

26/06/2018

CDL

USER MANUAL

HOBBY 100 GPH REVERSE OSMOSIS



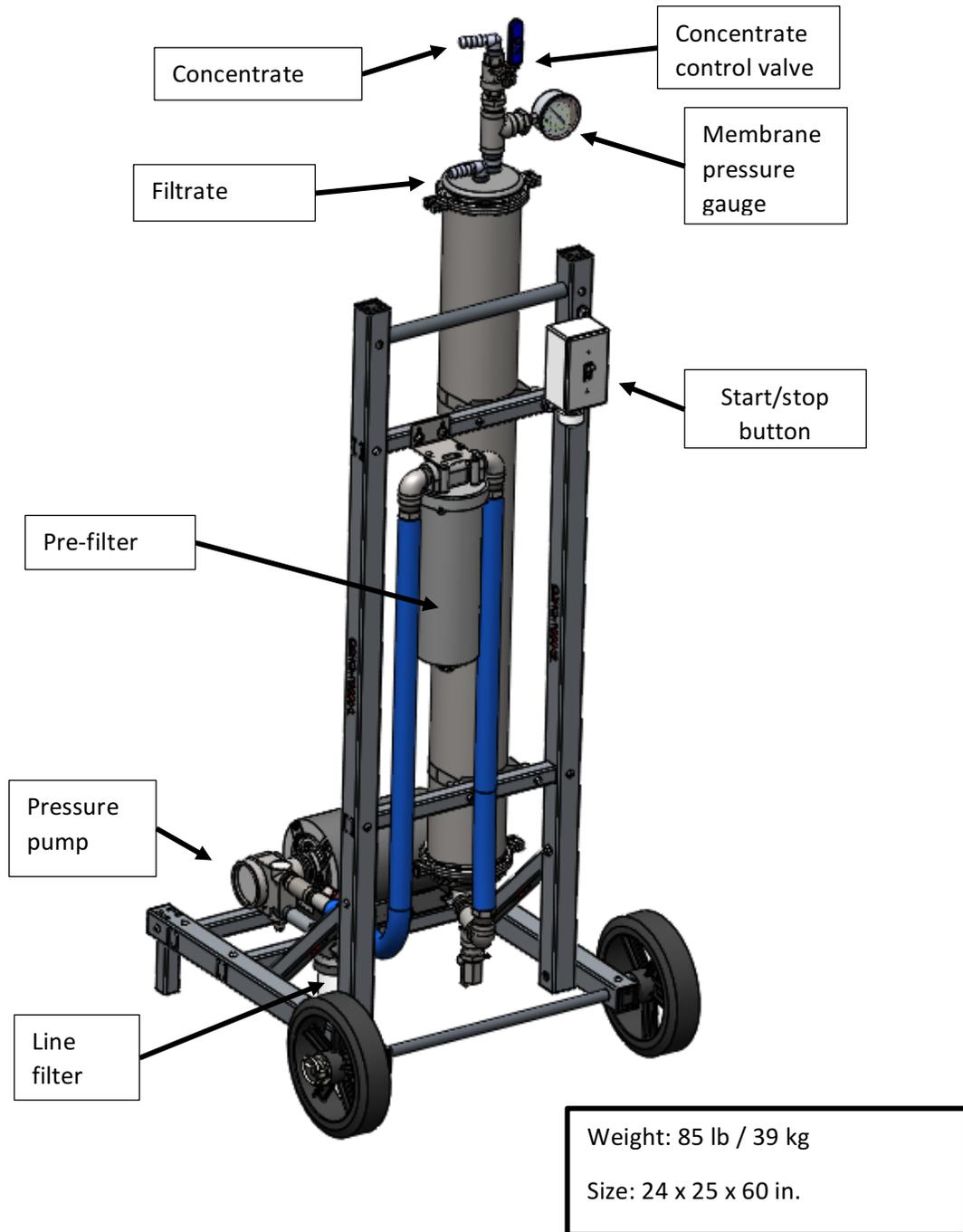
Thank you for purchasing a CDL Hobby reverse osmosis system. This document will help you make the most of your product.

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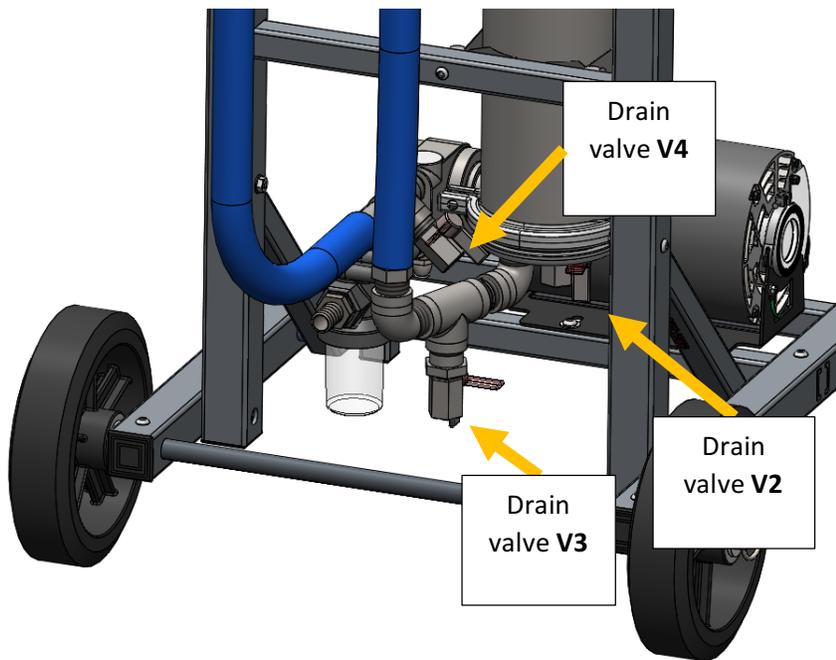
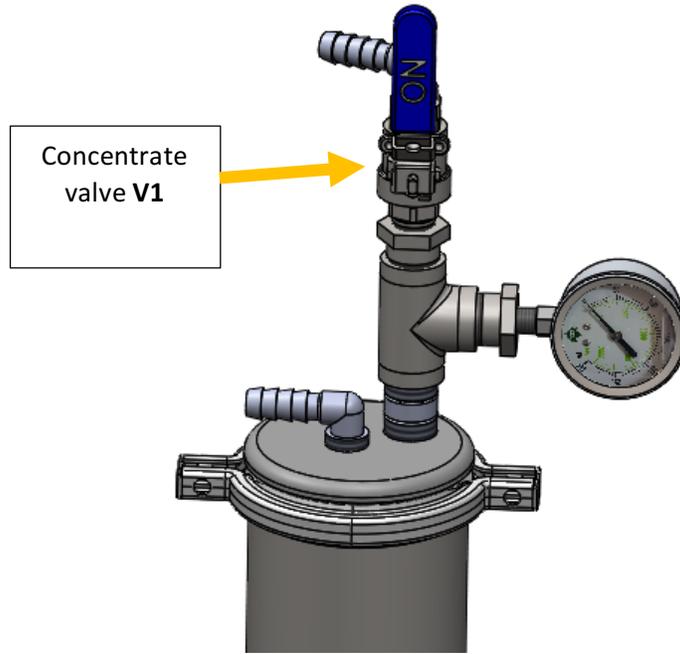
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Product diagram



Valve locations



Definition

Sap: Liquid that comes from a maple tree. Generally, this water contains around 2% sugar and mineral salts.

Filtrate: Pure water that no longer contains sugar. It is created when it runs through a membrane in the reverse osmosis (RO) system. It is used to wash the machine.

Concentrate: Sugar water obtained after sap has run through the RO system, removing the pure water.

Pressure pump: Pump that uses pressure to push the sap through the membranes.

Line filter: Filter at the entrance of the feed pump that prevents debris from entering the pump.

Pre-filter: Filter that sits before the membranes and prevents debris from entering the system and the recirculation pump.

Concentrate valve: Valve that controls the flow of the concentrate exiting the system.

Safety

It is important to read this document before using the reverse osmosis system. It contains information on how to use the system safely. Misuse can be dangerous for the user because of the system's working pressure.

Inspection

Perform a quick visual inspection once you receive the system to check for breaks or anomalies. Inspect it again before each use.

Installation

Ensure that the RO system is installed according to the requirements below. The product's lifespan may be shortened if its installation does not follow CDL's recommendations.

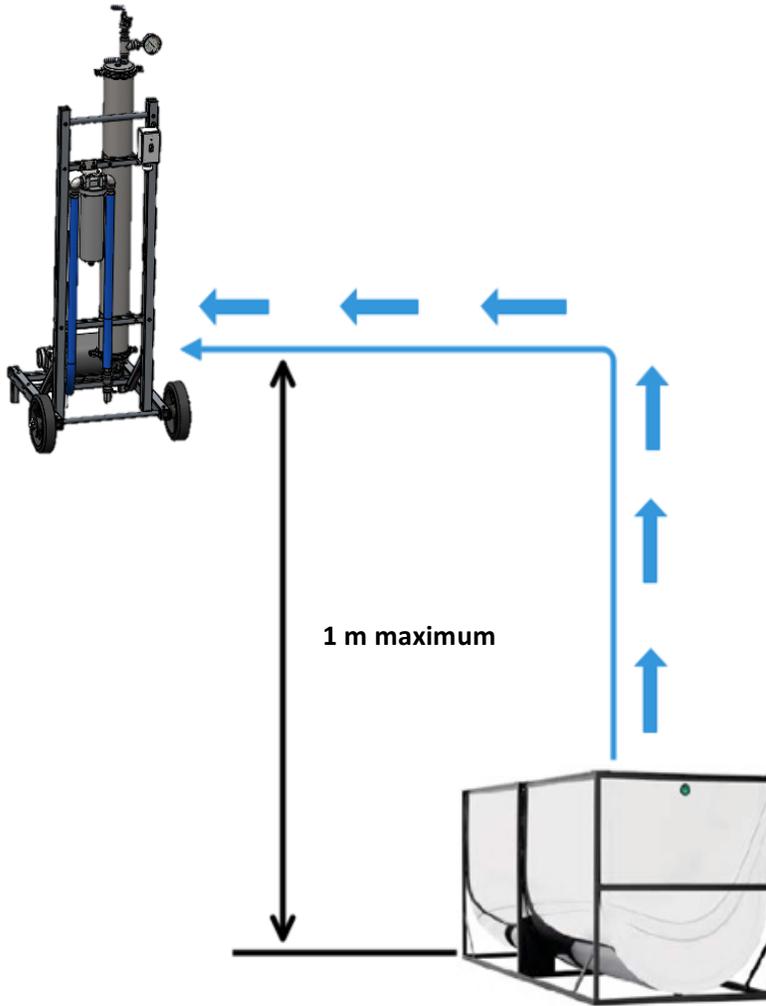
Electrical

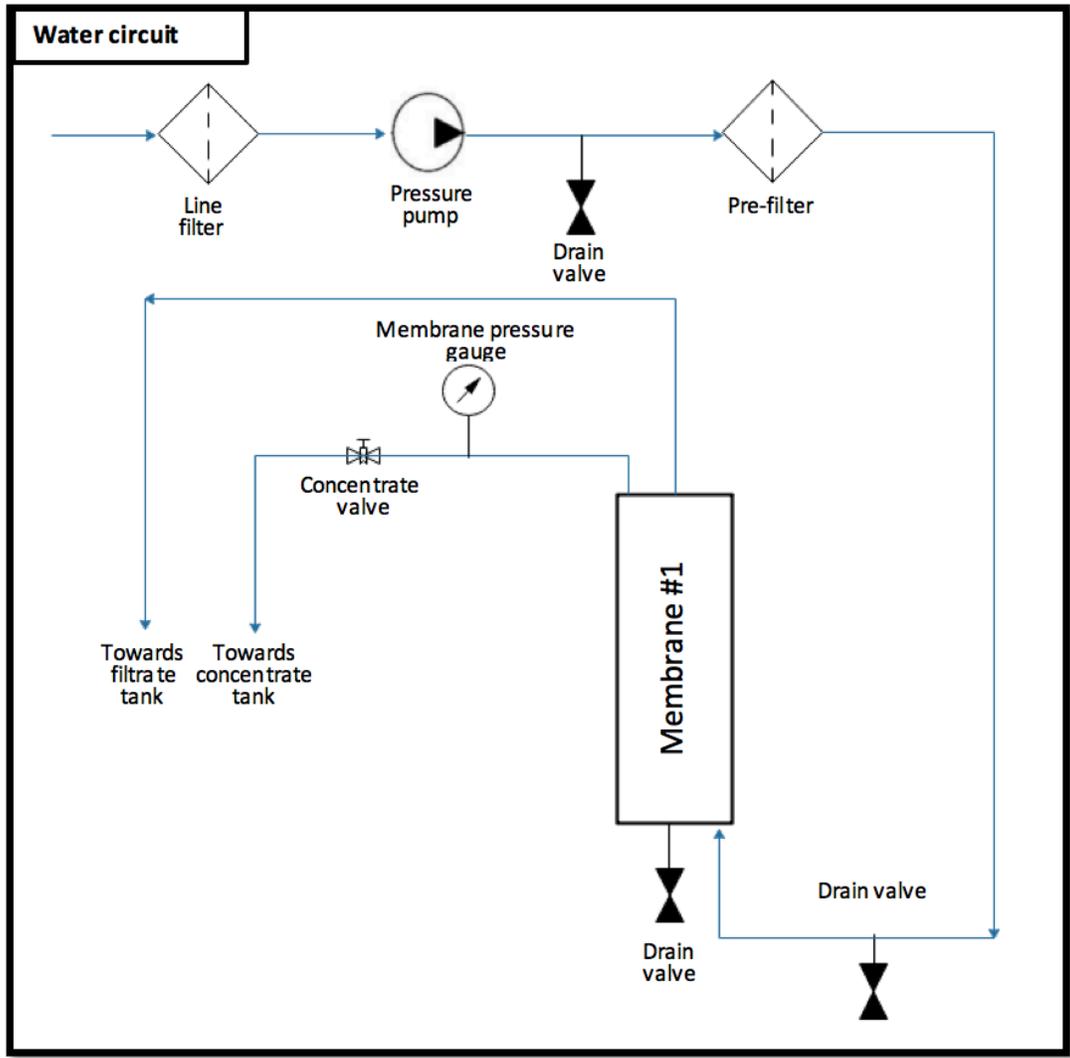
The machine must be plugged into a 110 V single-phase outlet. **If an extension cord must be used, it must be at least 14 AWG.** An extension cord that is too long or that has too high of a gauge may overload the motors. Overloading may cause the motors to overheat and break.

Plumbing

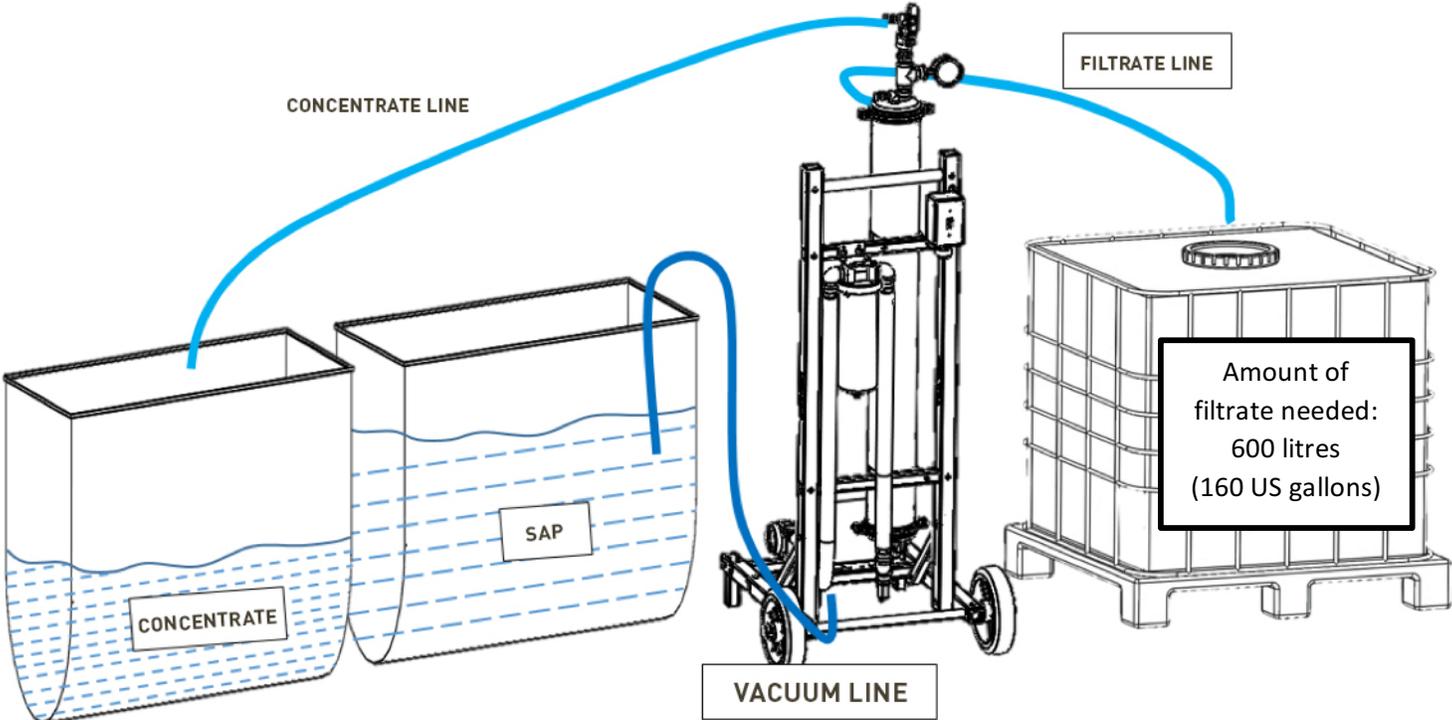
The system contains an 8-foot suction line. **Do not extend this line. If it is extended, the pump may run dry for too long upon starting, which may damage internal parts.** To prevent bubbles from forming in the feed pump, do not place the pump more than 1 m above the bottom of the tank.



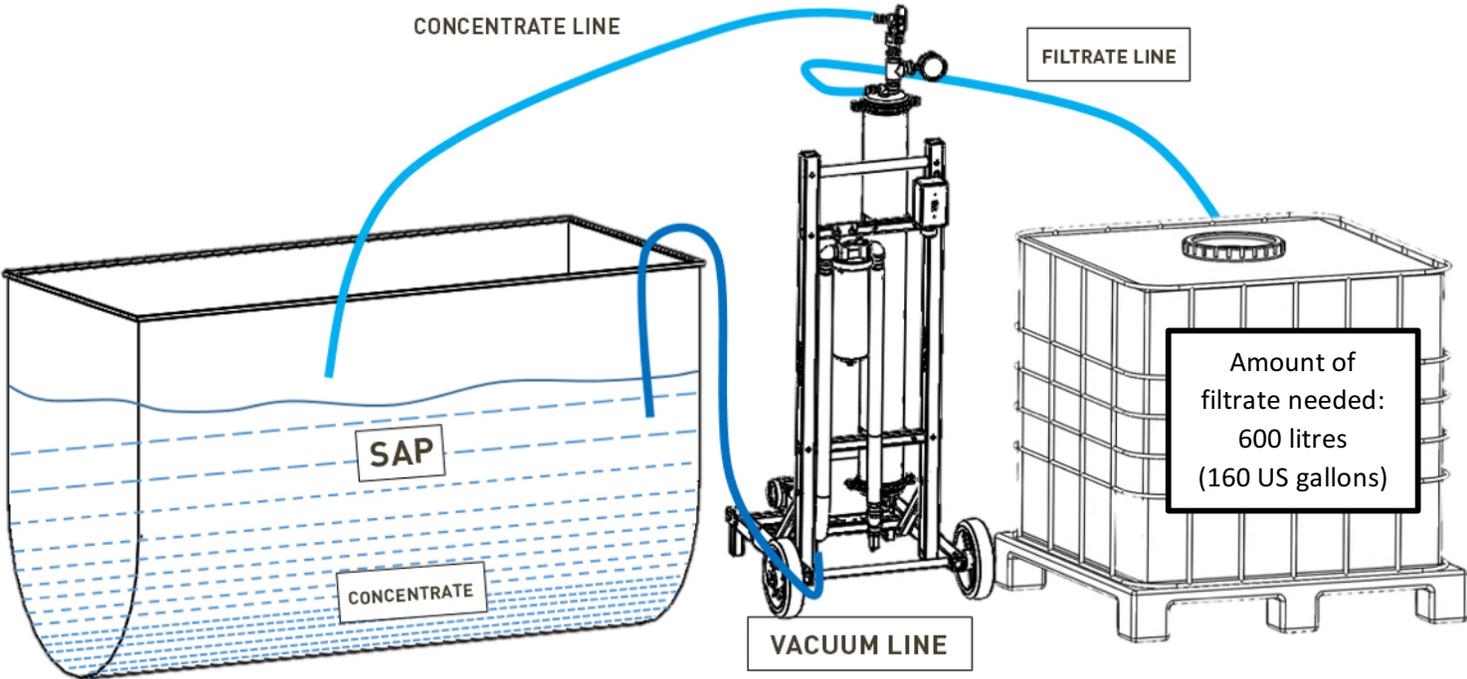




Standard concentration

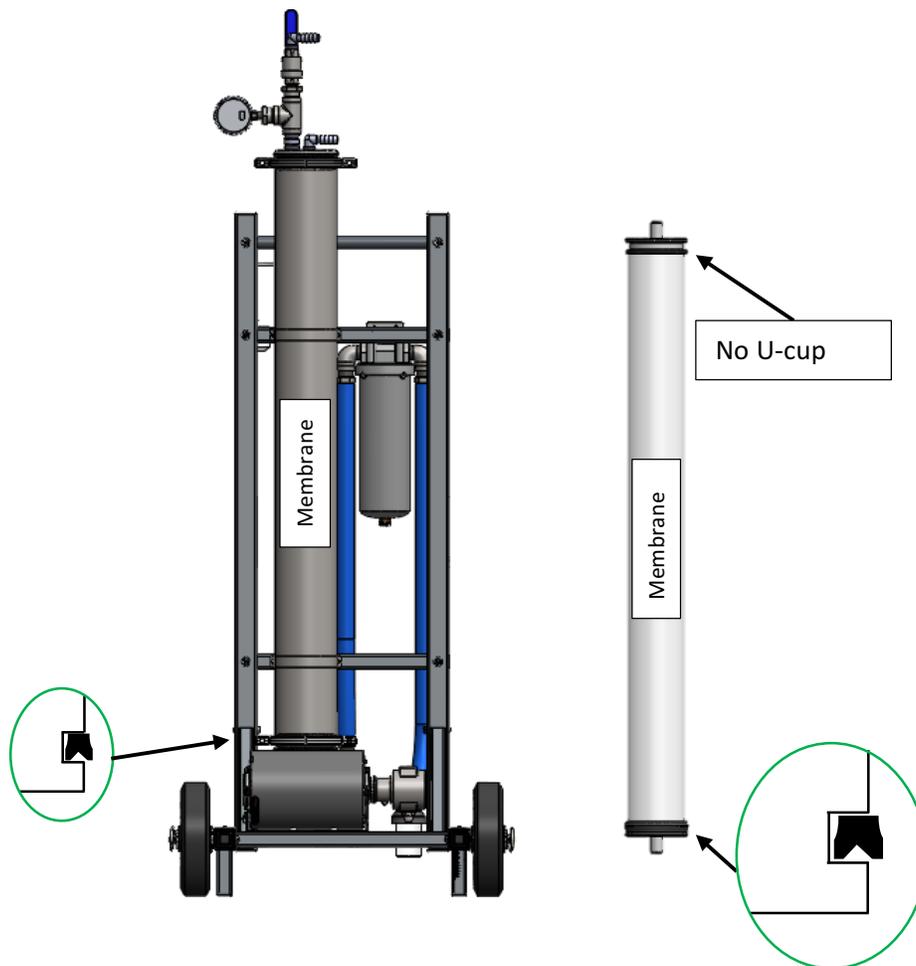


Batch concentration (sparging)

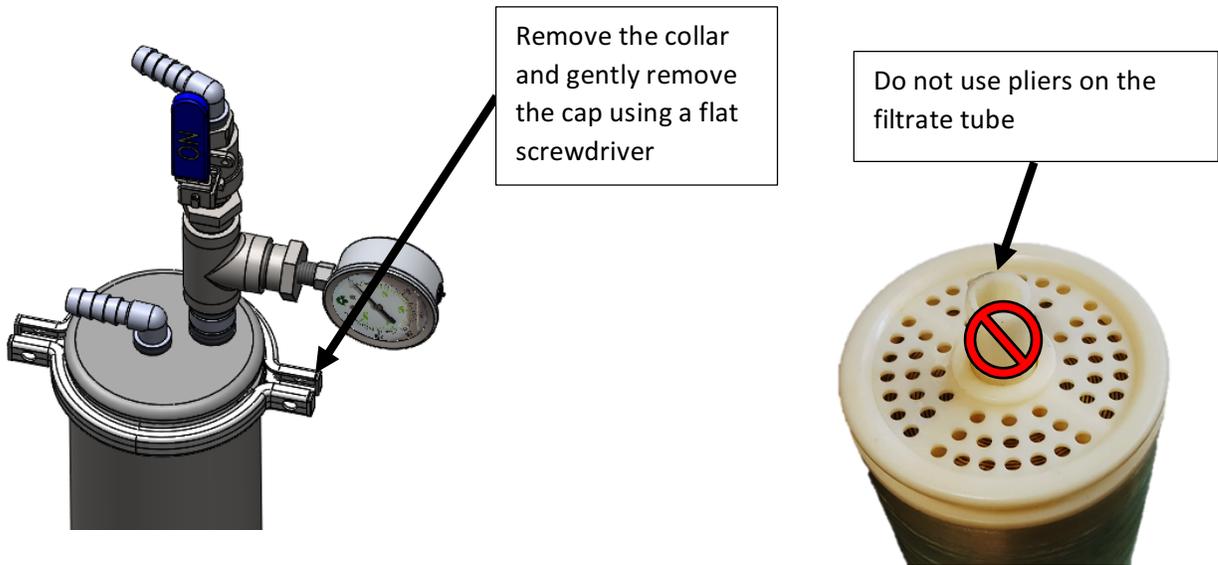


Membrane installation

When using new membranes in the RO system, **these steps must be followed in order: Rinse, soap wash, rinse.** If these steps are not followed, the membranes' performance and life span may be affected. Ensure that the U-cups are installed according to the diagram. Add food-grade grease to the gaskets and U-cups. Once the membranes are in place, rotate them slightly in the housing to ensure everything is working properly. ***Note: do not use too much grease. Excess grease may plug pores in the membrane.**

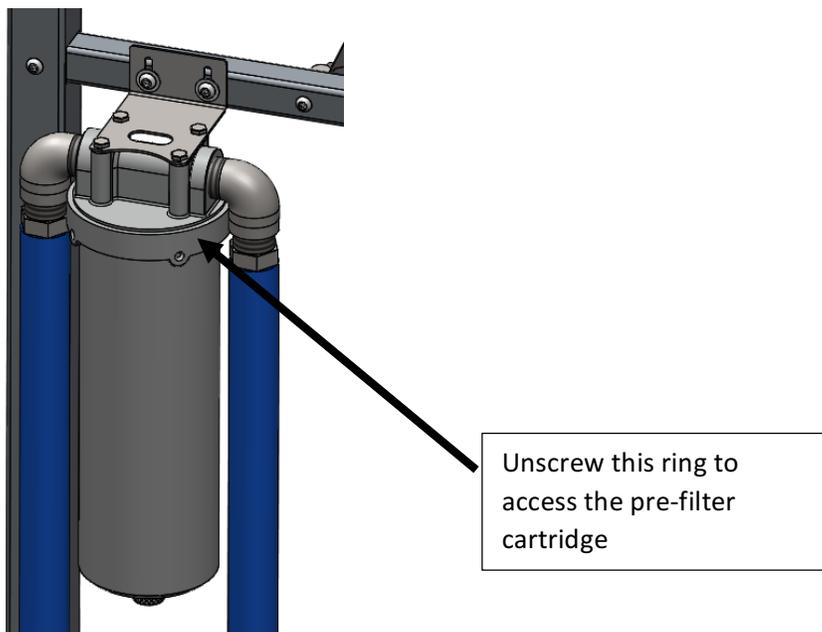


Before removing membranes from the RO system, remove any liquid remaining in the housings using the drain valves. Next, unscrew the collar and remove the upper cover. Lay the system flat and remove the membranes. **Do not use pliers to remove the membrane via the filtrate tube! This may damage the tube, causing sugar to run into the filtrate.**

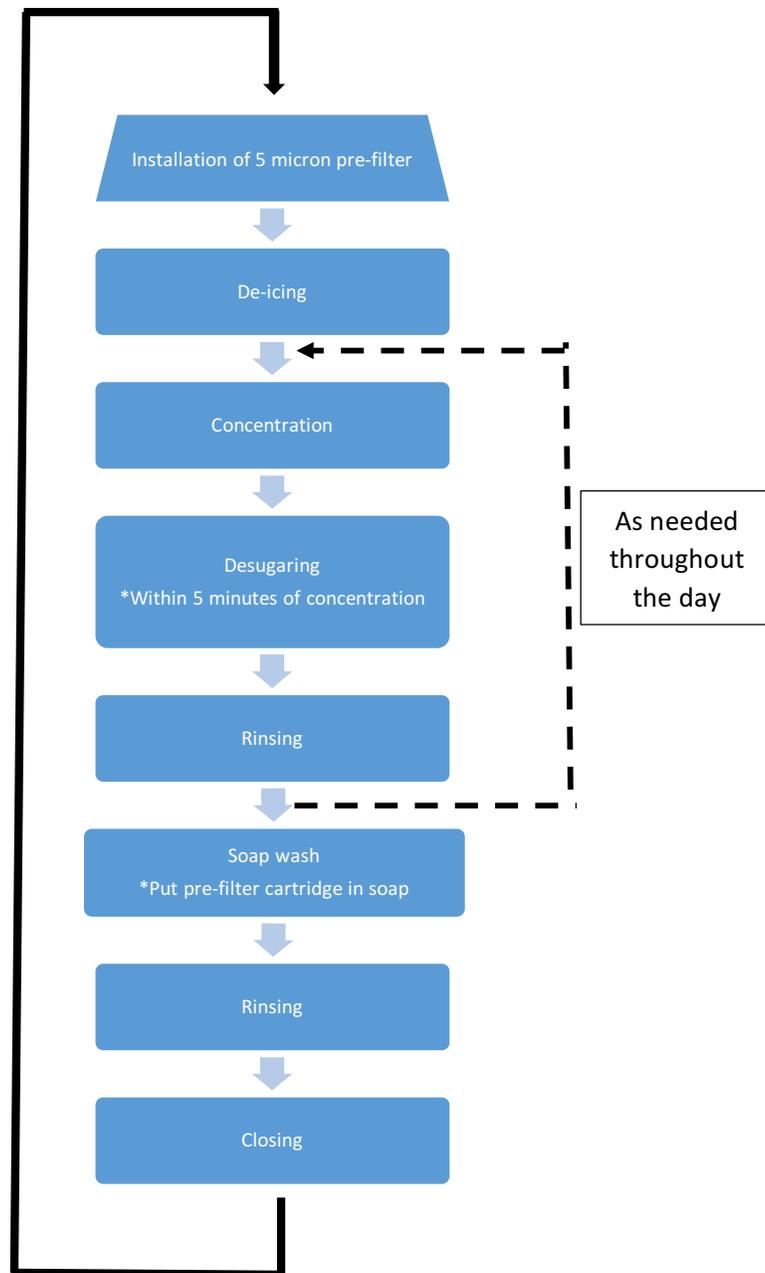


Pre-filter cartridge

Unscrew the pre-filter housing and insert a 10" 5 micron filter (#6682101). If you have trouble, use the tool designed for this purpose. Put the ring back in place to close everything and ensure that the drain plug is properly in place. ***Make sure the cartridge is placed correctly in the pre-filter.**

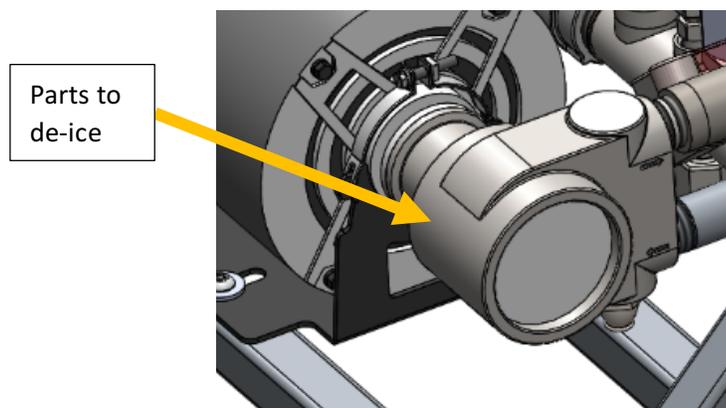


Daily operations



De-icing

If the RO system is used after being exposed to freezing conditions, it must be de-iced before use. To do so, use a hot air gun to heat the outer stainless steel surface of the pressure pump. You may also use towels soaked in very hot water. If you choose this method, wrap the towels around the stainless steel parts of the pumps and leave them for several minutes to ensure that no ice remains in the pump. Soak the towels in more hot water as needed.



Concentration

- 1) Close drain valves V2–V4.
- 2) Attach the line filter receptacle, which is located at the entrance of the feed pump.
- 3) Install the pre-filter. *Ideally, use a cartridge other than the one used in washing. Attach the plug below the pre-filter.
- 4) Open concentrate valve V1 fully.
- 5) Plug the RO system into a 110 V outlet.
- 6) Place the blue suction hose into the sap tank.
- 7) Place the filtrate and concentrate hoses into the appropriate tank(s).
- 8) Start the RO system using the switch. Ensure that water reaches the pump after a few seconds. If it does not, stop the pump.
- 9) Use the handle to slowly close concentrate valve V1 fully. **Take at least 10 seconds to close the valve, as this will allow pressure to increase gradually in the system. Closing the valve too fast may damage the system.**
- 10) Regularly check operation settings.
- 11) Once concentration has ended, fully open the concentrate valve and stop the system. ***Note: Do not wait until the system runs out of sap, as it is not equipped with an automatic stop. The pump will run dry and break.**

***Never concentrate to more than 8 degrees Brix.**

Desugaring

- 1) Place the filtrate and feed hose in the filtrate tank. The concentrate hose must remain in the concentrate tank.
- 2) Start the system to begin the desugaring cycle (step 8 of the concentration cycle).
- 3) Take samples of concentrate at regular intervals, until the concentration is at 0.5 degrees Brix.
- 4) Stop the system.

Rinsing

- 1) Place the feed hose in the permeate tank. Place the concentrate and filtrate hose over the drain.
- 2) Start the system (step 8 of the concentration cycle). A minimum of 300 L / 80 US gal. of filtrate must be used.
- 3) Stop the system once the recommended water level has been reached.

Washing

- 1) Exchange the pre-filter cartridge for one dedicated exclusively to washing.
- 2) Place the concentrate, filtrate and suction hoses into a 5 US gallon boiler.
- 3) Fill the wash tank with filtrate **that has been heated to 40 °C** and add the required amount of soap. Follow the manufacturer's recommendations for the amount of soap to use.
- 4) Start the system (step 8 of the concentration cycle).
- 5) Let it run for 30 minutes.
- 6) Stop the system after 30 minutes and perform a rinse.

Closing

- 1) Remove the pre-filter cartridge and unscrew the cap from the bottom of the housing.
- 2) Open drain and concentration valves V1–V4.
- 3) Raise the suction hose to drain the water inside.
- 4) Detach the line filter receptacle at the entrance of the feed pump to remove residual water.
- 5) Start the RO system for **2 seconds**. **This will evacuate the water remaining inside the feed pump.**
- 6) Repeat step 6 twice, ten seconds apart.
- 7) Unplug the RO system.

Procedure following a power outage

If the RO system has stopped after a power outage, make sure no ice has formed inside the pumps. Next, follow the **rinse procedure** before restarting concentration.

Draining

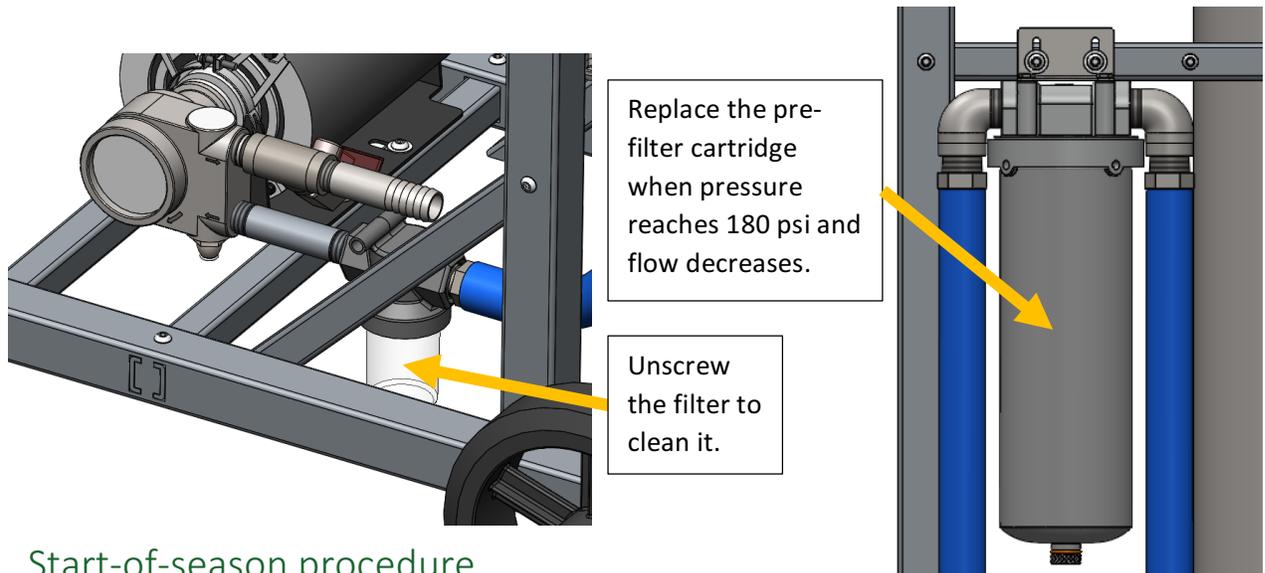
It is important to drain the RO system **as soon as you are finished using it**. This will prevent ice from building up if the system is stored in an area that is subject to freezing conditions. Open drain and concentrate valves V1–V4 to remove any liquid remaining in the system.



Maintenance

The line filter must be cleaned before each use. Blockages in the filter can restrict pump input, causing bubbles to form. This causes premature wear and a shortened life span for the pump.

The pre-filter cartridge must be replaced when pressure reaches around 180 psi and flow decreases.



Start-of-season procedure

Before concentrating the first sap harvest of the year, you must follow these steps:

1. Insert a new pre-filter cartridge.
2. Install the membrane in the separator. Pay attention to the direction of the U-cup.
3. Rinse with potable water **that does not contain iron or manganese**.
4. Perform a soap wash.
5. Rinse.

Once these steps are finished, you may begin concentration.

End-of-season procedure

At the end of the season, it is recommended to perform the following procedures in order before storing the system and its membranes: **soap wash, rinse, citric acid wash, rinse, soap wash, rinse**. Use the following procedure for the citric acid wash:

- 1) Exchange the pre-filter cartridge for one dedicated exclusively to washing.
- 2) Place the concentrate, filtrate and suction hoses into a 5 US gallon boiler.
- 3) Fill the wash tank with filtrate **that has been heated to 40 °C** and add a cup of powdered citric acid.
- 4) Start the system.
- 5) Let it run for 30 minutes.



Once the washes are finished, store the membrane in the system or a storage canister. If the membrane is stored in a canister or hermetically sealed bag, use storage solution CDL #80000. **Remove the U-cup** and use a tablespoon of solution for a canister full of filtrate. If the membrane is stored in the system, fill the filtrate machine with 2 litres of food-grade propylene glycol #88020. Leave the membrane in this solution and ensure that the feed, filtrate and concentrate hoses are plugged. Air must not enter the system. **Never store the membrane in the system with storage solution #80000 (sodium metabisulfite). This solution wears down the canister covers and gaskets. Keep the membranes and solution away from freezing conditions.**

Tips

Here are a few tips to help your RO system run efficiently and increase your yield:

- **Perform rinse and wash cycles after each use.**
- During the wash cycle, pre-heat your filtrate to 40 °C/104 °F (**do not exceed 43 °C / 109.4 °F**). Washing is more effective at this temperature.
- Use different pre-filter cartridges for washing and concentration.
- Do not let the membranes sit in maple water for more than 5 minutes. Bacteria in the sap may plug the surface of the membrane.
- If water other than filtrate is used for rinsing, make sure the water does not contain iron or manganese.
- The end-of-season procedure will help extend the life span of the membrane.



Troubleshooting chart

This chart describes several minor issues the operator may encounter during the season. If a problem arises, refer to this table to find a solution. If the problem persists, contact our technical service.

Problem	Cause	Solution
The system is not starting	<ul style="list-style-type: none"> • It is not plugged in • Ice is preventing the pump from working 	<ul style="list-style-type: none"> • Check the breakers in the electrical panel • Follow the de-icing procedure
The filtrate flow is decreasing	<ul style="list-style-type: none"> • The membranes are plugged • The sap's Brix is too high 	<ul style="list-style-type: none"> • Perform a wash cycle • Stop the system if it exceeds 8 degrees Brix
The pressure pump is making a strange noise	<ul style="list-style-type: none"> • The line filter is plugged • Air is entering the system • The suction strainer is plugged • Sap is not reaching the pump 	<ul style="list-style-type: none"> • Clean the line filter • Make sure the suction strainer is not blocked • Make sure the suction hose is not blocked • Make sure the suction hose is connected properly



Potential savings

Here is a table showing your potential savings. While these values may vary from one location to another, they give a general idea of the evaporation time you may save.

Initial amount of sap: 200 US gal.

Evaporation: 16 US gal. / hour

Concentration (Brix)	2	4	6	8
Amount of concentrate to boil	200	100	66.7	50
Amount of water to evaporate (US gal.)	194	94	60.7	44
Evaporation time (%)	100	48.5	31	22.7

Warranty

The system has a 1-year warranty on all manufacturing defects. The product must be used under normal conditions to be covered. The warranty does not apply if the operator has increased the maximum operating pressure or made any other modifications to the reverse osmosis system.

