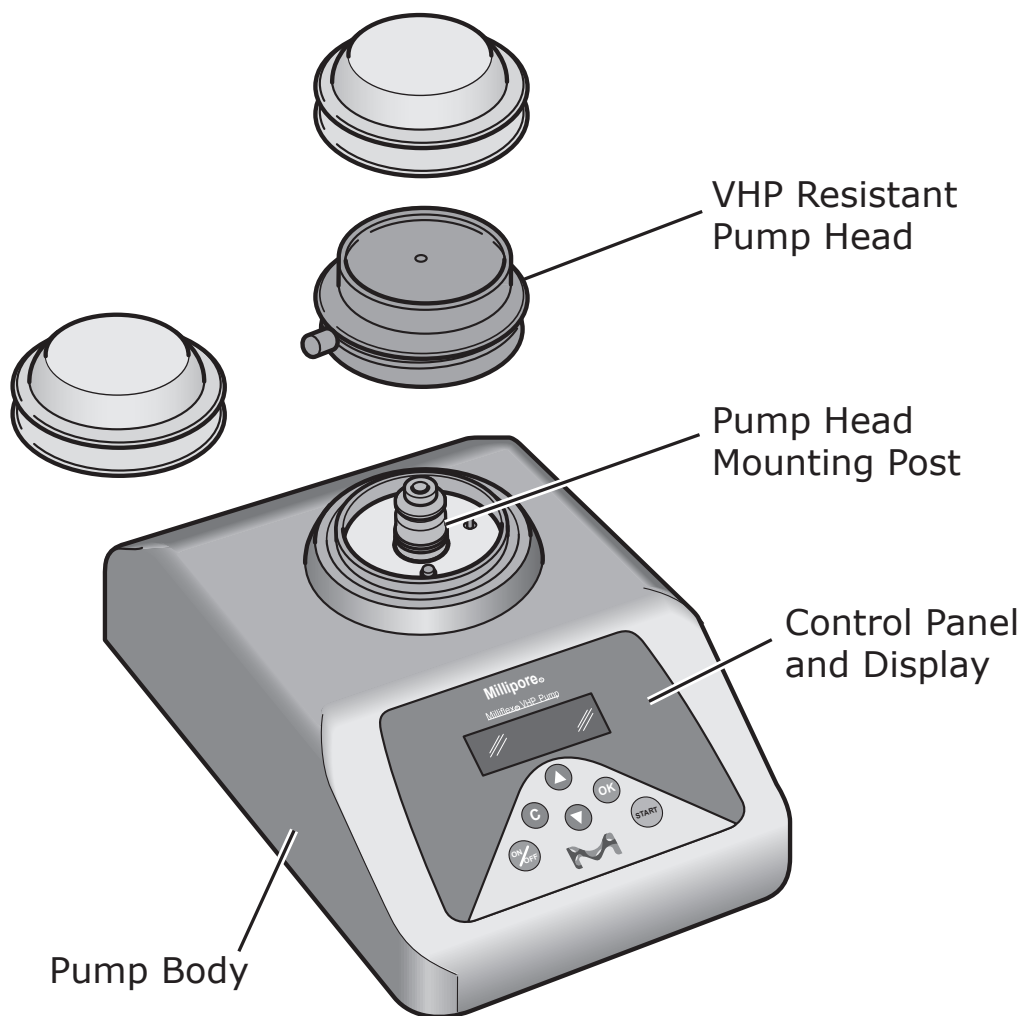
Go to millipore.com/weee for details on how to ensure proper treatment of the product in different countries.

4. System description

A. VHP Pump (MXPPLUVHP)

The Milliflex® Plus VHP pump is composed of the following elements:

- The pump body
- The pump head with its protective cover (MXPHEAVHP)
- A lead to protect the pump when the pump head is not in place (to be used for assembling the pumps with the manifold tray)



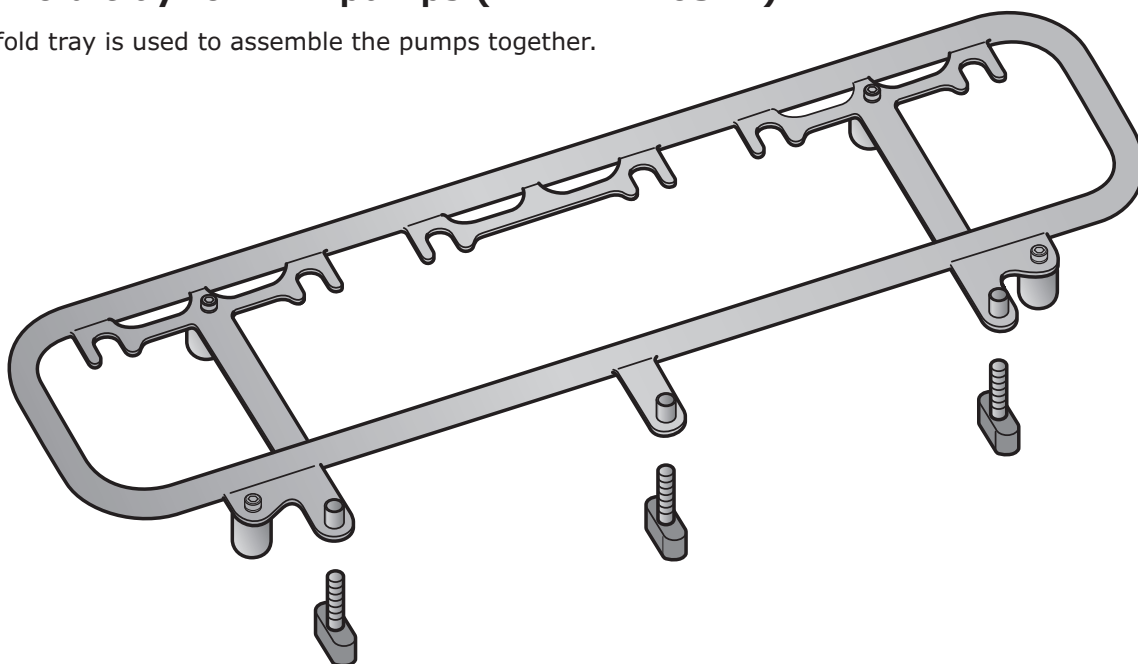
The pump comes with the following documents:

- User Guide PF12640
- Certificate of conformity for the pump (MXPPLUVHPCOQ) and the pump head (MXPHEAVHPCOQ)

Note: The VHP resistant pump (MXPPLUVHP) is compatible with the VHP resistant pump head (MXPHEAVHP) only. These items are designed for use with Milliflex® filtration devices only.

B. Manifold tray for VHP pumps (MXPTRAY03V2)

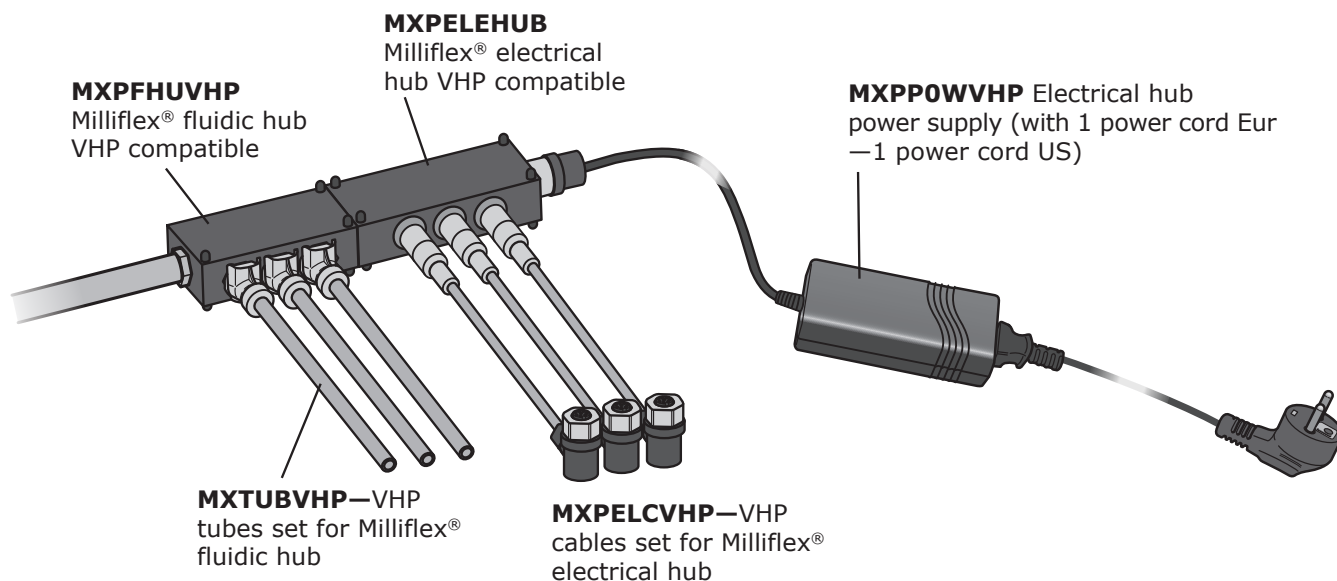
The manifold tray is used to assemble the pumps together.



C. Milliflex® Plus pump VHP Hub kit (MXPHUBKIT)

The VHP Hub kit is composed of:

- Some components for the electrical parts: electrical hub, cables set and power supply
- Some components for the fluidic parts: fluidic hub and tubes set



D. Supply set for one VHP Pump (MXPSPL001)

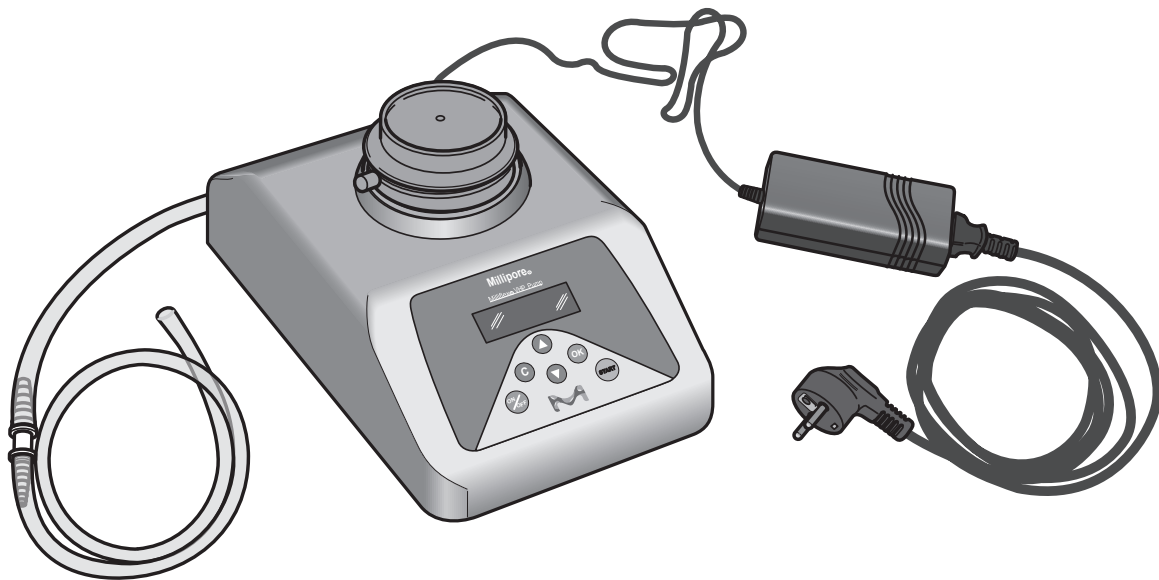
The supply set is composed of:

- A power supply
- A fluidic tube

5. System installation

A. Single pump system

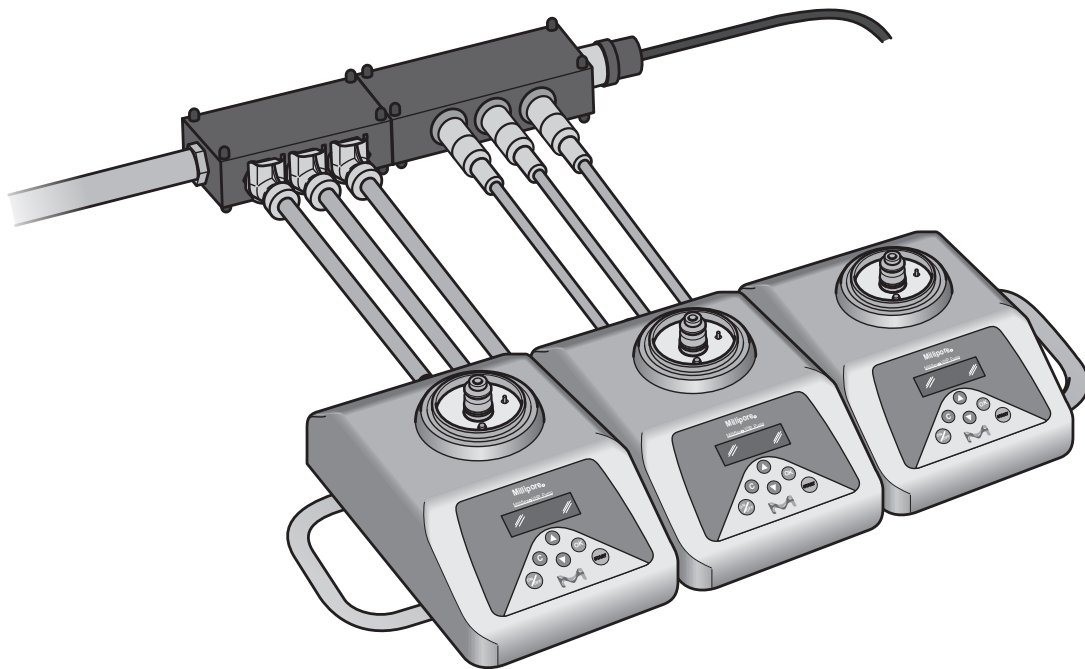
Connect the supply set (fluidic tube and power cable) to the VHP pump as follows:



Then place the system in the isolator.

B. Three pump system

When using a three pump system, it is strongly recommended to assemble the pumps on the Manifold tray, and to use the Hub kit for the electrical and fluidic connections.



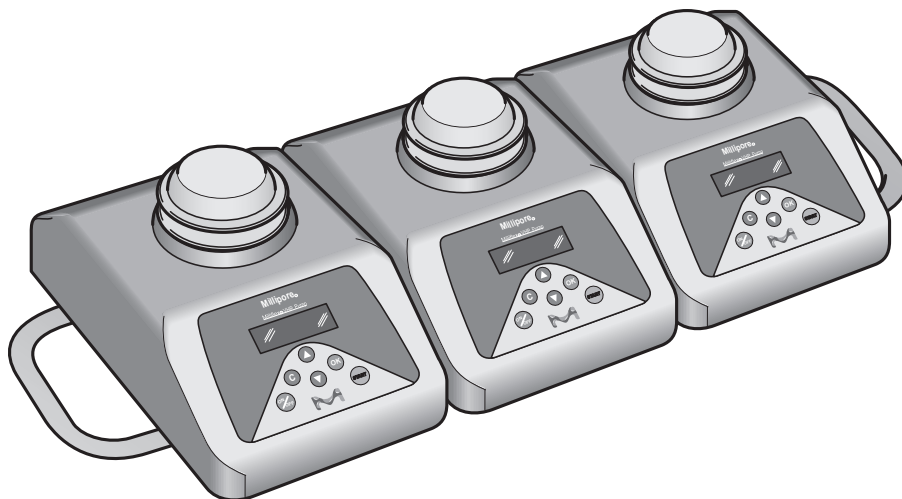
It is recommended to assemble the pumps together **before placing the system in the isolator**. The use of the tray facilitates the transfer of the assembled system to the isolator.

Caution: when assembled, the system is heavy (14.3 kg without the heads). Make sure you can handle the system to transfer to the isolator.

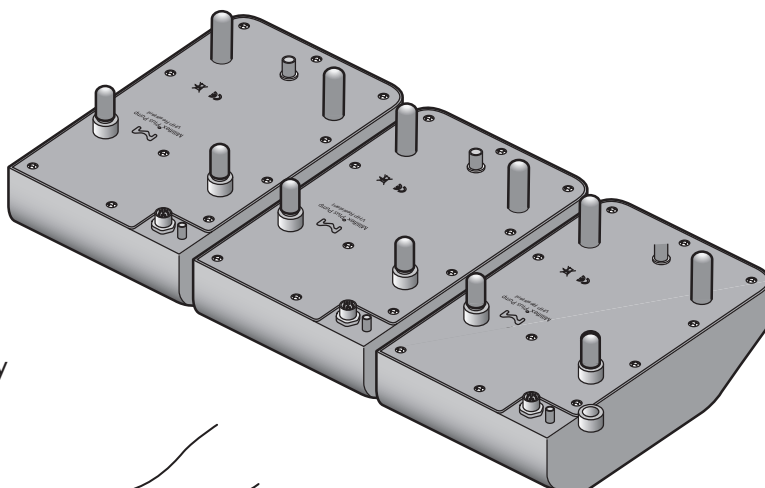
1. Assembly of the 3 pumps on the tray

Do not place the pump head at this stage.

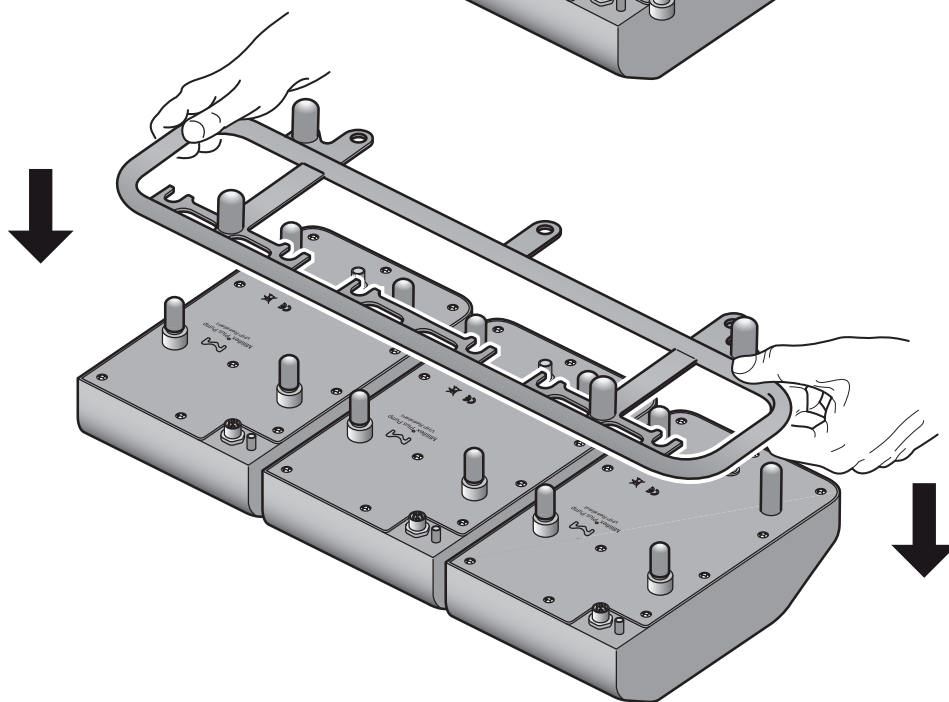
- Put the pump lead on each pump to protect them through the assembly step.



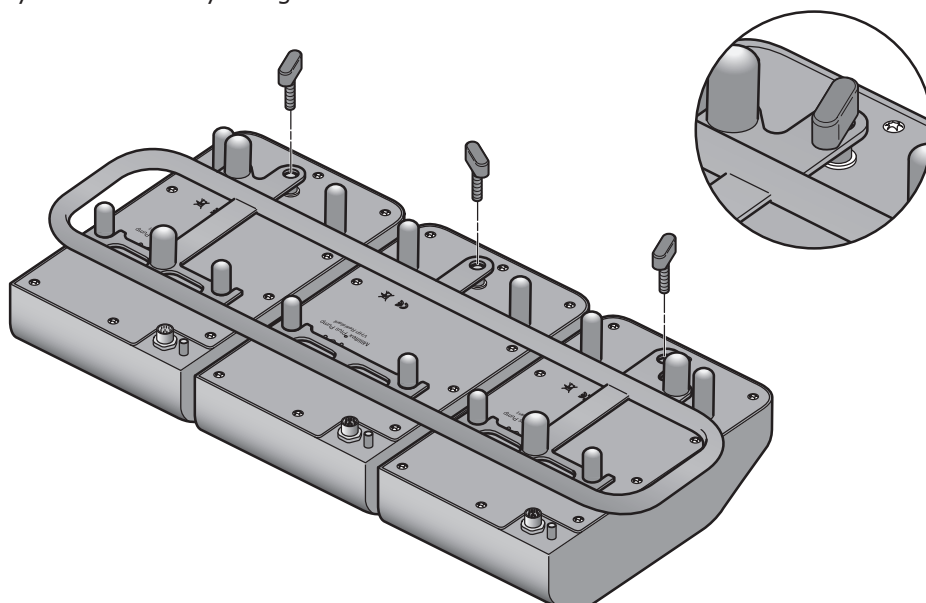
- Reverse the 3 pumps: the keypad should be facing the operator and the pumps should be aligned to enable assembly with the tray



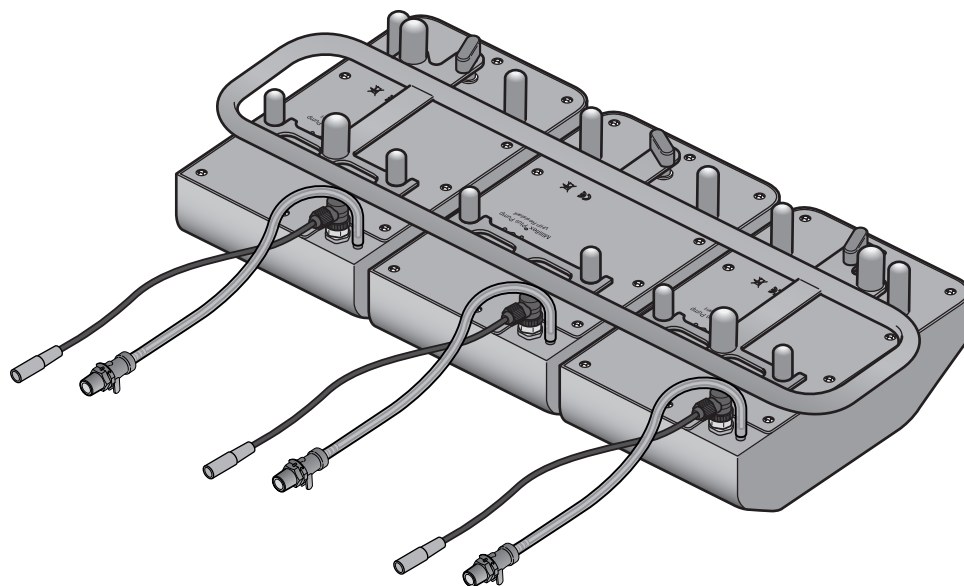
- Put in place the tray



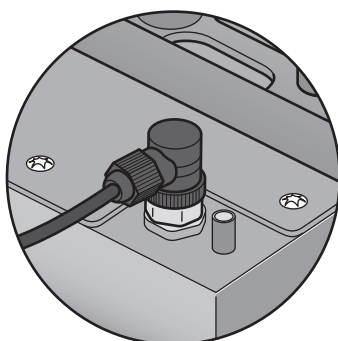
- Fix each pump one by one to the tray using the fast screw



- Once the 3 pumps are assembled on the tray, connect the electric cables and fluidic tubes to each pump

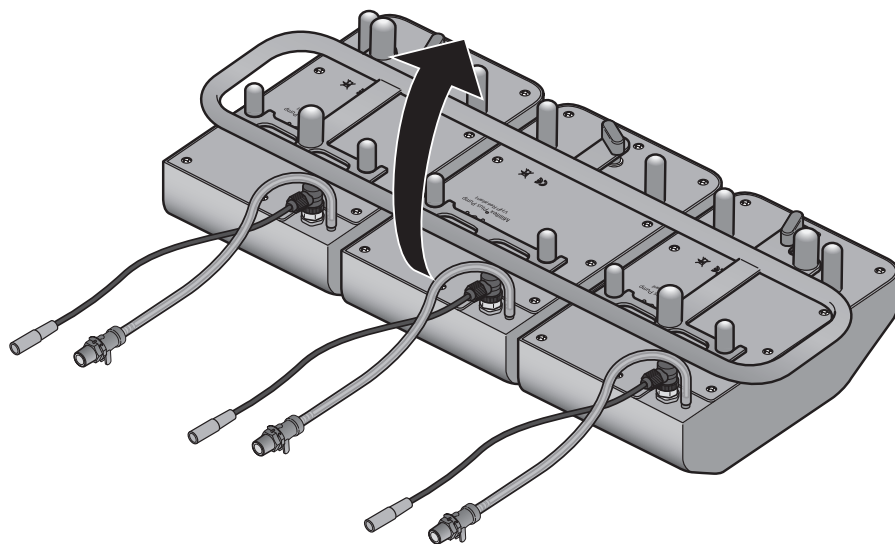


Detail of the electrical connection:

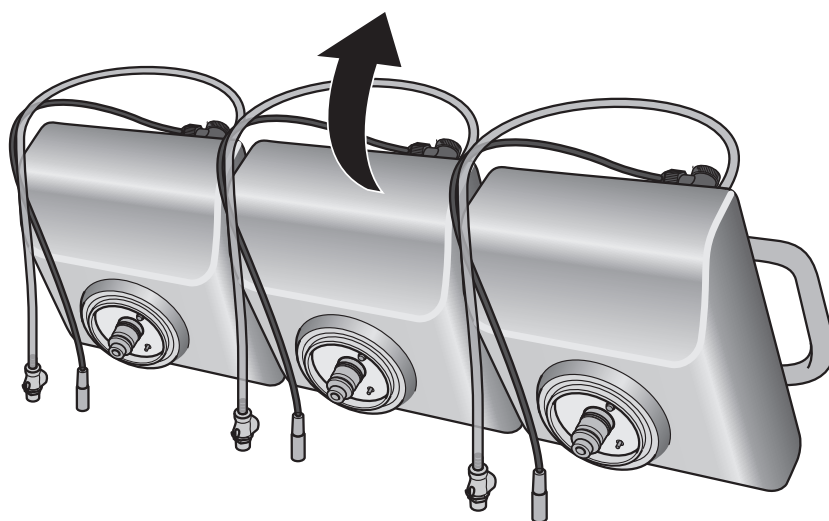


- Once all the connections are in place, reverse the whole system using the manifold tray. Take care not to crush the fluidic tubes and electric cables while reversing the system.

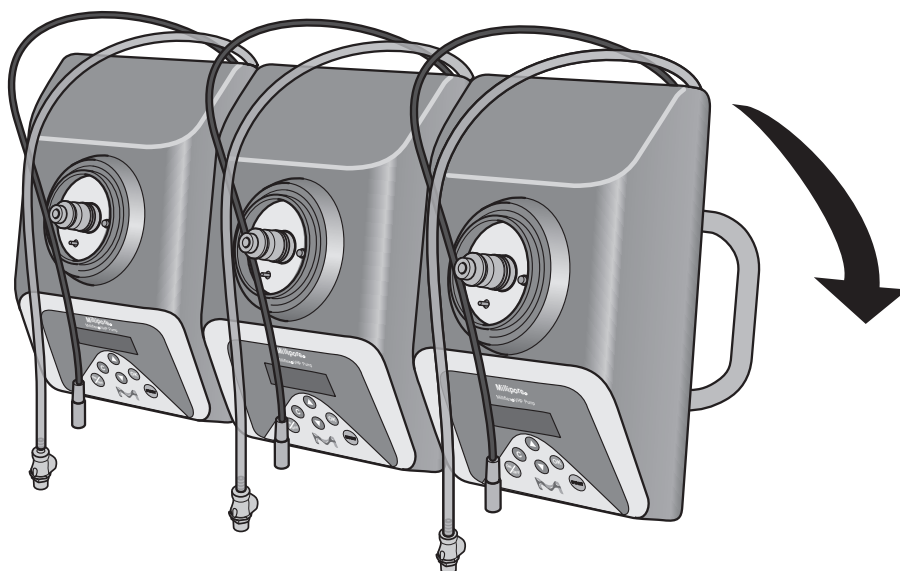
1.



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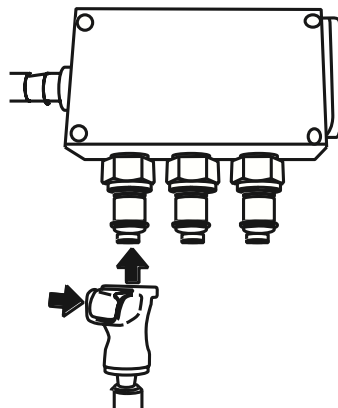


2. Hub installation

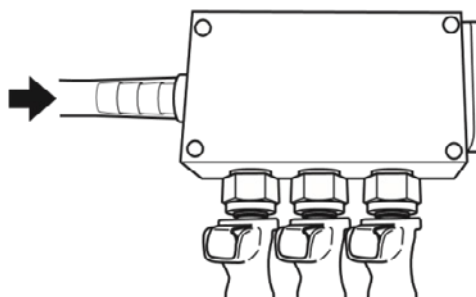
The VHP Compatible Milliflex® PLUS Pump Hub is used to connect the fluidic tubes and electrical cables from up to three Milliflex® PLUS pumps.

• Fluid Line Connections

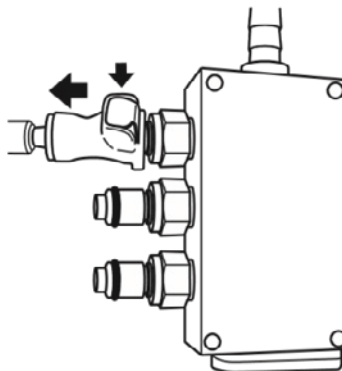
Push the Milliflex® PLUS Pump fluid line connectors into the fluid hub until a click is heard. Install the other end of the tubing onto the pumps.



Insert the output tubing onto the stainless steel connector.

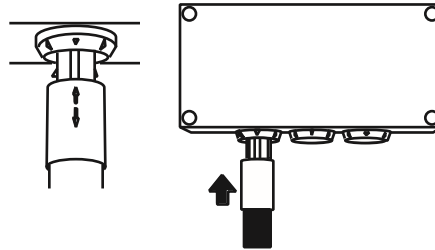


To disconnect the fluid lines, push on the button and pull the connector.

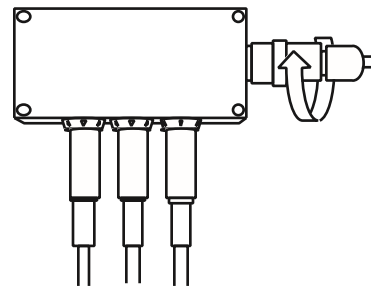


- **Electrical Connection**

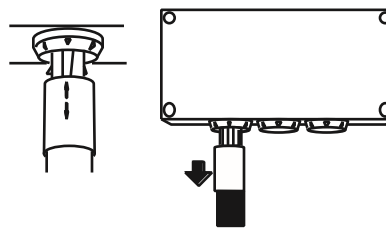
Push the Milliflex® PLUS Pump electrical cables into the electrical hub until a click is heard. Connect the other end of the cables onto the pumps.



Connect the power supply to the electrical hub and tighten the connector.

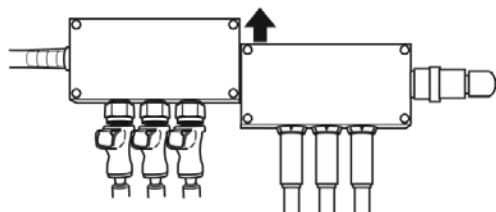


To disconnect the electrical cables from the hub, pull the cables out of the hub.



- **Connecting the Hubs**

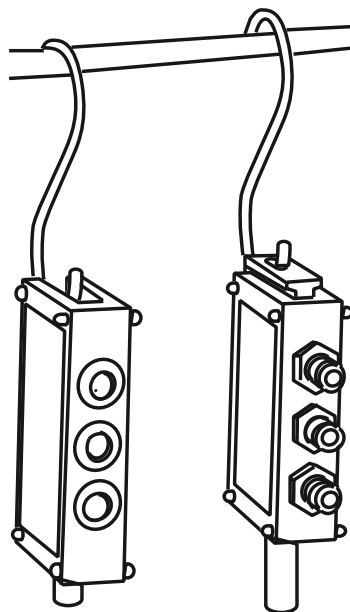
The fluid and electrical hubs may be connected or disconnected by sliding them together.



- **Decontamination**

The hubs must be cleaned after each use. To decontaminate the fluid line hub and the tubing, use the sanitizing mode of the Milliflex® PLUS Pump (refer to the Milliflex® PLUS Pump User Guide). The external parts of both hubs may be sprayed with an alcohol solution or a standard laboratory surface decontamination solution.

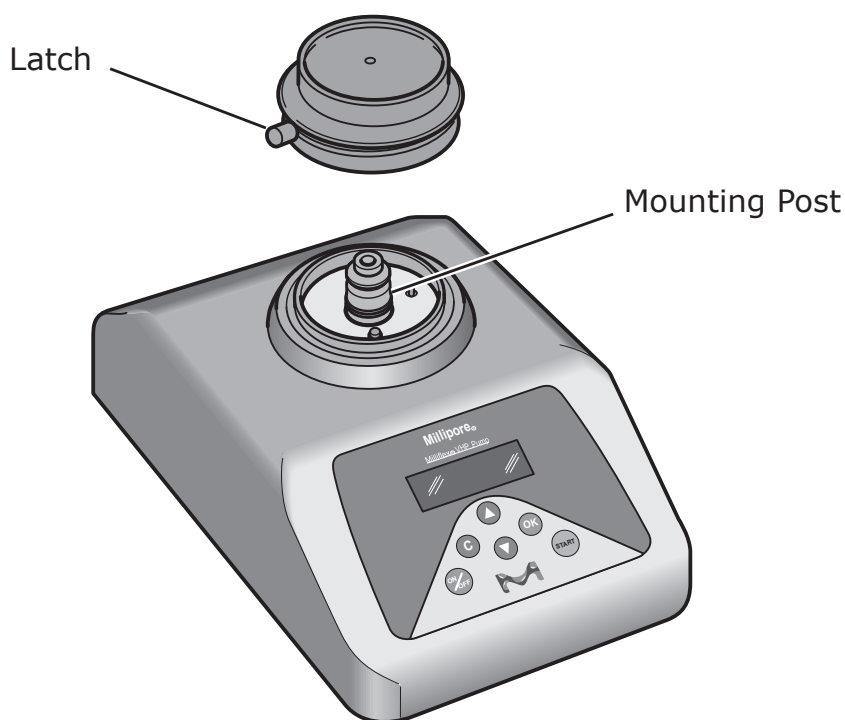
Hang the hubs inside the isolator during the decontamination cycle as shown below.



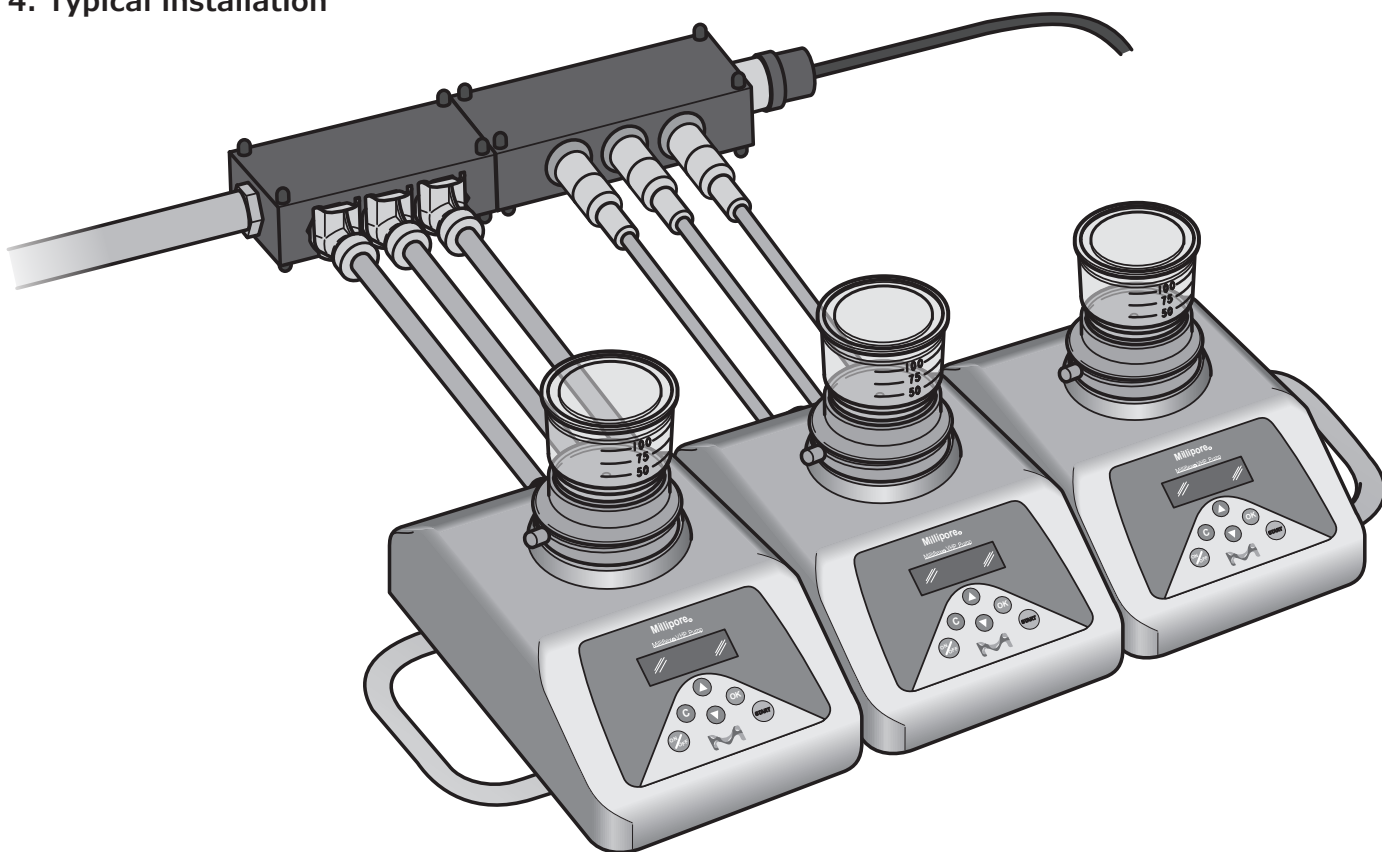
3. Pump head installation

- Push in the latch on the side of the pump head.
- Place the pump head onto the mounting post, with the latch to the left, as you face the pump, as shown.
- Turn the pump head until it drops down and is fully in contact with the mounting post. The latch is automatically released and locks the head in place. The latch should be positioned on the left side of the pump assembly, when the head is locked in place.

NOTE: The pump head should be autoclaved before the first use, as described in the Maintenance section.



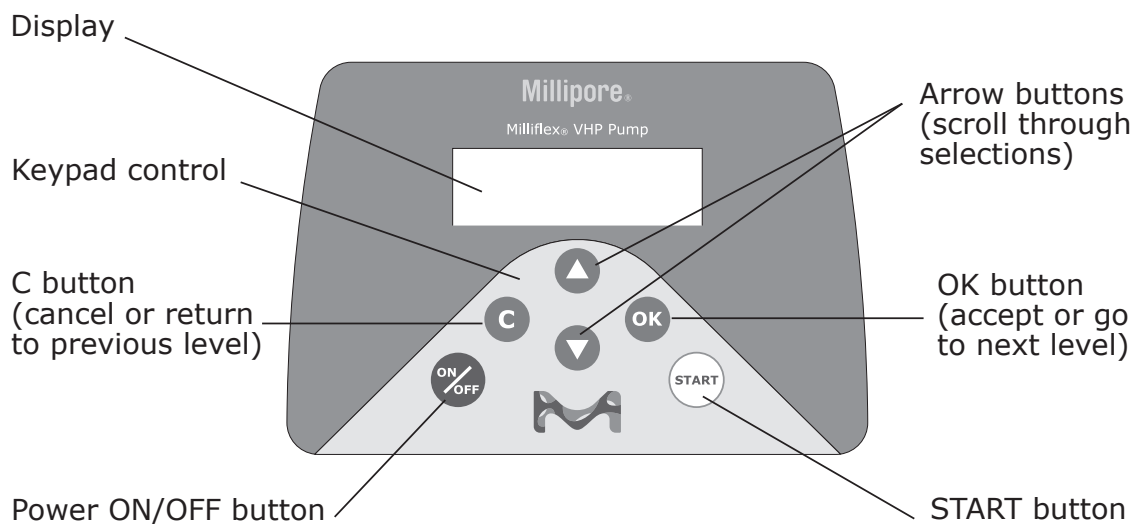
4. Typical installation



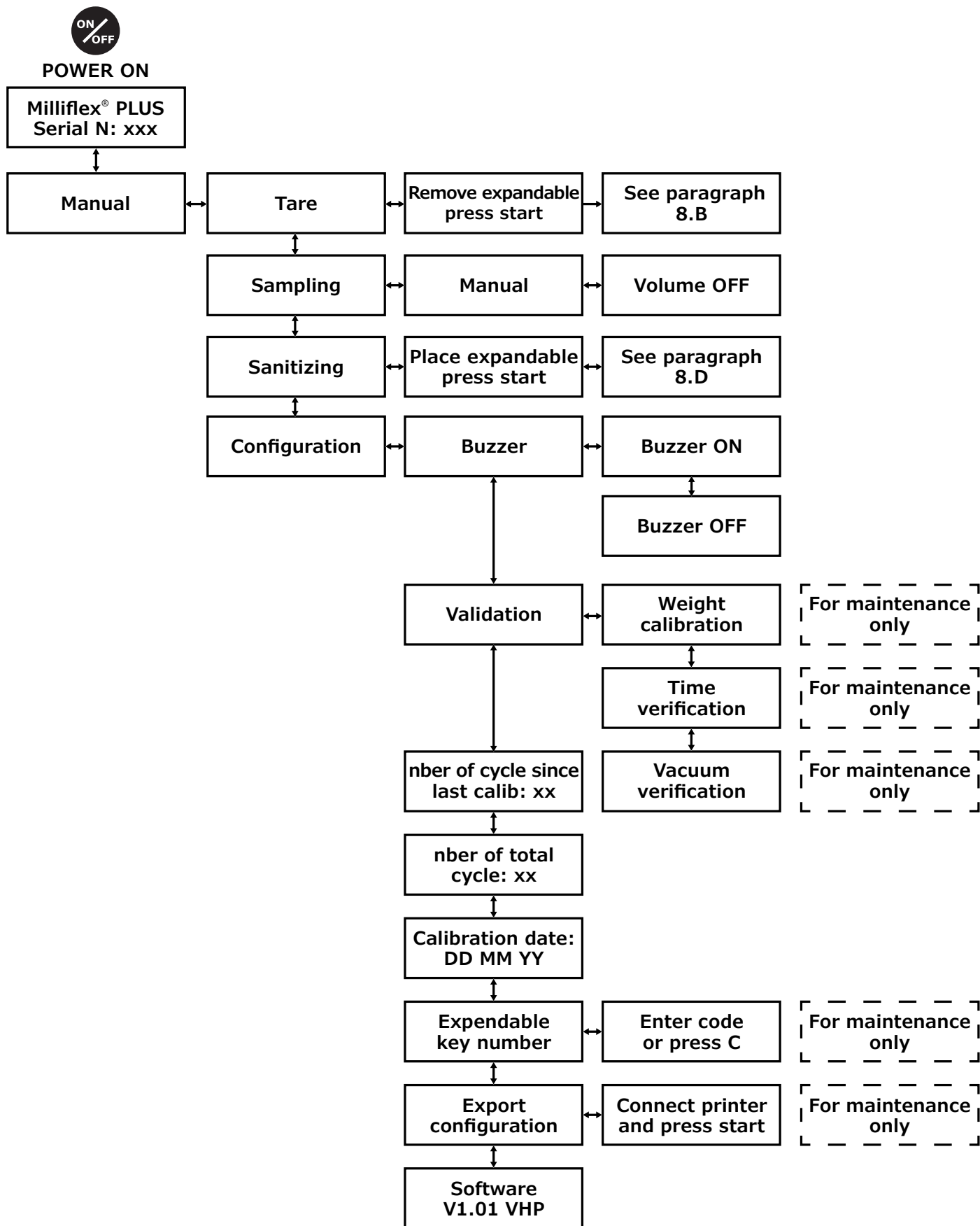
Caution: the pump will not be VHP resistant if the O-ring or any screws are removed. The pump head must remain in place on the pump during VHP cycle to maintain VHP resistance. The white cover delivered with the pump head does NOT ensure VHP resistance of the pump.

6. Controls and display

A. Keypad



B. Control functions menu



7. Initial Power-up

At installation, the steps described above (Hardware Installation) should have been performed, as applicable, before configuration.

1. Switch the pump on by pressing the ON/OFF button on the keypad. The display shows the following for a few seconds: Milliflex® PLUS SERIAL N:
2. The following display appears: Manual
3. Press OK. The display will show: Tare
4. Press OK. The display shows: Remove expendable—press start
5. Remove anything on the pump head (e.g., cover or disposable) and press START. The display shows: measuring..... please wait.....
6. After a few seconds, the display will revert to the display manual testing. (Additional information on the Tare procedure may be found in the Preparation for Testing section.)

8. Operation

A. Preparation for Testing

We recommend that the pump head be autoclaved before the first use and after each workday. See the Maintenance section.

Whenever the pump head is removed, the Tare cycle must be run (see below).

It is also recommended to sanitize the pump interior before the first use and after each workday, and if the pump is unused for more than a day. See Sanitizing below, in this section.

1. Install the pump head, as described in the Installation section. Run the Tare cycle, as described below.
2. To prepare for testing, switch on the pump, by pressing the ON/OFF button on the keypad. For a few seconds, the display shows: Milliflex® PLUS Serial N:

After the power-up display, the Main Program Screen for the previously selected program is displayed. For example: Manual

B. Tare

The Tare procedure adjusts the measurement system in the pump for the positioning and removing of the Milliflex® funnels

1. When the display shows Tare, press OK. The display shows: Remove expendable. Press Start
2. Remove anything on the pump head (e.g., cover or disposable) and press START. The display shows: Measuring... Please wait...

After a few seconds, the display returns to the Main Program Screen for the previously-selected program.

C. Sample Processing

1. Position a tray of Milliflex® 100 funnels with the Millipore name facing the operator.
2. Remove a funnel from its packaging tray. A notch in the tray is uncovered: this will facilitate picking up the spacer.
3. Use sterile forceps to place the aseptic spacer on the pump head. Firmly press the funnel onto the pump head.
NOTE: Make sure that the base of the funnel is flush with the top of the pump head filter support.
4. Remove the cover from the funnel, while maintaining the funnel in position with the other hand.

5. Pour a sample into the funnel, using the graduations to reach the required volume. When the required volume has been reached, stop pouring. Leave the cover tilted on top of the funnel, but not closed, during the next two steps.
6. Press START to start the pump.
7. Operate the pump until the sample has been filtered, then press START to dry out the pump head. Wait for the pump to stop.
8. Remove the white/opalescent cover from the solid cassette or the paper cover from the liquid cassette.
9. Remove the funnel from the pump head and reinstall the funnel cover.
10. Inspect the underside of the membrane, to verify membrane integrity. When viewed from beneath the funnel, the membrane should have a convex shape.
11. Place the funnel base down over (and the filter membrane onto) the exposed medium cassette. The membrane should be fully in contact with the medium.
12. Assure and secure membrane contact with the medium, by pressing slowly and firmly on the cover with the thumb and forefinger of each hand.
13. Press down on the top of the funnel with the palm of one hand. Start with a firm vertical pressure and gradually increase your hand pressure until the funnel breaks off. The funnel will shear off at the groove on the unit. **NOTE:** If the working position is uncomfortable, e.g., in a vertical laminar flow hood with the shield in a low position, then the funnel may be broken in two steps, thus requiring less strength. Press slightly to one side of the funnel first, until a “snap” is heard, then press on the opposite side of the funnel until a second “snap” is heard.
14. After the funnel section has broken off, remove the cover from the funnel and place it on top of the filter cassette assembly.
15. Incubate upside down.
16. Wipe the pump head with an aseptic wipe.

D. Sanitizing

The pump interior should be sanitized before its first use, after each workday and if unused for more than a day. The Sanitizing cycle enables the user to sanitize the interior surfaces of the pump, according to a fixed regimen.

See the Specifications section for information on acceptable sanitizing agents.

The pump head can be autoclaved.

See the Maintenance section for autoclaving specifications and for recommendations on cleaning the pump exterior.

In the Sanitizing cycle, the pump automatically circulates a quantity of sanitizing agent through the interior of the fluid-handling mechanism; pauses for ten minutes, while the interior surfaces are still wetted with the agent; circulates the rest of the agent through the pump; and then circulates multiple rinses. The user is prompted to add the appropriate liquid when required, at each stage. A drying cycle completes the process. The Milliflex® HA (mixed cellulose esters membrane) funnel should be used for sanitization with any recommended agent except for solutions containing alcohol, where the Milliflex® HV (PVDF membrane) is required. If the agent and the membrane used are not compatible, remove the membrane from the funnel before sanitizing.

CAUTION

Install the exhaust tubing and waste receptacle higher than the pump, to prevent sanitizing agent being siphoned out of the pump during the ten minutes of contact time.

1. At the Main Program Screen, press OK, to enter the Main Menu. The display shows: Tare
2. Press the down arrow until the display shows: Sanitizing
3. Press OK. The display shows: Put expendable—press start
4. Place an aseptic spacer and a Milliflex® 100 funnel, without its cover, on the pump head and press START. The display shows: Fill 100 mL of Agent press start
5. Fill the funnel with 100 mL of sanitizing agent and press START. The pump starts and the display shows: Sanitizing

6. The pump should pull 25 to 75 mL of agent through (filtration during five seconds); pause for ten minutes, and then pull the remaining liquid through. A bar graph at the bottom of the display shows the progress of this operation.
7. After the pump has emptied the funnel, it runs a drying cycle and then the display shows: Fill 100 mL of Water press start
8. Fill the funnel with 100 mL of sterile water and press START. The display shows: Rinsing
9. The pump empties the funnel and runs a drying cycle. Then the display shows: Fill 100 mL of Water press start
10. Fill the funnel with 100 mL of sterile water and press START. The rinsing cycle is performed as before.
11. Then the display prompts for the funnel to be filled again, for each rinse, for a total of four rinses. When the fourth rinse has been completed, the display shows: Sanitizing finished—Press start
12. Press START. Remove the funnel and discard it. The display shows: Sanitizing
13. Press C button to go back to the display manual testing. Remove the residual liquid on the Milliflex® Head.

9. Maintenance

A. Autoclaving

Autoclave the pump head before the first use and after the last use each day. Autoclave at 121 °C for 30 minutes, or at 134 °C for 10 minutes.

B. Sanitizing

After each workday, or when the pump is unused for more than a day, sanitize the pump interior, using the automated procedure provided in Sanitizing.

Sanitizing agents:

- Bleach 250 ppm
- Peracetic acid 0.125%
- Quaternary ammonium

C. Exterior Cleaning

The exterior surface can be cleaned with a soft cloth, moistened with alcoholic solution or a standard laboratory surface alcohol decontamination solution

D. Calibration

Must be performed by our authorized internal Technician.

10. System Specifications

Materials of Construction	Housing	Stainless steel 316 L	
	Key pad	Polyester	
	Screen window	Polyester with coating	
	Drying valve o-ring	Viton® elastomer	
	Liquid pump housing	Polypropylene	
	Liquid pump membrane	PTFE	
	Liquid pump valve	Viton elastomer	
	Pump head	Stainless steel 316 L with local Teflon® coating	
	Fluidic connections	Polyamide	
	Fluidic tubing	Silicone	
	Pump head cover	Polyacetal	
	Seal (O-ring between pump and pump head)	EPDM	
	Bottom plate seal	Silicone	
	Dimensions		Single
Width		170 mm	585 mm
Depth		265 mm	265 mm
Height without head		162 mm	167 mm
Height with head		170 mm	175 mm
Weight without head		4.4 kg	14.3 kg
Weight with head		5.2 kg	16.8 kg
Electrical		Power supply input	100–240 V — 50–60 Hz — 1.8 A
	Power supply output	24 V VDC—3.0 A	
	Pump input	24 VDC	
	Pump power	25 VA	
	Electrical Hub	24 VDC/75 VA	
Vacuum	≥ 0.4 bar (11.8 inches of Hg)		
Flow rate	7 to 16 seconds for 100 mL of Milli-Q® grade sterile water filtered through a Milliflex® MXHAWG124 funnel		
TimeAccuracy	± 2 seconds in 5 minutes		
OperationalRequirements	Temperature	10 °C to 40 °C (50 °F to 104 °F)	
	Relative humidity	See chapter 3—Operator and Equipment Safety	
	Altitude	< 2,000 Meters (6,561 feet)	
	Pollution degree	II	
	Main supply voltage	± 10% of the nominal voltage	
	Transient over voltages	Over voltage category II	
Regulatory Information	Millipore SAS certifies that the VHP Resistant Milliflex® PLUS pump is designed and manufactured in application of:		
	2014/30/EU Relating to electromagnetic compatibility		
	2014/35/EU Relating to electrical equipment designed for use within certain voltage		
	2011/65/EU Relating to the restriction of the use of certain hazardous substances (ROHS) in electrical and electronic equipment		








11. Ordering Information

Catalogue No.	Description	Qty./Pk
MXPP0WVHP	Milliflex® PLUS Pump VHP Resistant	1
MXPHEAVHP	Milliflex® PLUS Pump Head VHP Resistant	1
MXPFHUVHP	Milliflex® Fluidic Hub VHP Compatible	1
MXPELEHUB	Milliflex® Electrical Hub VHP compatible	1
MXPTUBVHP	VHP tubes set for Milliflex® Fluidic Hub	3
MXPELCVHP	VHP Cables set for Milliflex® Electrical Hub	3
MXPP0WVHP	Electrical Hub Power Supply	1
MXPTRAY03V2	Milliflex® VHP Tray for 3 Pumps	1
MXPSPL001	Supply set for one Milliflex® PLUS Pump VHP	1
FTPF01866	Power cord for Europe	
FTPF02471	Power cord for North America, Central America Brazil Mexico	
SIMCABLE1	Power cord for United Kigdom, Ireland, Malaysia, Singapore, Hong Kong	
SIMCABLE2	Power cord for Denmark	
SIMCABLE3	Power cord for India, South Africa	
SIMCABLE4	Power cord for Switzerland	
SIMCABLE7	Power cord for Japan	
SIMCABLE8	Power cord for Australia, China, New Zealand, Argentina	
SIMCABLE9	Power cord for Italy	

Kits information

Kit No./Description	Components	Qty
MXPHUBKIT Milliflex® Plus Pump VHP Hub kit	MXPFHUVHP	1
	MXPELEHUB	1
	MXPTUBVHP	1
	MXPELCVHP	1
	MXPP0WVHP	1
MXPVHPKIT Milliflex® VHP 3 heads kit	MXPPLUVHP	3
	MXPTRAY03V2	1
	MXPFHUVHP	1
	MXPELEHUB	1
	MXPTUBVHP	1
	MXPELCVHP	1
	MXPP0WVHP	1

12. SymbolsReferenced

	<p>The presence of this logo on the product signifies the compliance of VHP Resistant Milliflex® PLUS Pump with the following European Union directives:</p> <p>2014/30/EU relating to electromagnetic compatibility</p> <p>2014/35/EU relating to electrical equipment designed for use within certain voltage limits</p> <p>2011/65/EU relating to the Restriction of the use of certain Hazardous Substances (RoHS) in electrical and electronic equipment</p>
	<p>In accordance to the European Union Directive 2012/19/EC on Waste Electric and Electronic Equipment, the presence of this logo on the product indicates that it should not be disposed of in the normal waste stream, but should be collected separately.</p> <p>Go to Millipore.com/weee for details on how to ensure proper treatment of the in different countries.</p>
LPS	Indicates that the output voltage and current are limited.
	Direct current (DC).
	Alternate current (AC).
	Hazard Hot surface.
	Possible high-voltage hazard.
	Do not disassemble.

13. Standard Warranty

The applicable warranty for the products listed in this publication may be found at **Millipore.com/terms** ("Terms & Conditions of Sale").

Manufacturer

Millipore SAS
39 Route Industrielle de la Hardt
67120 Molsheim, France

Technical Assistance

For more information, please visit **Millipore.com/offices**
for up-to-date worldwide contact information

