INSTRUCTION MANUAL

Tangential Flow Filtration System

Model No.

Tanfil 100

Tech support

ROCKER

Please read this instruction manual before using this product.

Table of Contents

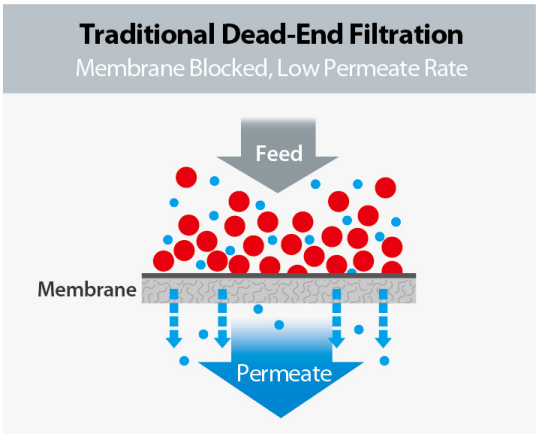
1. Introduction

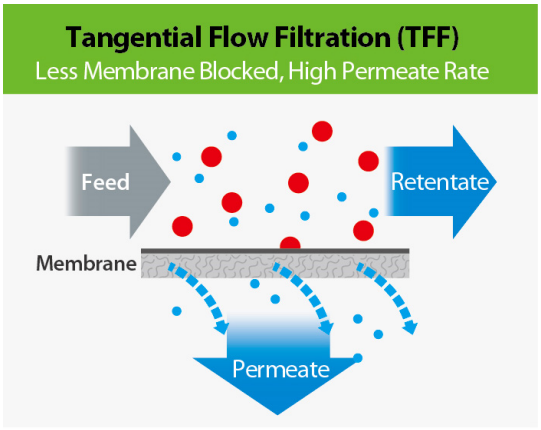
Tanfil 100 is a laboratory scale tangential flow filtration (TFF) system designed for performing concentration, purification and diafiltration of biomolecules, including proteins, peptides, and nucleic acids. This user-friendly system incorporates a peristaltic pump, 500 mL liquid reservoir, 2 pressure gauges, and magnetic stirrer, creating a simple and ready to use system.

Its integrated design and versatile capability to accommodate various types of capsules and cartridges make Tanfil 100 an ideal choice for a range of applications, including evaluation, validation studies, and process development within the laboratory setting.

** A capsule or cartridge with specific molecular weight cutoffs (MWCO) is required to perform TFF process. The relevant operating limits of used capsules and cartridges, please refer to its instruction manual.*

- *Applications*





TFF system serves as an effective solution for preventing membrane fouling and separating targe molecules based on size differences. The efficiency makes it a preferred method for concentration, purification, and diafiltration of biomolecules. The applications include:

- Concentration and purification of proteins, peptides, or nucleic acids.
- Recovery of proteins, antibodies, extracellular vesicles (EVs) from cell culture media.
- Isolation and concentration of extracellular vesicles (EVs), exosome, microvesicles (MVs).
- Bacteria recovery or removal from solutions.
- Cell debris removal from fermentation broth or cell culture media.
- Buffer exchange or desalting before analysis.

2. Important Notice

This instrument is designed for laboratory usage only. Please read this manual carefully before installing and operating. The instrument shall not be modified in any way. Any modification will void the warranty and may result in potential hazard. We are not responsible for any injury or damage caused by any non-intended purposes and modifying the instrument without authorization.

1. Check the voltage specified on the name plate and ensure it matches the line voltage in your location.
2. Install the instrument in a clean, dust-less, non-hazardous, and ventilated area under 50°C.
3. Never use the instrument with any corrosive, flammable, combustible, or solvent liquids.
4. Overpressure or thick liquids can trigger the motor's self-protection, leading to automatic shutdown. Please switch it off for at least 5 minutes before restarting.
5. Before each start, please check for kinks or restrictions in the tubing. Pressure buildup may cause tubing and hoses to burst or rupture.
6. Pump tubing may rupture due to continuous contact with moving parts; it is advisable to replace it according to the tubing manufacture's replacement interval.
7. Never move the system while it is operating, or when capsule and cartridge is connected.
8. In case of any issues with instrument, please contact the manufacturer or your service agent for assistance. Do NOT disassemble it improperly.
9. Please discard packing materials in accordance with relevant local regulations.
10. Visit the official website and refer to the latest product guide for more information.
11. Operating Condition
    (a) Ambient temperature: 5 ~ 50°C
    (b) Relative humidity: 80% RH Max.
    (c) Power supply: 100-240V~, 50/60Hz, 50W
    (d) Fuse: T1.5A, 250V
    (e) Altitude: up to 2000 m
    (f) Pollution degree: II
    (g) Indoor use

Do NOT start the system with the pump head open.

Pressure in tubing should be less than 40 psi, or the tubing would be expanded due to overpressure.

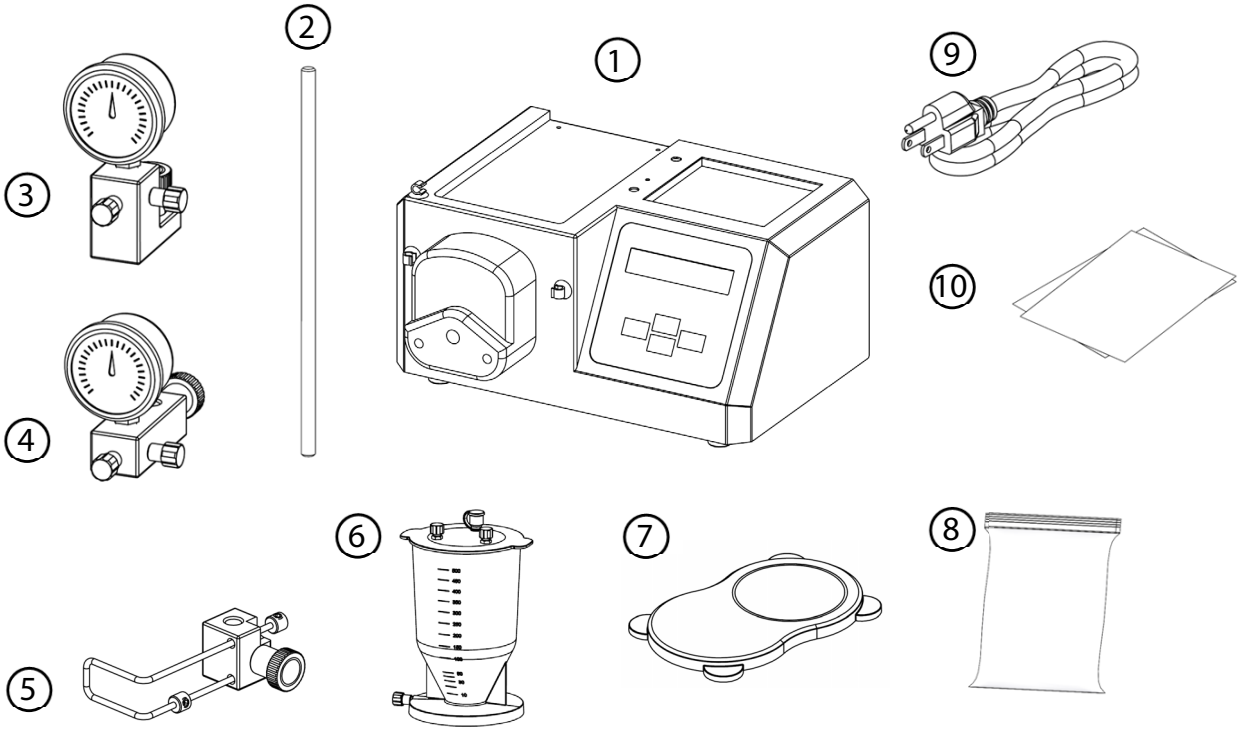
Please turn the instrument off and disconnect it from the main power before replacing the fuse.

Do NOT operate or place the instrument inside a refrigerator to prevent damage from condensation.

** Before operation, please check whether the compatibility of contact materials of instrument with sample solution.*

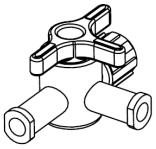
3. Unpacking

Please check if the package is complete without any damage before unpacking. When unpacking, please make sure you have all accessories that indicated on the list. If there is any problem, please keep the serial number along with packing case and contact your local distributor immediately for assistance.

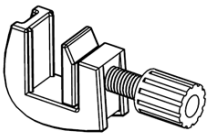


Model	Standard Package Includes:	
Tanfil 100	1	Tanfil 100, TFF System (Main Unit)
	2	Support Rod
	3	Feed Gauge Mounting Set
	4	Retentate Gauge Mounting Set
	5	Capsule Bracket Set
	6	Reservoir (Including Lid Kit)
	7	Magnetic Stirrer
	8	Fittings / Parts Bag
	9	Power Cord
	10	Instruction Manual

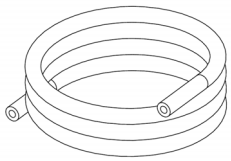
The following items are packed in Fittings / Parts Bag:



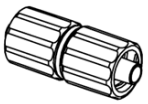
Three-Way Stopcock *4



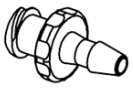
Screw Clamp
for Tubing *1



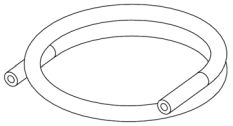
2 m Tube-ULTR-C *1
(translucent)



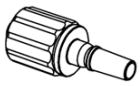
Male Luer Coupler *2



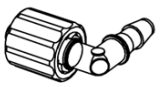
Female Luer Lock
- 1/8″ hose barb *2



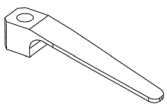
0.5 m Tube-Pharmed BPT *1
(opaque)



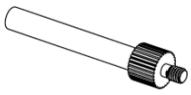
Male Luer Rotating Lock
- 1/8″ hose barb *9



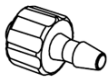
Male Luer Rotating Lock
- 1/8″ elbow hose barb *2



Spring Plate *2

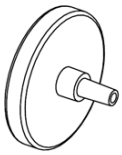


Rod of
Spring Plate *2



Male Luer Lock
- 1/8″ hose barb *4

Tubing
Clamps *14

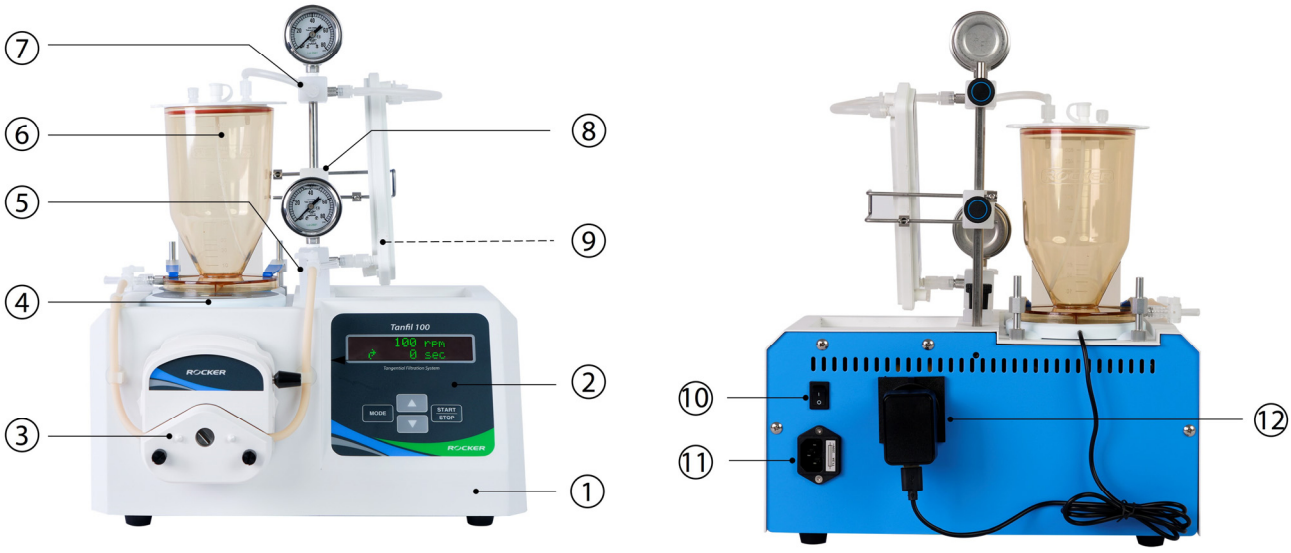


Disc Filter *1

Hex Wrench *1

4. Product Description

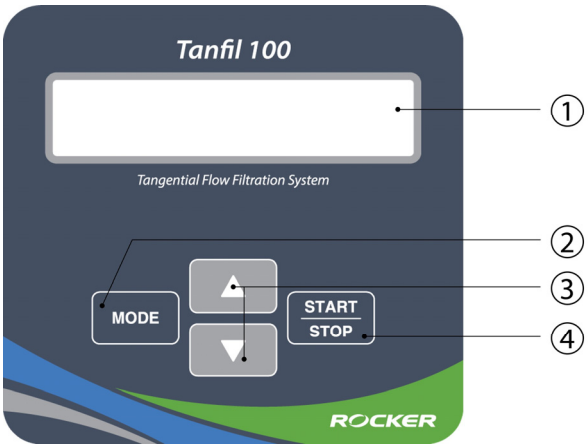
(1). Tanfil 100, TFF System



Position	Designation	Position	Designation
1	Main Unit	7	Retentate Gauge Mounting Set
2	Operation Panel	8	Capsule Bracket Set
3	Pump Head	9	Capsule / Cartridge (not included)
4	Magnetic Stirrer	10	Power Switch
5	Feed Gauge Mounting Set	11	AC Socket and Fuse Holder (Input)
6	Reservoir	12	AC Socket for Magnetic Stirrer (Output)

(2). Operation Panel

Position	Designation
1	Display
2	MODE Button
3	Up / Down Button
4	Start / Stop Button



(3). Parts Material List

Part	Material	Part	Material
Reservoir	PES	Gauge Wetted Parts	SS316
Reservoir Lid	PP	Gauge Mounting Block	PP
Reservoir O-ring	Silicon	Luer Fittings	SS316, PP
Magnetic Stir Bar	PTFE Coated	Luer Fitting O-ring	Silicone
Three-Way Stopcock	PC, POM	Tubing - ULTR-C	Platinum-Cured Silicone
		Tubing - Pharmed BPT	TPE*

* TPE: polypropylene-based thermoplastic elastomer (TPE)

5. Button / Symbol / Display Explication

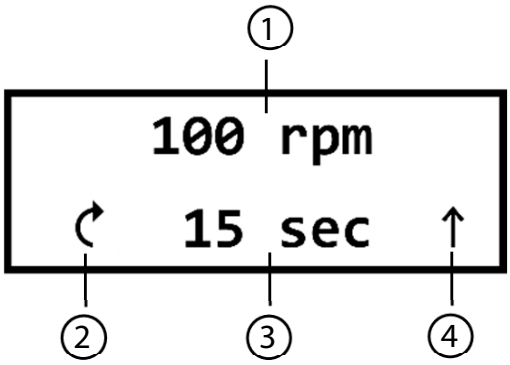
(1). Buttons

Buttons	Designation	Description
▲	Up Button	Change setting value. (Hold the button to change value continuously)
▼	Down Button	Change setting value. (Hold the button to change value continuously)
MODE	MODE Button	Switch setting parameters, such as rotational speed (rpm), time, pump head direction.
START **STOP**	START / STOP Button	Start or stop the operation. (Hold the button for cleaning mode at Max. rpm)

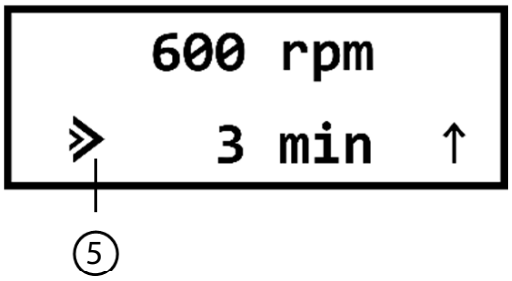
(2). Symbols

Symbols	Designation	Description
↑ / ↓	Type of Timer	Counter / Countdown Timer
↻ / ↺	Pump Head Direction	CW / CCW
≫ / ≪	Fast Clean Mode	Run at Maximum speed (600 rpm) with pump head direction (CW / CCW)

(3). Display



Running Mode



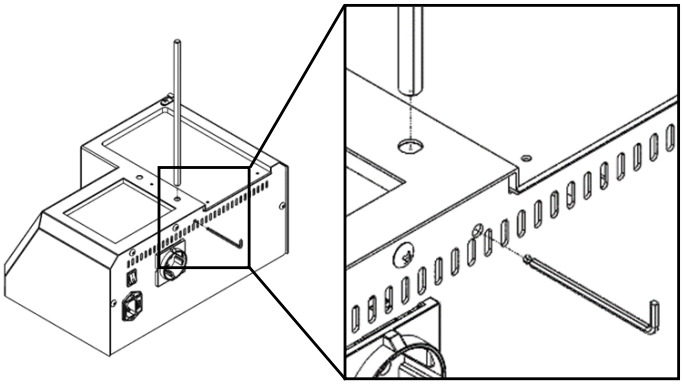
Fast Clean Mode

Position	Designation	Position	Designation
1	Rotational Speed (rpm)	4	Type of Timer
2	Pump Head Direction	5	Fast Clean Mode
3	Timer (sec, min)		

6. Installation

(1). Main Part

1.1 Support Rod



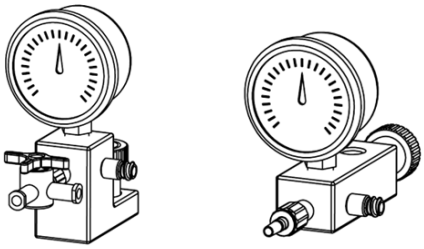
(A) Insert the support rod on the specified hole, ensuring the flat side of the rod faces the back side of main unit.

(B) Use provided hex wrench (2.5 mm) to loosen the screw located in the back plate of main unit. (see above diagram)

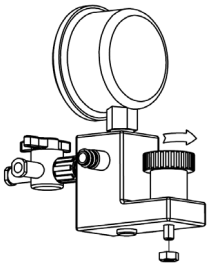
(C) Once the support rod touches bottom, securely fasten by screwing it back in.

1.2 Gauge Mounting Set

Feed Retentate



Installed Feed and Retentate Gauge Sets



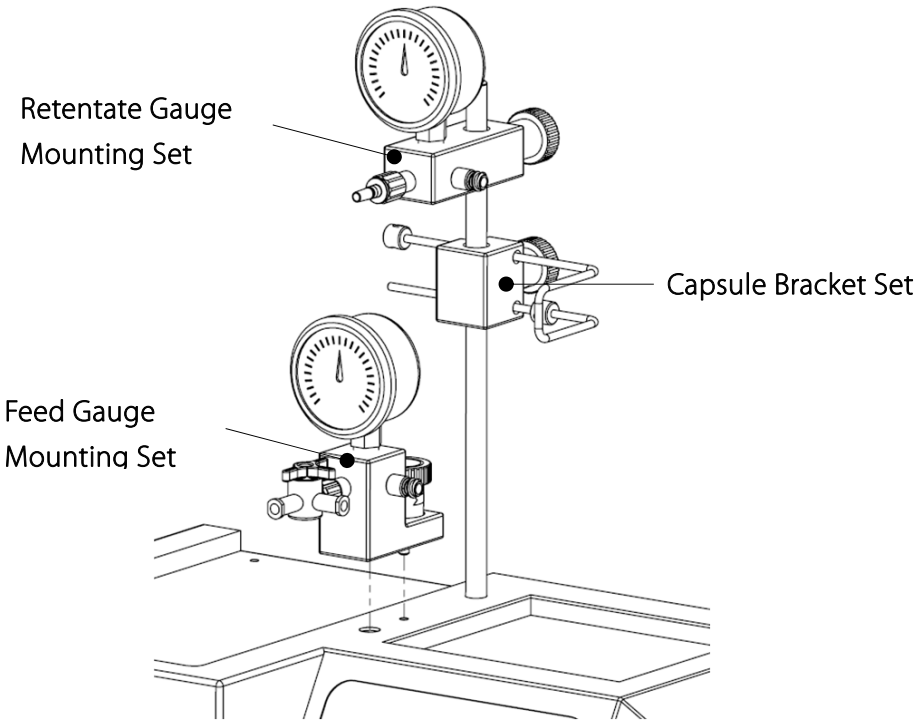
Nut Removal of Feed Gauge Mounting Set

(A) Remove all male luer plugs from both the feed and retentate gauge mounting sets and install the three-way stopcock and male luer rotating lock - 1/8" hose barb as shown above.

- Install the three-way stopcock on the front of the retentate set if necessary.

(B) Remove the nut beneath the thumb screw of feed gauge mounting set.

- It's easier to remove the nut by fixing it and rotating the thumb screw.

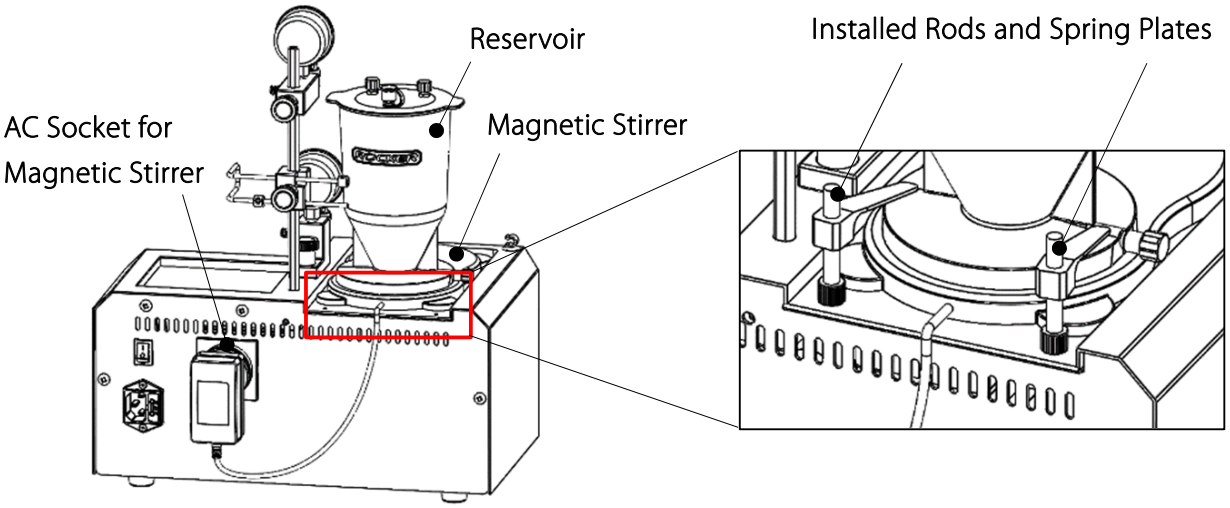


(C) Ensure the gauge faces forward, then install the feed gauge mounting set by aligning the pin with the hole on the case and securing it by fastening the thumb screw.

(D) Install the capsule bracket set through the support rod first and secure it by fastening the thumb screw.

(E) Install the retentate gauge mounting set through the support rod with gauge facing forward, and secure it on the upper side of the support rod by fastening the thumb screw.

1.3 Magnetic Stirrer and Reservoir



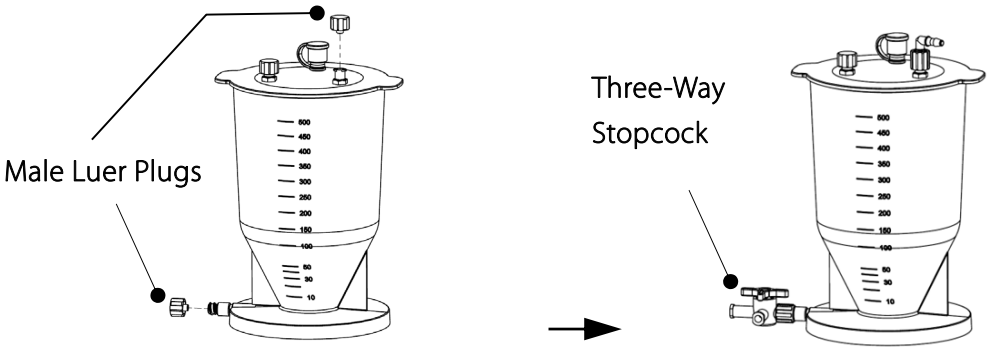
(A) Position the magnetic stirrer into the left compartment of the main unit, and plug its adaptor into the AC socket at the back of the main unit labeled "Max. 5W".

(B) Set the reservoir on the magnetic stirrer with outlet toward left side of the main unit.

- To optimize stir bar performance, ensure the reservoir is centered on the magnetic stirrer.

(C) Screw the 2 rods of spring plate into threaded holes at rear of the left compartment, then press spring plate through the rods until the reservoir is securely fixed.

1.4 Luer Fittings and Tubing



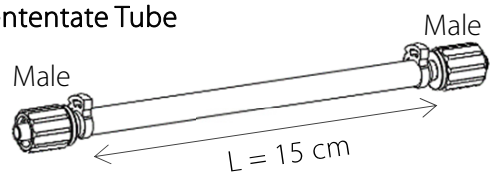
(A) Remove a male luer plug from outlet of the reservoir and install a three-way stopcock onto it.

(B) Remove a male luer plug from lid of the reservoir.

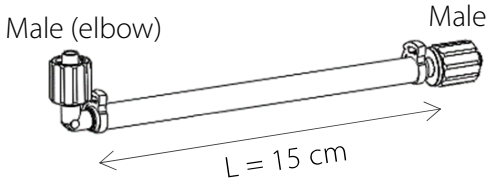
- General operation can be performed without the lid kit by placing the concentrate tube directly into the reservoir.
- If performing diafiltration, place the lid onto reservoir and connect 2 fittings simultaneously.

See p.19 (4). 4.1 Diafiltration.

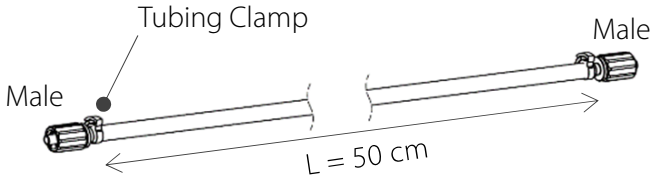
Rententate Tube



Concentrate Tube



Pump Tube



Male: Male Luer Rotating Lock - 1/8" hose barb
Male (elbow): Male Luer Rotating Lock - 1/8" elbow hose barb

- Install a tubing clamp over each tubing connected to the hose barb. Tighten clamp by pinching it.

(C) Cut 2 pieces of ULTR-C tubing (translucent) as retentate and concentrate tubes, and install fittings as shown above.

- If performing without lid kit, cut concentrate tube to appropriate length to reach the reservoir and do not install the male (elbow) fitting on the reservoir side.

(D) Use Pharmed BPT tubing (opaque) as pump tube and install fittings as shown above.

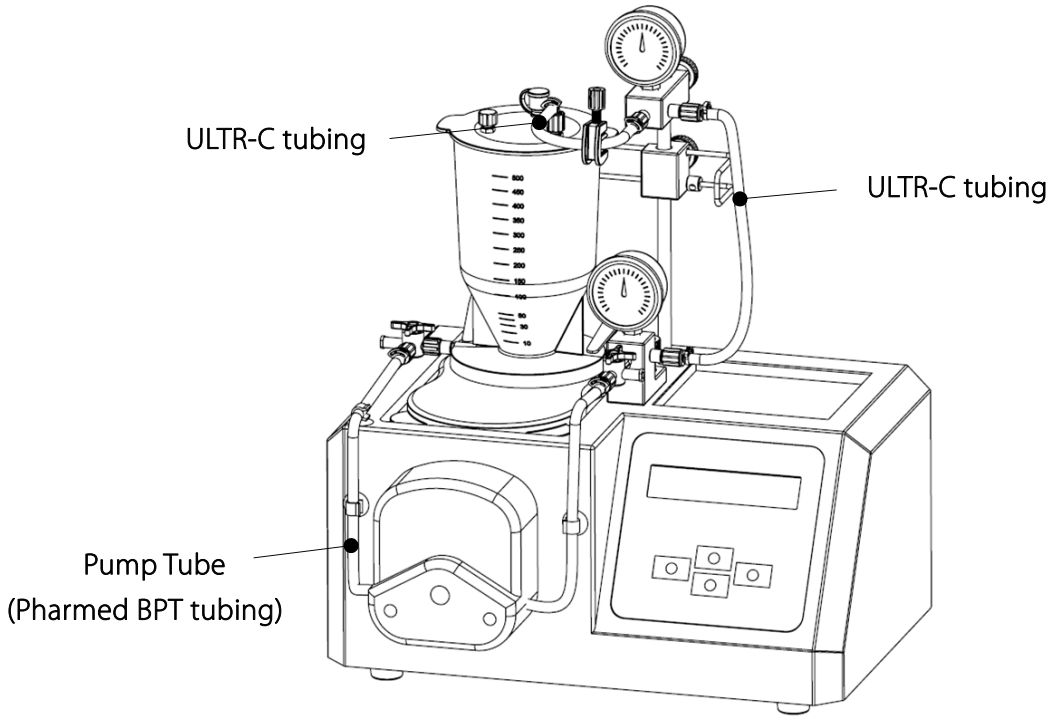
(E) Connect Pharmed BPT tubing (opaque) to three-way stopcocks at reservoir outlet and feed gauge mounting set.

(F) Insert pump tube into open pump head and close pump head onto tubing.

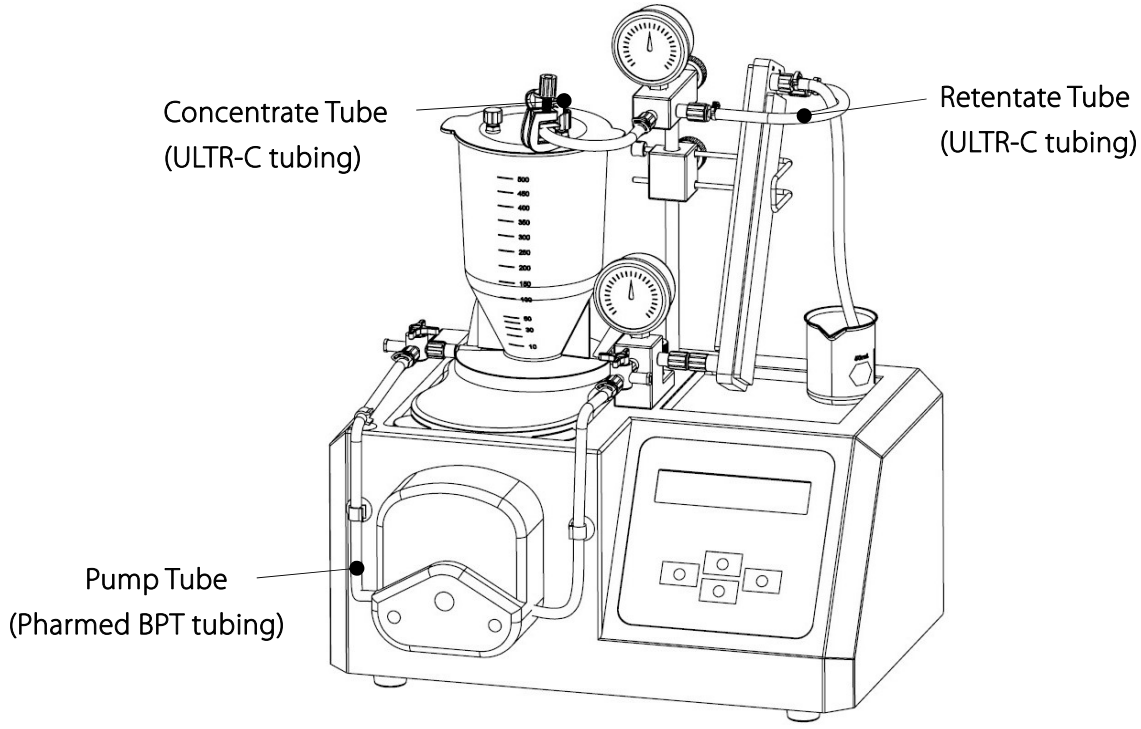
- Pump tube can be clipped into the white clamp on the main unit to avoid shaking during operation.

(G) Connect all tubing and capsule as show below.

(H) If draining the residual liquid in system, cut ULTR-C tubing (translucent) to appropriate length and connect it to one of the three-way stopcocks with a hose barb. See p.21 (5) Draining.

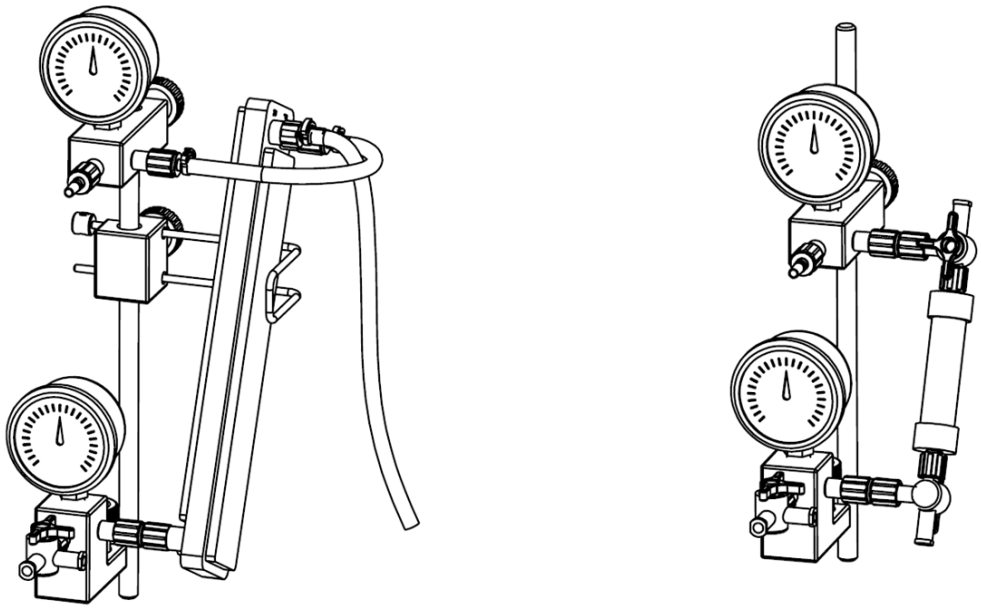


System Without Capsule



System With Capsule

(2). Capsules (or Cartridges)



Example of connecting capsule and cartridge

Left: Pall Minimate™ Capsule, Right: HansaBioMed TFF Cartridge

(A) Remove the caps from both the feed and retentate ports of capsule.

- Please keep all caps for storage of capsule or cartridge.

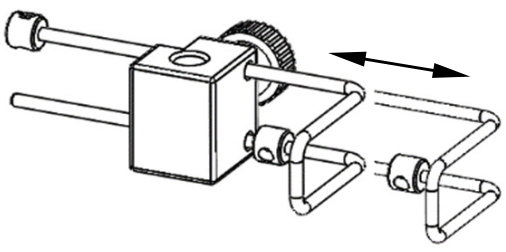
(B) Connect the feed port of capsule to the side of feed gauge mounting set using the provided luer fittings (and tubing).

(C) Connect the retentate port of capsule to the side of retentate gauge mounting set using the provided luer fittings (and tubing).

- During operation, ensure all tubing is as short as possible to minimize the residual volume in the system.
- A screw clamp can be clamped on concentrate tube to adjust the pressure and filtrate flow.

(D) Remove one of the filtrate caps of the capsule and attach a male or female luer lock – 1/8" hose barb on it.

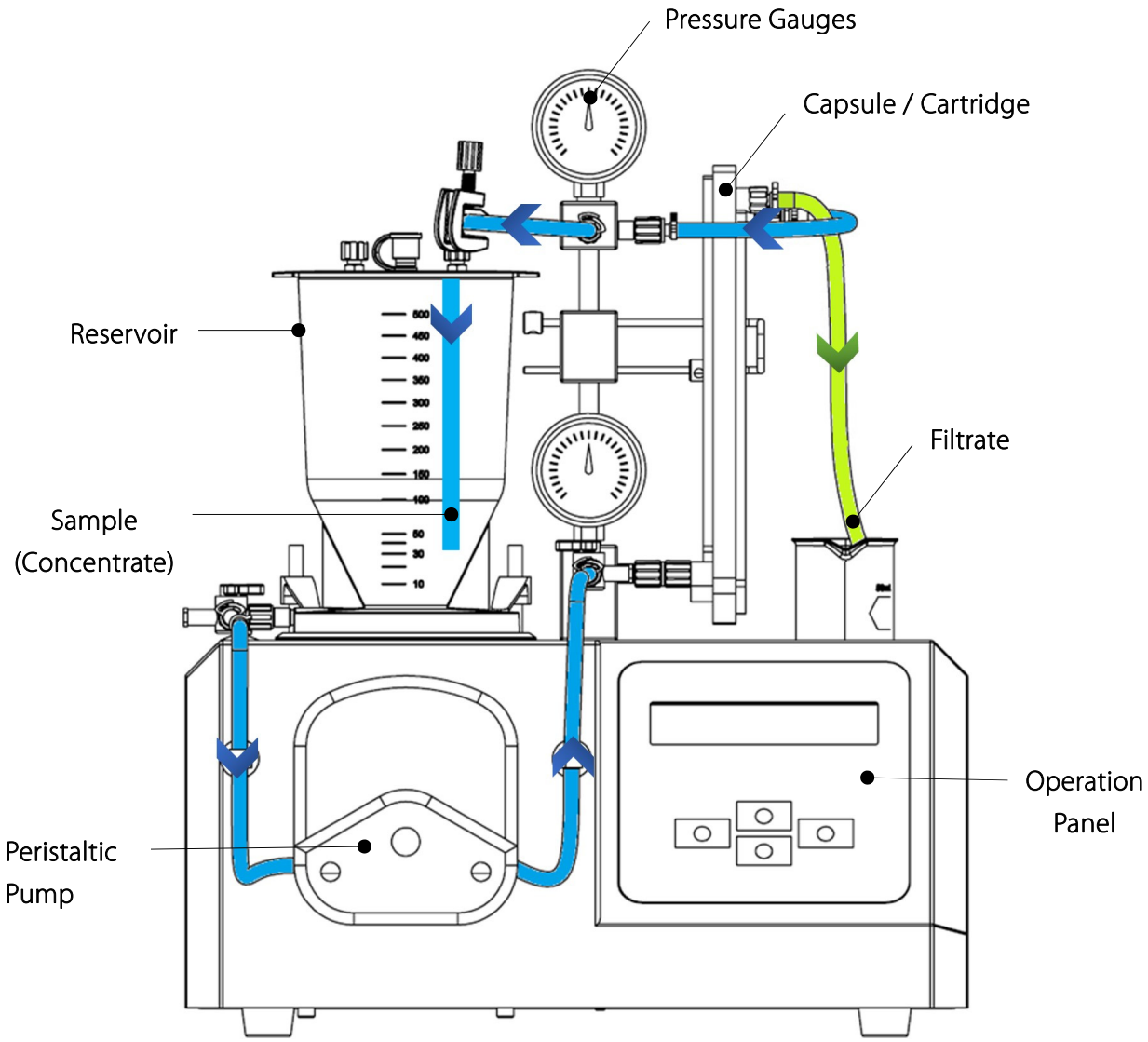
(E) Attach a piece of ULTR-C silicone tubing to filtrate hose barb and place the other end in the filtrate collecting vessel.



(F) Adjust capsule bracket set to appropriate position to hold the capsule.

- The rings on bracket can be adjusted by loosening screw with a hex wrench (2.5mm).

(3). Typical Set up of TFF System



7. Operation

(1). Important Notice Before Starting

There are several procedures during operation, please follow the instruction for system set up. The recommended operational details and parameters may vary based on the specific capsules and cartridges; therefore, refer to the manufacture's instructions for proper handling.

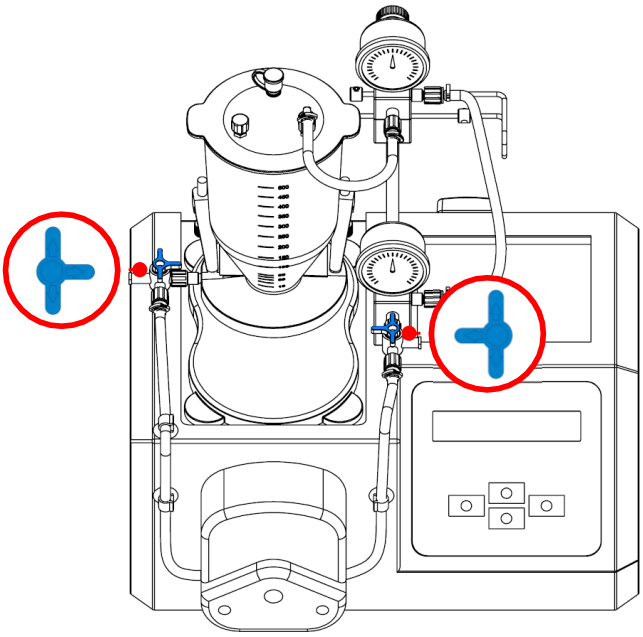
- Confirm all fittings and tubing are securely connected without any leaks before running liquid.
- When using new tubing, work with a break-in period to prevent tubing splits and ensure stable flow rates, refer to p.17 (2) Tubing Break-in Procedure.
- Load the tubing onto the center of pump head's rotor to prevent inappropriate wear or premature rupture.
- Open the pump head when not in operation to prevent the tubing from remaining in a deformed state and optimize its performance lifetime.
- While operating with the lid kit sealed on reservoir, please open a port and/or attach a disc filter to it.

The general procedure is outlined below, but the actual process may vary depending on whether a capsule or cartridge is being used.

Refer to		Step 1	Step 2	Step 3	Step 4	Step 5
p.18	(3) Cleaning and Flushing	V	V			V
p.19	(4). Sample Concentration, Purification, or Diafiltration			V		
p.21	(5). Draining	V	V		V	V

(2). Tubing Break-in Procedure

Performing the tubing break-in procedure is highly recommend while using new Pharmed BPT tubing (opaque) or peristaltic tubing. This process enhances tubing flexibility and elasticity, preventing damage and sample loss. Please ensure to break the tubing in before running the sample.



(A) Install the Tanfil 100 main unit and tubing as instructed in Chapter 6. Installation, without attaching a capsule or cartridge. The system setup for break-in procedure is shown above.

(B) Pump the system and recirculate with water at maximum rpm for 15 to 20 minutes.

(C) After the break-in period, drain the system by running water into waste vessel.

(D) Open the pump head and examine the tubing for completeness without damage.

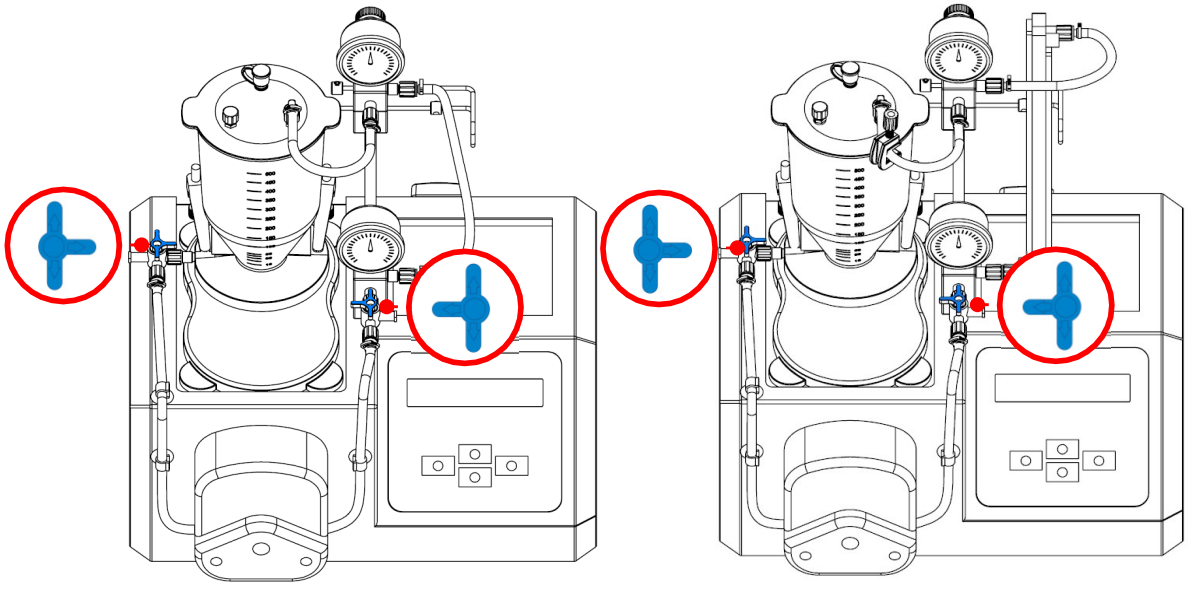
(E) Reload the tubing, close the pump head, and it's ready for next procedure.

- Ensure the tubing is loaded onto the center of pump head's rotor to prevent inappropriate wear or premature rupture.

(3). Cleaning and Flushing

Cleaning the system without attaching the capsule is recommend for the first use or when idle for an extended period. Follow the setup outlined in this section for all the cleaning and flushing procedures.

- For cleaning the system, connect both gauge mounting sets with ULTR-C tubing (translucent).
- For cleaning the capsule or cartridge, connect it to the system as instructed on p.14 Capsules (or Cartridges).
- Refer to the manufacture's instructions of the cleaning solution for the capsule.
- If the cleaning solution becomes dirty, please promptly replace it with a new buffer and repeat the cleaning cycle to maintain optimal cleaning effectiveness.



System Cleaning

Capsule Cleaning

(A) Install the Tanfil 100 main unit and tubing as instructed in Chapter 6. Installation, and adjust the three-way stopcocks as shown above.

(B) Fill the reservoir with 250 mL of purified and filtered water and recirculate for 15 minutes.

- 0.1 N Sodium Hydroxide (NaOH) at 35~45 °C can be used to sanitize the system.
- The cleaning solution at 35~45 °C can enhance the cleaning effectiveness.

(C) Adjust the three-way stopcocks as instructed on p. 21 (5) Draining, then pump the cleaning solution to waste.

- If the capsule or cartridge does not allow air to run into it, discount them before the draining step or until the solution level drops to the bottom of reservoir.

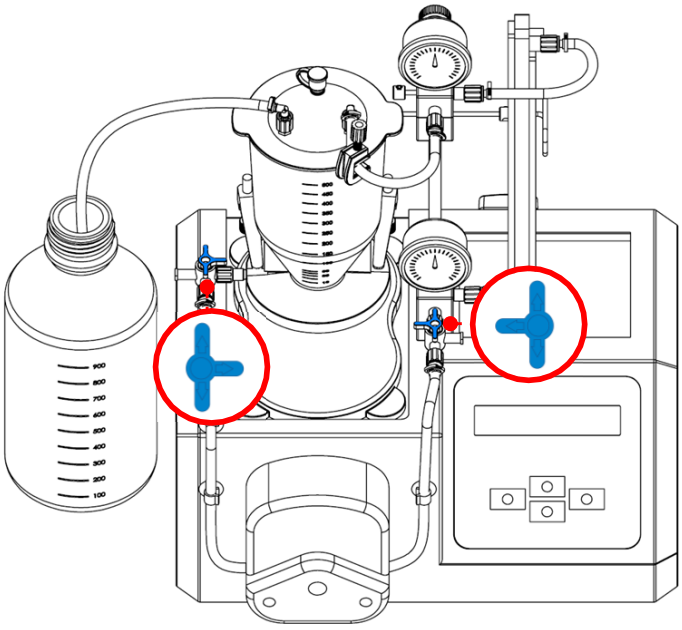
(4). Sample Concentration, Purification, or Diafiltration

Repeat the setup and instructions on p.18 (3) Cleaning and Flushing, but substitute the sample liquid for purified water or cleaning solution.

- A screw clamp can be clamped on concentrate tube to adjust the pressure and filtrate flow.
- Refer to the manufacture's instructions for operating parameters of capsules, such as pressure.

4.1 Diafiltration

The lid kit of reservoir is necessary for continuous diafiltration. The common application of diafiltration includes desalting and buffer exchange.



(A) Place and seal the lid kit onto the reservoir, and remove the male luer plug from lid.

(B) Attach the hose barb fittings (male luer rotating lock - 1/8" elbow hose barb * 2) to lid.

(C) Connect a ULTR-C tubing (translucent) from the hose barbs on lid to the hose barb on the retentate gauge mounting set.

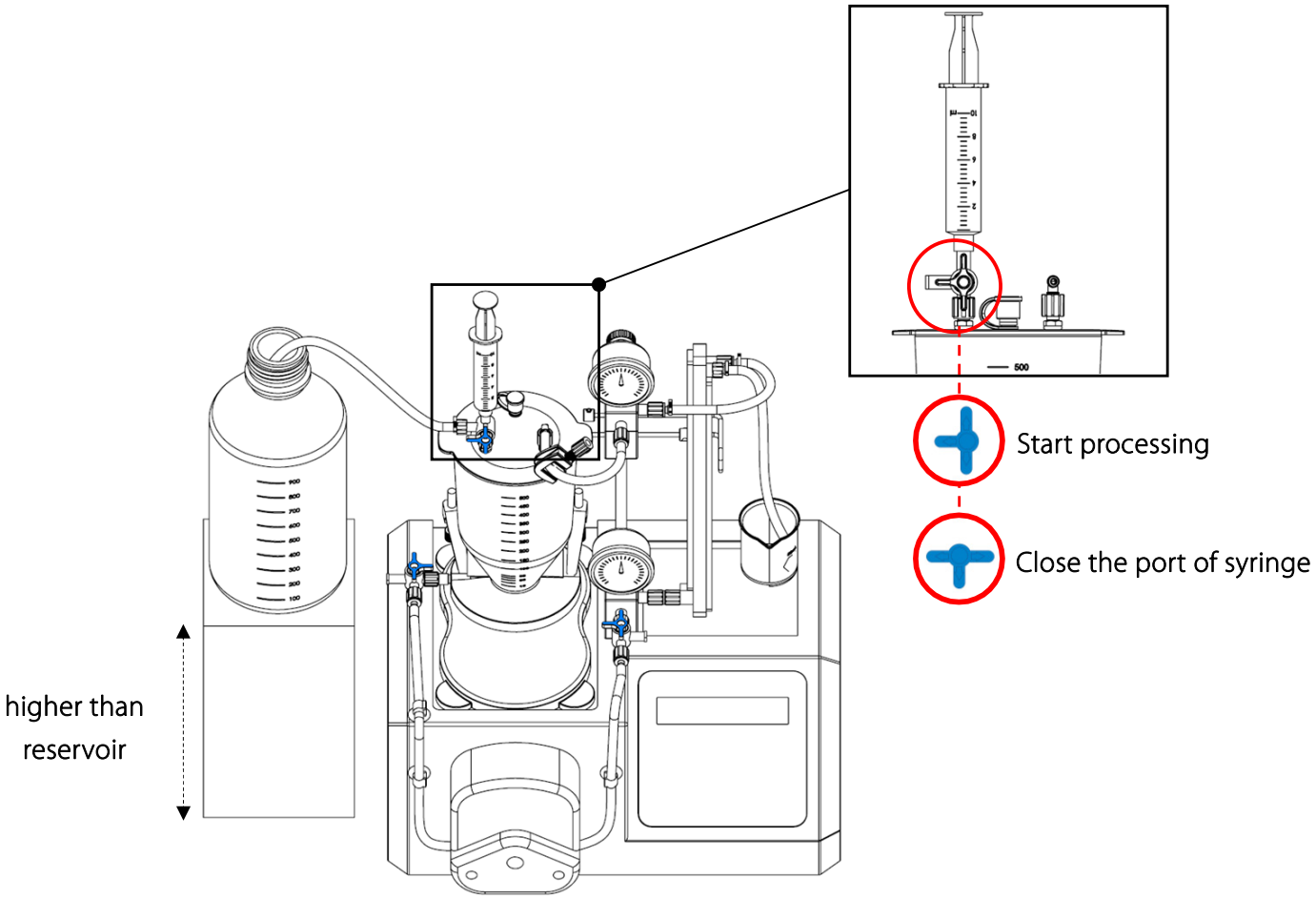
(D) Connect a ULTR-C tubing (translucent) to another hose barb on lid and place another end of tubing in a vessel filled with a buffer solution.

- During diafiltration, please close the left port on the lid to ensure a complete seal.

(E) Adjust the direction of three-way stopcocks as instructed on p.18 (3) Cleaning and Flushing and start the processing.

4.2 Continuous Diafiltration for Small MWCO Membranes or Low Filtration Speed

For situations where filtration speed is extremely slow, such as when using a small MWCO membrane or if partial membrane blockage occurs, please follow the steps below to facilitate continuous diafiltration.



(A) Attach a three-way stopcock to the lid of the reservoir and ensure the third port is sealed.

(B) Elevate the vessel filled with buffer solution until it is positioned higher than the reservoir to enhance the process.

(C) Attach a syringe to the top port of stopcock and connect the side port to a tube leading to a vessel filled with buffer solution.

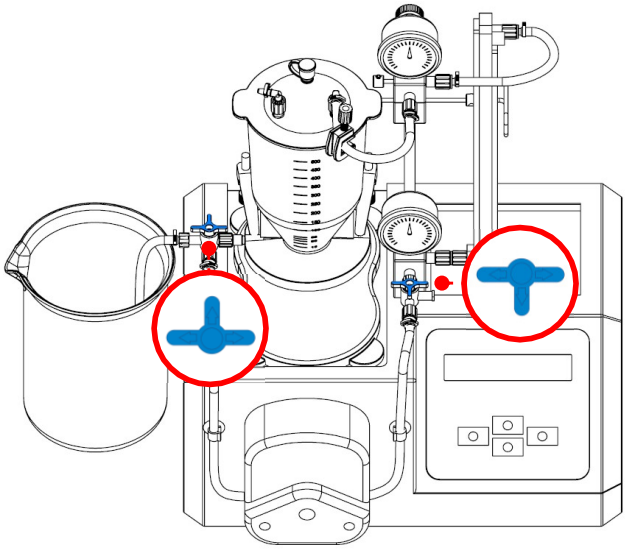
(D) Adjust the direction of stopcock as instructed on diagram and start processing. Use the syringe to create a vacuum, allowing buffer solution to be drawn from the vessel into the reservoir, ensuring a continuous flow.

(E) Adjust the direction of stopcock again to close the port connected to the syringe, then remove the syringe if needed.

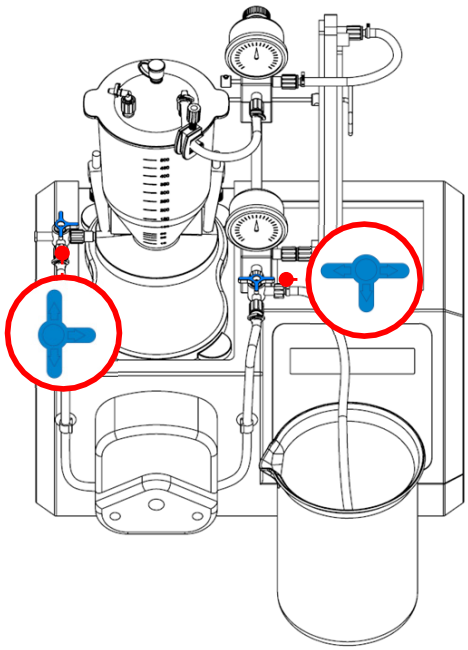
(5). Draining

Draining is used to remove the liquid from the system, such as cleaning solution or sample liquid. Therefore, it always follows the cleaning, concentration, or diafiltration procedure. Two different setups for draining are available: by gravity or by pump. Follow the setup outlined in this section for the desired method.

◆ If the capsule or cartridge does not allow air to run into it, discount them before the draining step or until the solution level drops to the bottom of reservoir.



Drain by Gravity



Drain by Pump

5.1 Drain by Gravity

(A) Attach a hose barb fitting (Male Luer Lock - 1/8" hose barb) to the three-way stopcocks at the outlet of the reservoir.

(B) Connect a ULTR-C tubing (translucent) to hose barb and place another end of tubing in a vessel.

(C) Adjust the three-way stopcock at outlet of the reservoir toward the direction of hose barb. The solution should now drain by gravity.

- While operating with the lid kit sealed on reservoir, please open a port and/or attach a disc filter to it.

5.2 Drain by Pump

(A) Attach a hose barb fitting (Male Luer Lock - 1/8" hose barb) to the three-way stopcocks at the front of feed gauge mounting set.

(B) Connect a ULTR-C tubing (translucent) to hose barb and put the other end of tubing in a vessel.

(C) Adjust the three-way stopcock at outlet of the reservoir toward direction of hose barb.

(D) Start pumping to eliminate the solution.

- While operating with the lid kit sealed on reservoir, please open a port and/or attach a disc filter to it.

8. Maintenance

1. Please operate the instrument in a well-ventilated area and keep it clean. Ensure to unplug it before cleaning.
2. The instrument is not autoclavable. Please clean the surface by pure water or 75% ethanol.
3. Open the pump head when not in operation to prevent the tubing from remaining in a deformed state and optimize its performance lifetime.
4. If there's any solution drop or splash to instrument, please switch off and unplug it immediately and clean the surface to prevent damage from penetration or corrosion.
5. If fuse blows, please troubleshoot and solve problems first. When replace fuse, get the spare fuse from the fuse holder by a flathead screwdriver.
6. O-ring(s), tubing, and disc filter are consumables, it is recommended to replace them on a yearly basis or as needed to ensure good operation. As for peristaltic tubing, follow tubing manufacture's recommended replacement interval.

9. Troubleshooting

Problem	Reason and Solution
Abnormal Display	• Loose plug → Reconnect plug to power supply. • Burnt fuse → Replace with a new fuse. • Display or components failure → Contact distributor for assistance.
Motor Shutdown	• Pump module overload → Slow down speed, release screw clamp, then restart the instrument.
No Stir with Magnetic Stirrer	• Loose plug → Reconnect plug to power supply on back plate. • Disorder of magnetic stirrer → Contact distributor for assistance.
Expansion of Silicone Tube	• Overpressure of silicone tube → Slow down speed, release screw clamp, then replace with a new silicone tube. • Capsule block → Replace with a new capsule.

10. Ordering Information

184100-01(02)	Tanfil 100, Tangential Flow Filtration System, AC100-240V, 50/60Hz, US plug (EU plug)
203100-01(02)	MS 100, Low Profile Magnetic Stirrer, AC100-240V, 50/60Hz, US plug (EU plug)
203100-10	PTFE Magnetic Stirring Bar, Ø 3.6 x 25 mm
184100-40	Reservoir Set
184100-62	Tanfil 100 Repair Kit
184100-47	TYGON®, Sani-Tech® Ultra-C Platinum-cured Silicone Tubing, ID 1/8" x OD 1/4", 50 ft
184100-48	Pharmed® BPT Tubing, ID 1/8" x OD 1/4", 25 ft

Pall, Minimate™ TFF Capsule

HansaBioMed, TFF Hollow Fibers

• Optional Capsules / Cartridges

PALOA001C12	Pall, 1K Minimate™ TFF Capsule with OMEGA membrane (1/pkg)
PALOA003C12	Pall, 3K Minimate™ TFF Capsule with OMEGA membrane (1/pkg)
PALOA005C12	Pall, 5K Minimate™ TFF Capsule with OMEGA membrane (1/pkg)
PALOA010C12	Pall, 10K Minimate™ TFF Capsule with OMEGA membrane (1/pkg)
PALOA030C12	Pall, 30K Minimate™ TFF Capsule with OMEGA membrane (1/pkg)
PALOA050C12	Pall, 50K Minimate™ TFF Capsule with OMEGA membrane (1/pkg)
PALOA070C12	Pall, 70K Minimate™ TFF Capsule with OMEGA membrane (1/pkg)
PALOA100C12	Pall, 100K Minimate™ TFF Capsule with OMEGA membrane (1/pkg)
PALOA300C12	Pall, 300K Minimate™ TFF Capsule with OMEGA membrane (1/pkg)
PALOA500C12	Pall, 500K Minimate™ TFF Capsule with OMEGA membrane (1/pkg)
PALOA990C12	Pall, 1000K Minimate™ TFF Capsule with OMEGA membrane (1/pkg)
HBM-TFF1	HansaBioMed, TFF-Easy Polysulfone hollow fibers, 5 nm (1/pkg)
HBM-TFFMV	HansaBioMed, TFF-MV Polysulfone hollow fibers, 200 nm (1/pkg)
HBM-TFFEVS-S	HansaBioMed, TFF-EVs Polyethersulfone hollow fibers, 50 ± 10 nm (1/pkg)

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