CDL SUGARING EQUIPMENT

OWNER'S MANUAL

Version 1.2 | 01/06/2021

NANO RO REVERSE OSMOSIS SYSTEM

nanoRO

TABLE OF CONTENT

CDL SUGARING EQUIPMENT

INTRODUCTION

Thank you for choosing our Nano RO 2- or 3-membrane system. Please read this manual carefully before installation and start-up.

The CDL 2- or 3-membrane Nano RO is a simple and effective tool for maple and birch sap concentration. Its three-stage prefiltration removes impurities like suspended solids and larger organic matter to better protect membranes and improve overall system performance.

Remarks and instructions

1. Read the instructions before installing and operating the RO system.
2. To avoid damage to the system, do not disassemble it unnecessarily. Disassembling and reassembling parts may cause breaks or leaks.e de liquide.
3.  For your safety, it is recommended to plug the unit into a GFCI electrical outlet.
4. To make sure that the system runs normally, be sure to use cleaning chemicals and filters supplied by CDL.
5. Please handle, install, and move the unit with care to avoid damaging the more delicate parts.
6. Before beginning operation, install the membranes and the 5-micron filter in their respective housings.
7. Wash and rinse the system thoroughly before concentrating the sap (see daily membranes cleaning page 18).
8. During concentration, do not exceed 100 psi for the 3-membrane system and 70 psi for the 2-membrane system. In the 2-membrane system, the concentrate flow must be double the permeate flow. Since the 2-membrane unit does not have a recirculation pump to ensure proper cross-flow circulation, it is important to follow those rules to prevent membrane fouling.
9. This system is not designed for concentrations exceeding 5 to 6 degrees Brix for the 3-membrane unit (which has a recirculation pump) and 4 degrees Brix in batch mode for the 2-membrane unit (which does not have a recirculation pump). Concentration capacity varies depending on the condition of the membranes, the temperature and quality of the sap, and the operating pressure.

10. Membranes must be cleaned daily.

11. If the device is not used for a few days, make sure to wash the membranes properly. To prevent bacterial growth, run a citric acid solution (3 pH) through the membranes by adding 1/4 cup of CDL citric acid to a 5-gallon bucket of permeate. Stop the device and install the 3 plugs (Green ■ = feed pump inlet; red ■ = concentrate outlet; blue ■ = filtrate outlet).

12. Rinse the equipment before resuming concentration.

CHARACTERISTICS

- Stage 1: The feed line strainer catches impurities in the water and prevents pump blockage. The strainer must remain connected to the feed line **(3/8" yellow ■ feed tube)**.
- Stage 2: The 5-micron filter absorbs harmful substances in the water, such as colorants and organic substances. It filter effectively removes sediment, mold, suspended matter, and other substances from the water **(3/8" yellow ■ feed tube)**.
- Stage 3: Reverse osmosis is achieved by using the 600 GPD RO membrane filter (3) and the 0.0001 µm RO membrane, allowing only pure water molecules and dissolved oxygen to pass through. Organic molecules such as sugar and good minerals are concentrated **(3/8" red ■ tube on the recirculation circuit and 1/4" red ■ on the concentrate outlet)**.
- Stage 4: A regulating valve on the 1/4" concentrate outlet **(red ■ tube)** increases and reduces the pressure and controls the level of concentration. **Maximum operating pressure: 100 psi (70 psi on 2-membrane system).**

Recirculation pump:

The 3-membrane Nano RO is equipped with a unique recirculation pump for better performance. By creating more cross flow on the membrane surface, the permeate flow remains steady and the system achieves higher concentration. This pump must be running at all times when processing sap, washing and rinsing the equipment. Select the automatic mode.

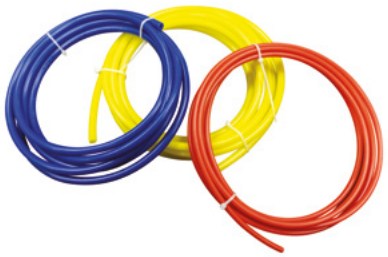
PARTS

PP Filter 600 gal
6682101

600 GPD RO Membrane
660600

Filter Housing Wrench

Membrane Housing Wrench



1/4" - 3/8" Tube

3/8" Feed Line Strainer

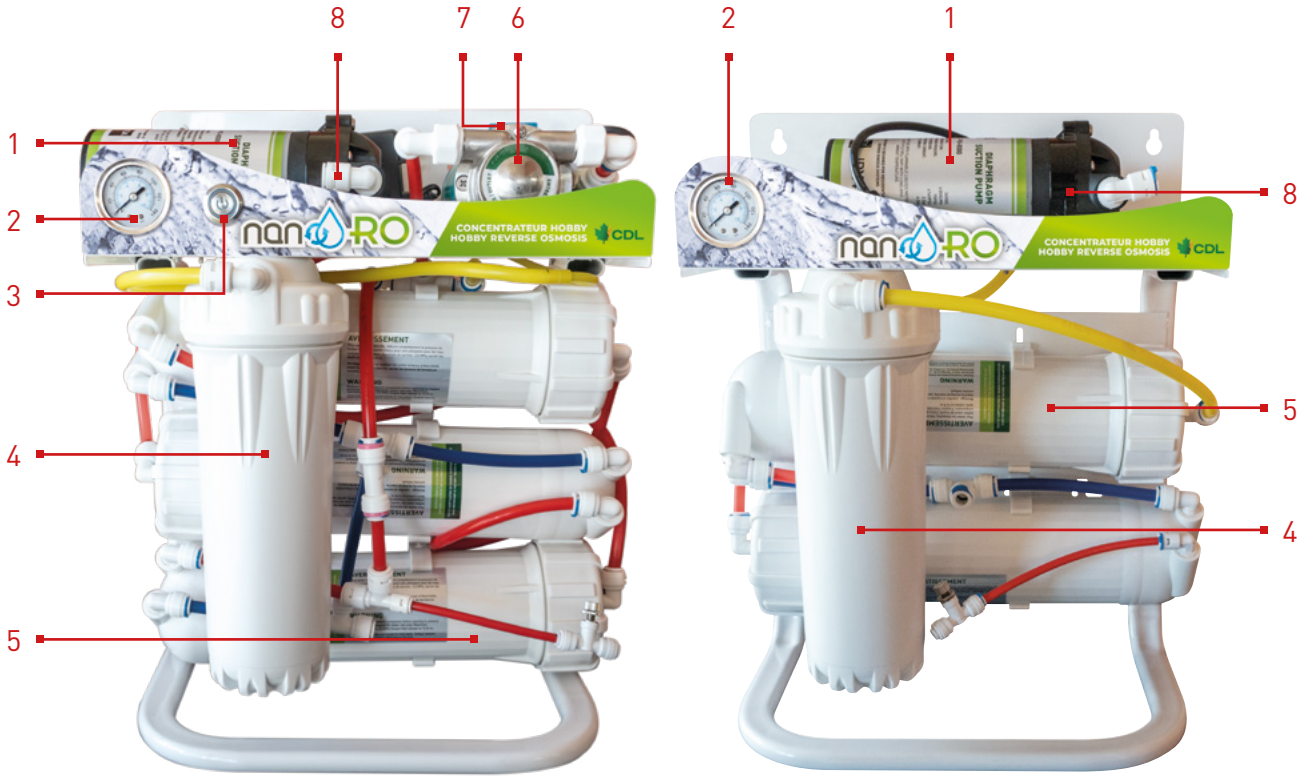
Cleaning products (not included)

Citric acid1 kg (powder)
66994

Organic membrane soap
"Superflow green" 1 kg (powder)
662403

CDL SUGARING EQUIPMENT

PRODUCT DESIGN



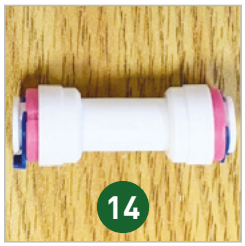
	DESCRIPTION		DESCRIPTION
1	800 gal 24 V Pump	5	3213 Membrane Housing
2	Pressure Gauge	6	Recirculation Pump
3	On-Off Button	7	Flow Switch
4	5 Micron PP Filter Housing	8	Feed Port

TECHNICAL SPECIFICATIONS

	REVERSE OSMOSIS SYSTEM WITH 2 MEMBRANES	REVERSE OSMOSIS SYSTEM WITH RECIRCULATION PUMP AND 3 MEMBRANES
Model #:	81008	81013R
Number of taps:	25–75	50–≥150
Membranes	2 Membranes 600 GPD	3 Membranes 600 GPD Recirculation pump 110 V, 0.45 A
Water removal:	6–8 GPH @ 4–5 Brix concentrate	10–13 GPH @ 5–6 Brix concentrate
Pump rating max flow:	40 GPH	40 GPH
Power consumption:	120 W	218 W
Transformer:	110 volts, transformer included	110 volts, transformer included
Shipping weight:	13.32 kg	17.97 kg
Shipping dimensions:	24" x 19" x 13"	24" x 19" x 13"
Included:	• 2x 600 GPD membrane • 1x pre-filter cartridge • Tool for pre-filter housing • Tool for membrane housing • 9.84' 3/8" suction tubing with strainer (yellow) • 9.84' 3/8" permeate tubing (blue) • 9.84' 1/4" concentrate tubing (red) • Spare fitting kit • Spare O-ring kit • Silicone lubricant • PTFE Sealing Tape	• 3x 600 GPD membrane • 1x pre-filter cartridge • Tool for pre-filter housing • Tool for membrane housing • 9.84' 3/8" suction tubing with strainer (yellow) • 9.84' 3/8" permeate tubing (blue) • 9.84' 1/4" concentrate tubing (red) • Spare fitting kit • Spare O-ring kit • Silicone lubricant • PTFE Sealing Tape
Test conditions:	Sap temperature 42 °F, 2 Brix, 50/50 water reduction, 70 psi	Sap temperature 42°F, 2 Brix, 65/35 water reduction, 100 psi

CDL SUGARING EQUIPMENT

FITTINGS

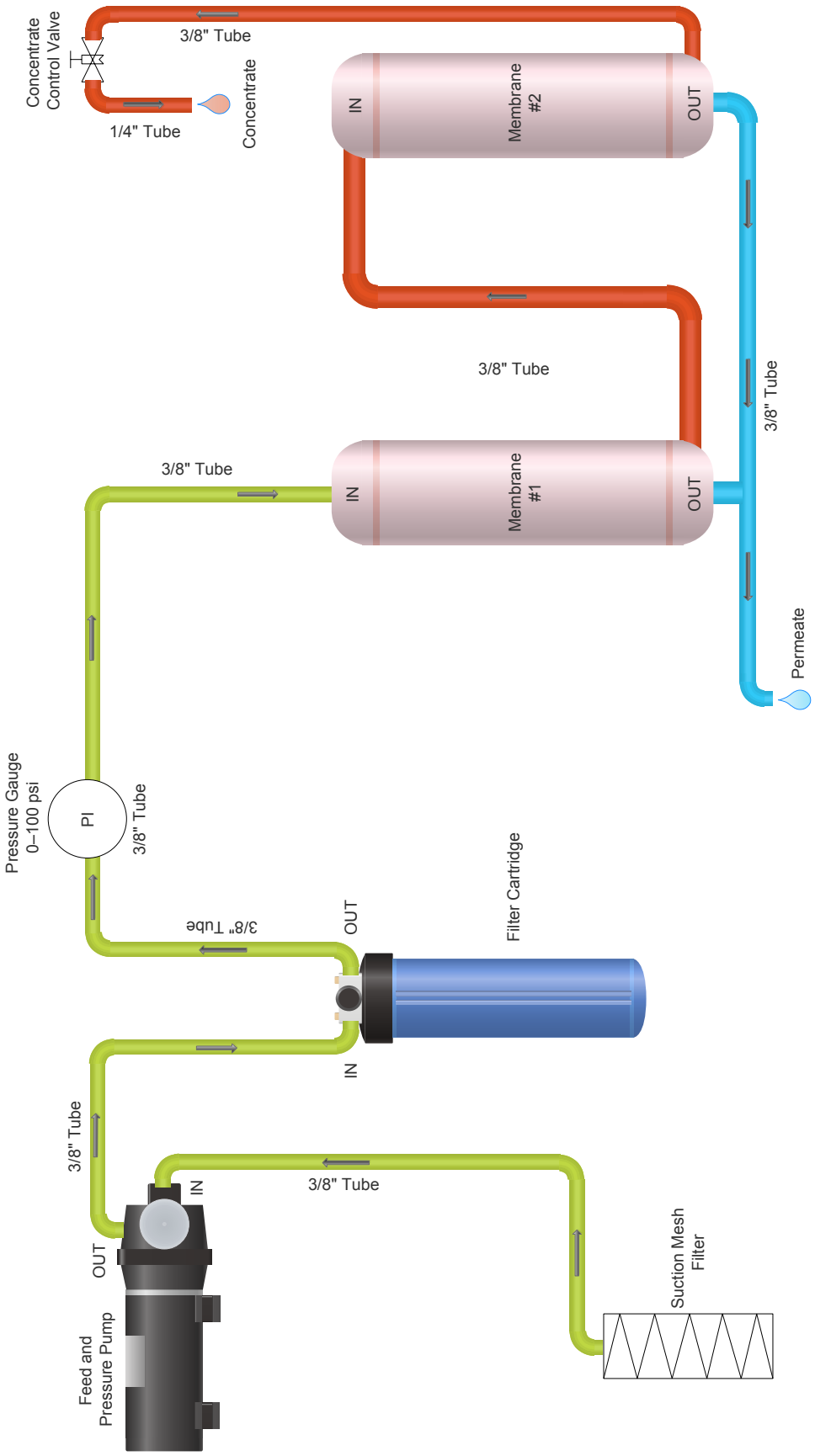


	DESCRIPTION	ITEM NUMBER
1	ELBOW 3/8" X 1/4" TUBE-MIPT	664661
2	ELBOW 3/8" X 3/8" TUBE-MIPT	664658
3	TEE 3/8" X 3/8" X 3/8" TUBE	664666
4	TEE 3/8" X 3/8" X 1/4" TUBE	664665
5	ADAPTATOR 3/8" X 1/2" TUBE-MIPT	664652
6	ADAPTATOR 1/4" X 1/8" TUBE-FIPT	664653
7	VALVE 1/4" TUBE	664667
8	CAP 1/4" TUBE	664655

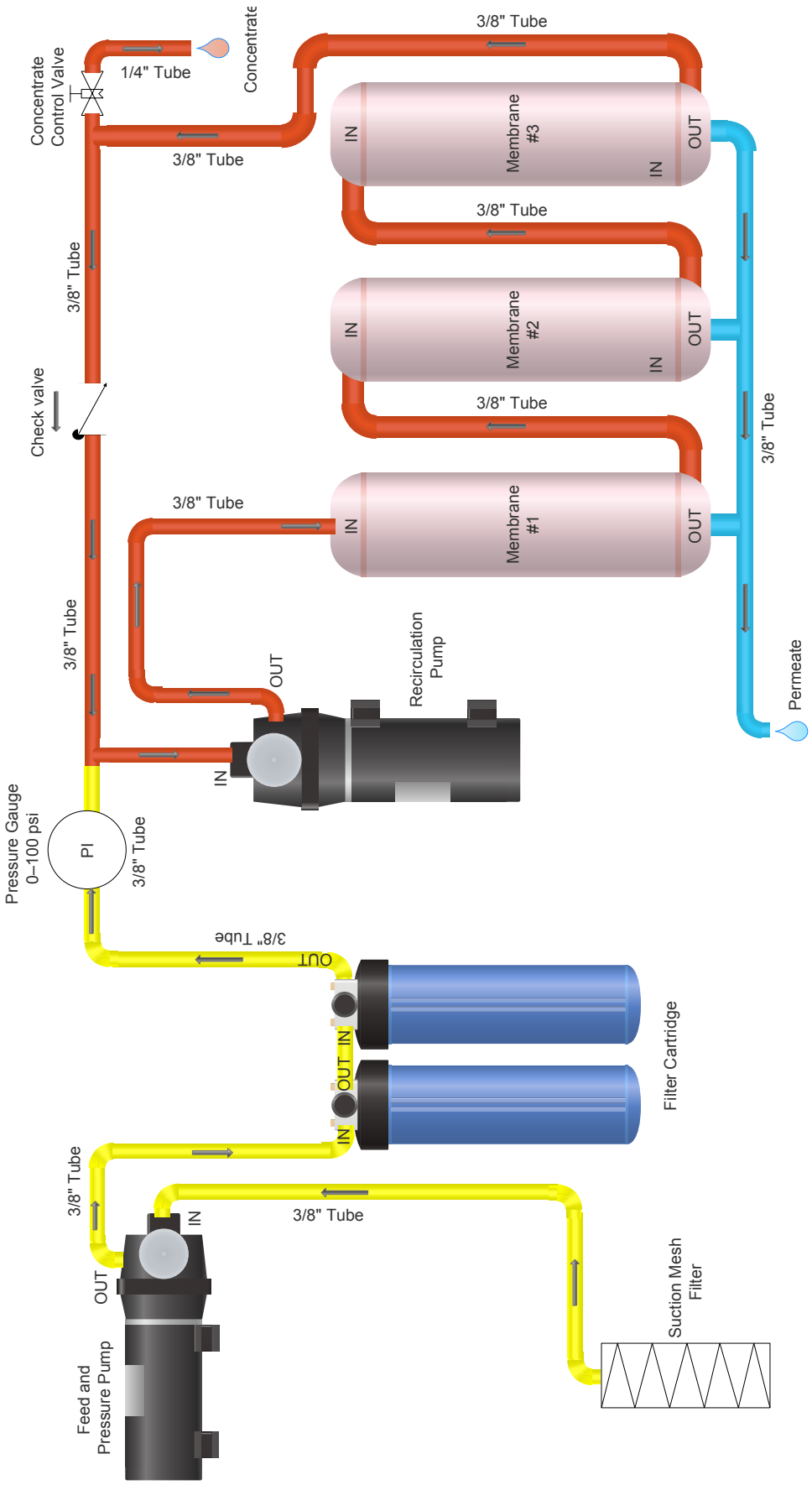
	DESCRIPTION	ITEM NUMBER
9	CAP 3/8" TUBE	664654
10	ELBOW 3/8" X 3/8" TUBE-STEM	664659
11	ELBOW 1/4" X 1/4" TUBE-STEM	664660
12	TEE 3/8" X 1/4" X 3/8" TUBE	664664
13	ADAPTATER 3/8" X 1/2" TUBE-FIPT	664651
14	SPRING CHECK VALVE 3/8" TUBE	664663
15	MANOMETER 0-140 PSI - 1/8" MIPT	664662

CDL SUGARING EQUIPMENT

Flow diagram (2-membrane model)

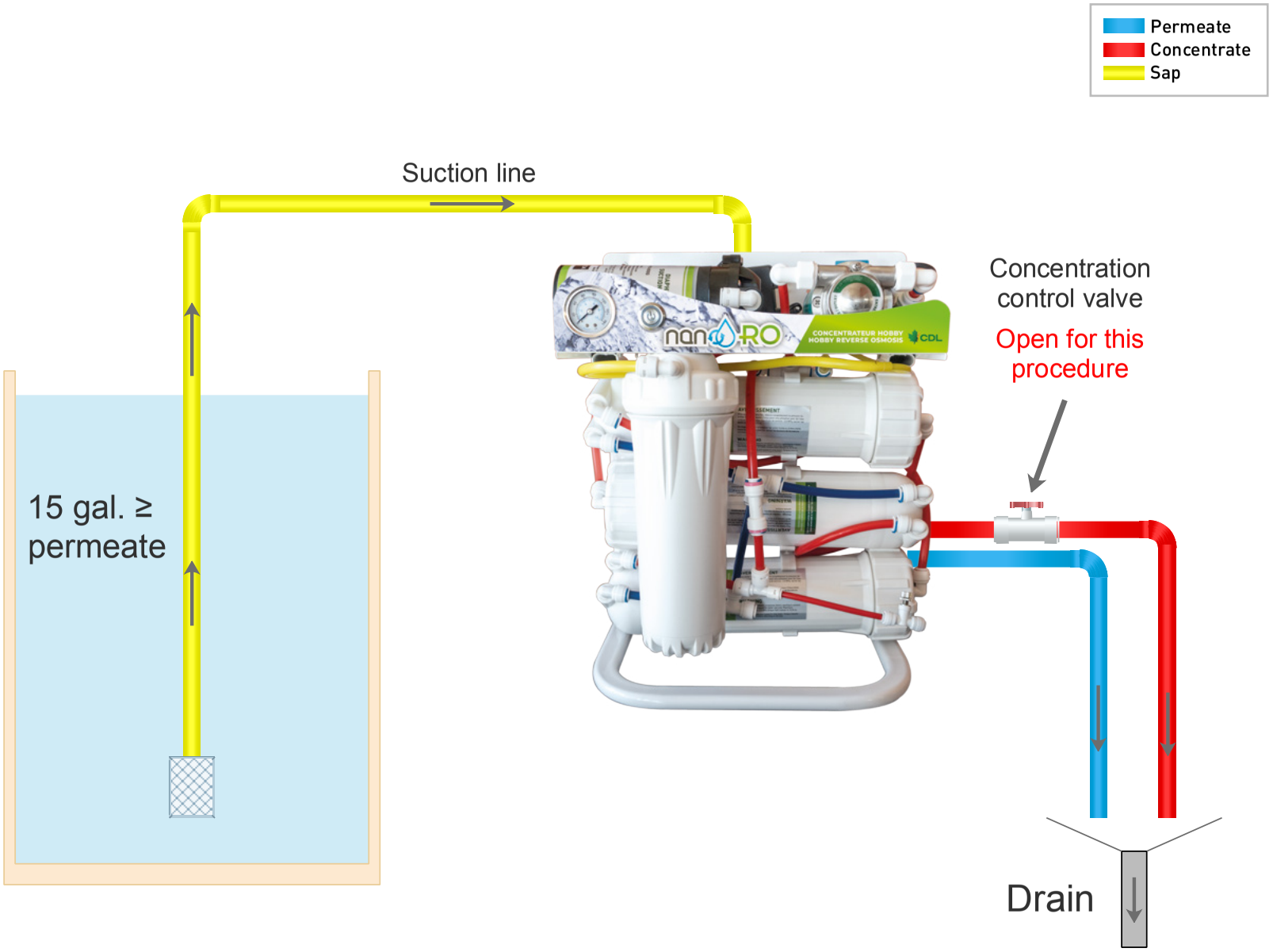


Flow diagram (3-membrane model)



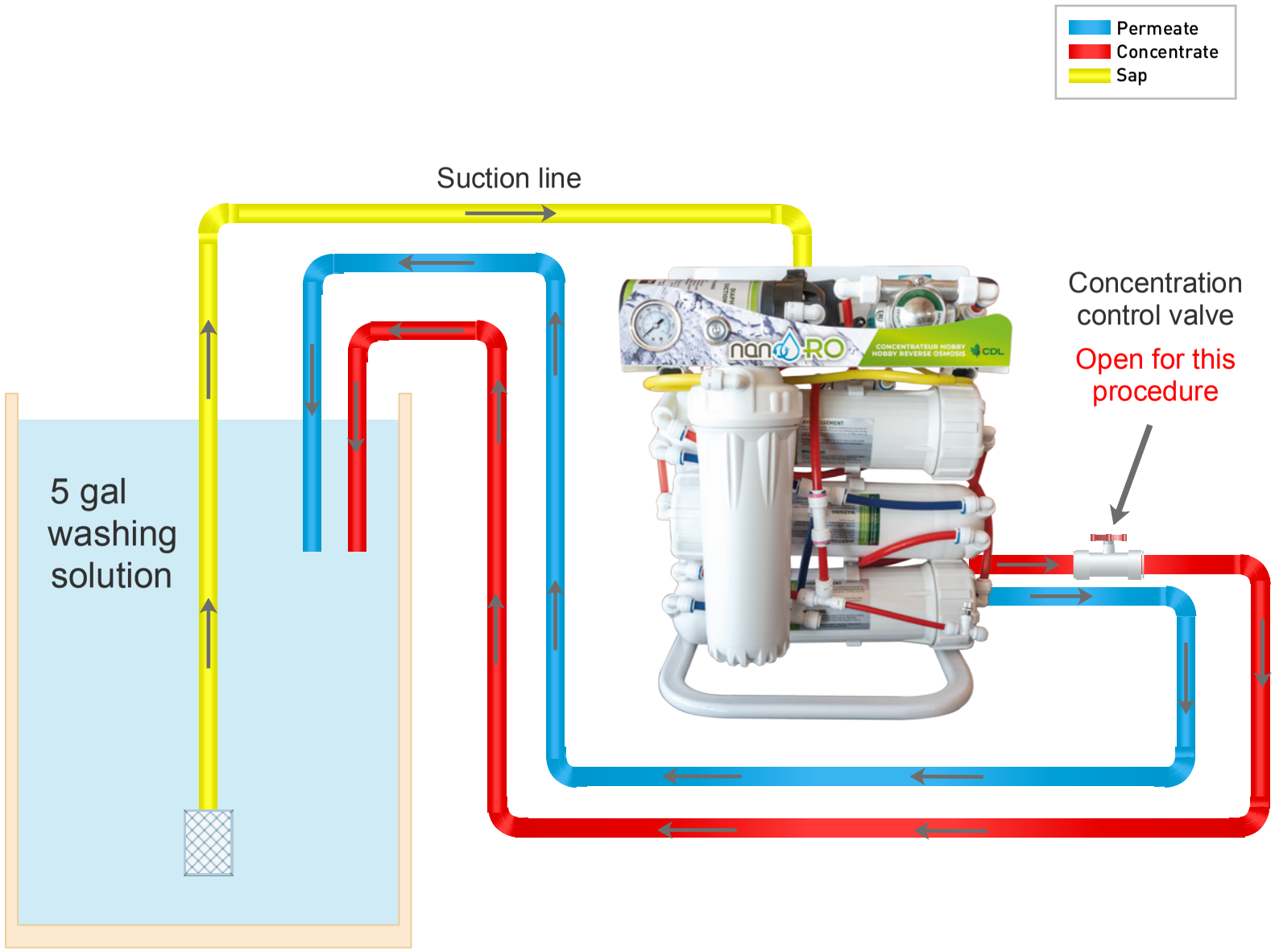
CDL SUGARING EQUIPMENT

Rinse

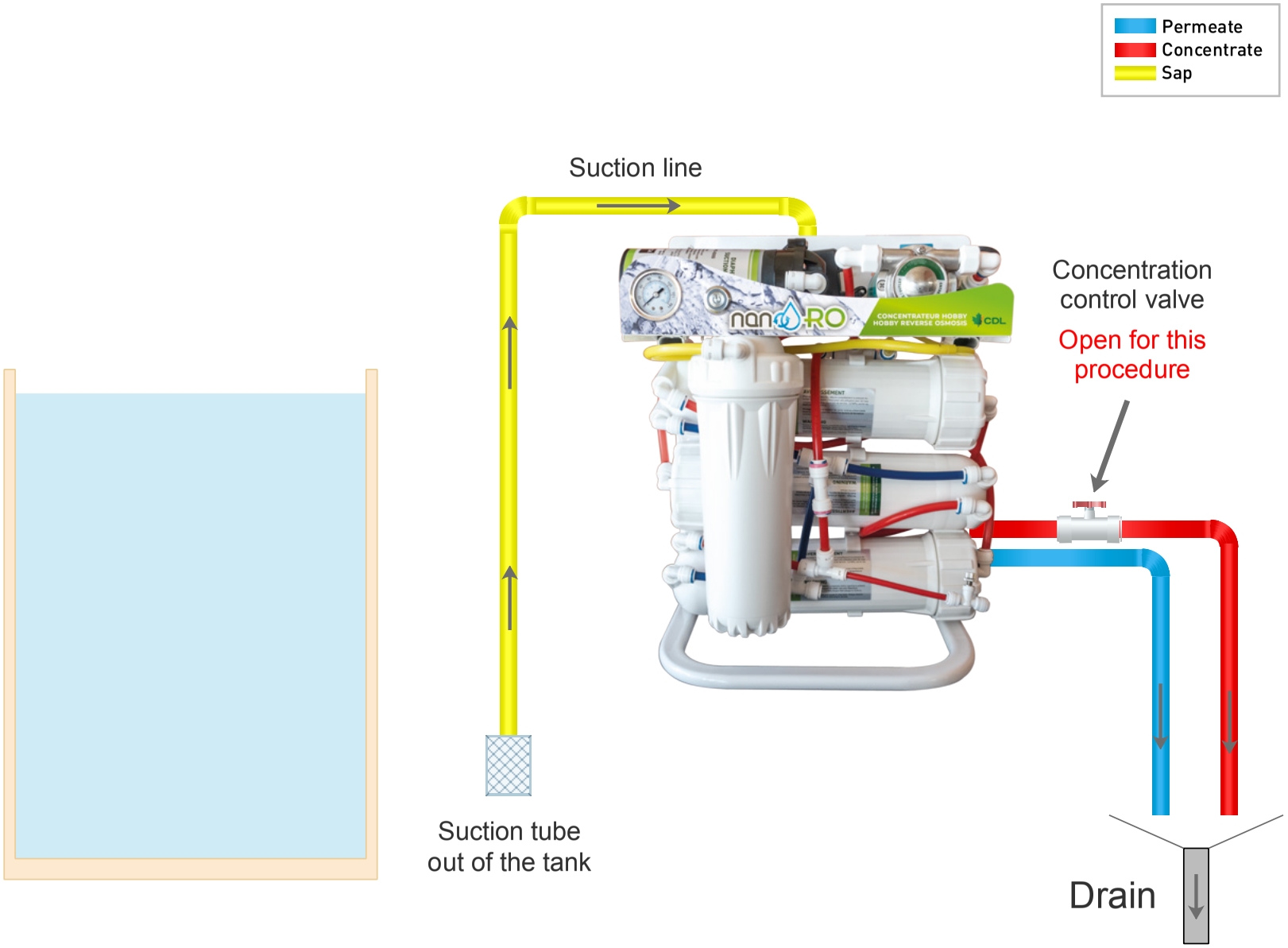


CDL SUGARING EQUIPMENT

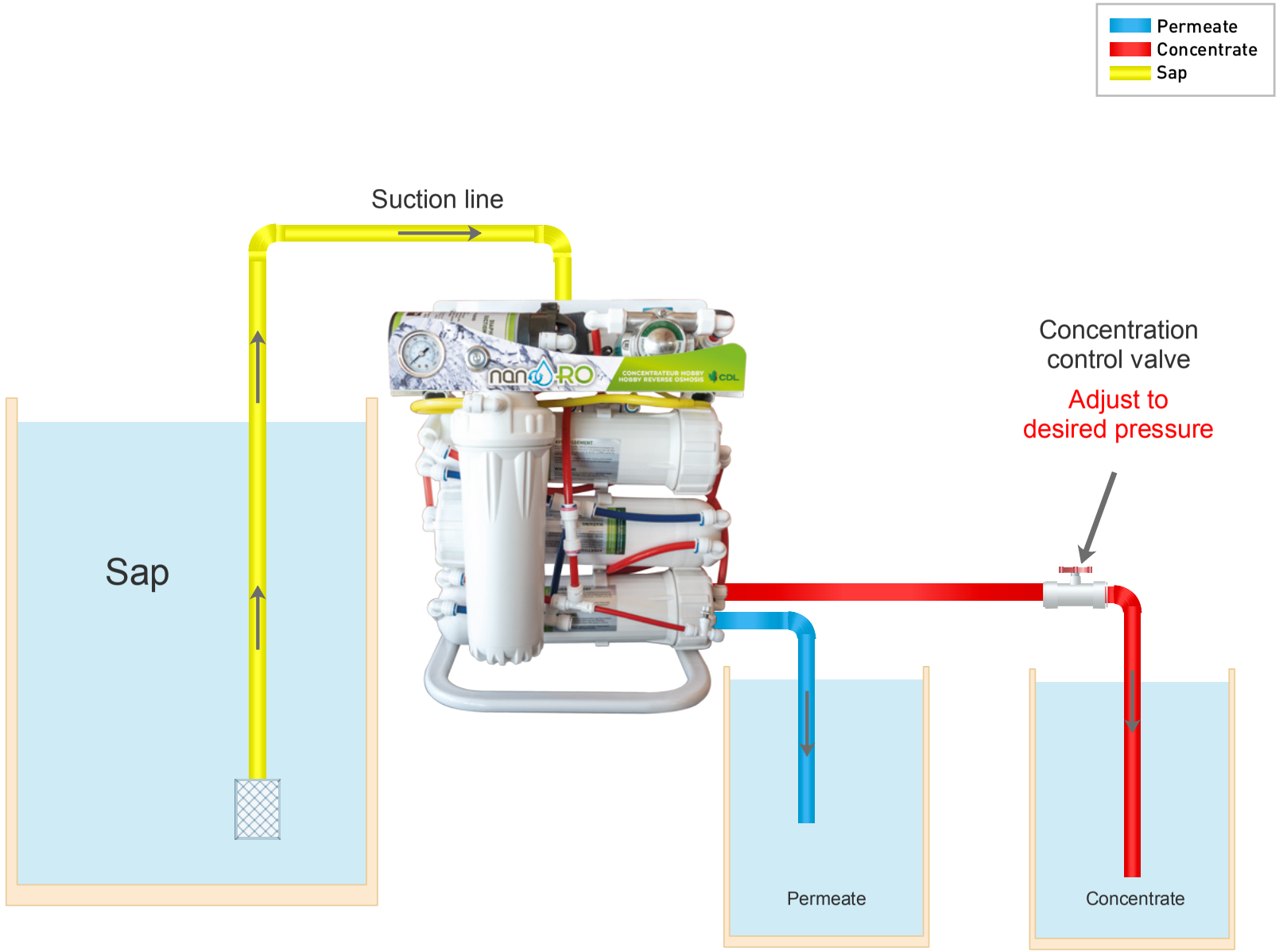
Wash


Permeate
Concentrate
Sap
Suction line
Concentration control valve
Open for this procedure
5 gal washing solution
nano-RO
CONCENTRATEUR HOBBY
HOBBY REVERSE OSMOSIS
CDL

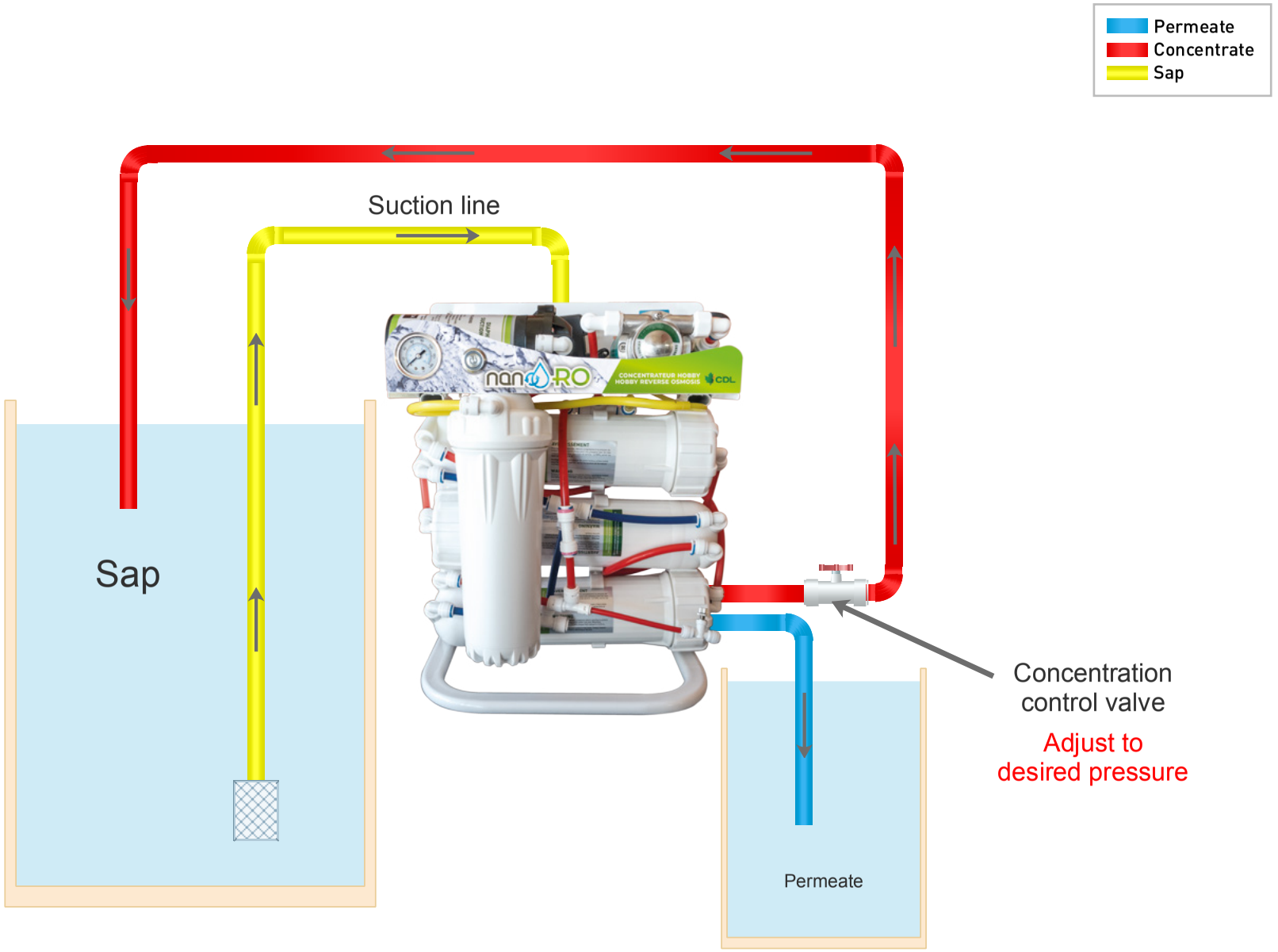
Drain


Permeate
Concentrate
Sap
Suction line
Concentration control valve
Open for this procedure
Suction tube out of the tank
Drain

Concentration (1 pass)



Concentration (batch)



CDL SUGARING EQUIPMENT

HOW TO REPLACE FILTRATION CARTRIDGE

1. Unscrew the cartridge housing.
2. Remove the old cartridge.
3. Insert the new cartridge into the housing.
4. Lubricate the transparent gasket lightly with silicone grease. Make sure the gasket is still in place.
5. Make sure that the cartridge is centred in the housing. Screw the housing into place.

HOW TO INSTALL MEMBRANES

1. Unscrew the cover from the housing.
2. Remove the old membrane.
3. Lightly lubricate all O-rings and casing seals with silicone-based food-grade grease. Insert the new membrane fully into the housing.
4. Make sure the membrane seal is on the cover side.
5. Screw the cover onto the housing.

DAILY MEMBRANE CLEANING

- Rinse the sugar water out of the equipment using 5 gallons of permeate and recover it in the sap tank.
- Complete the rinse by draining with 5 gallons of permeate.
- Using a 5-gallon bucket of permeate at 80 °F, add 1/4 cup of Super Flow Green membrane cleaner.
- Place the suction tube **(yellow)**, permeate tube **(blue)**, and concentrate tube **(red)** into the wash solution bucket.
- Open the concentrate control valve.
- Run the equipment in a closed loop into the wash solution bucket for 30 minutes.
- Once the wash is finished, flush the solution to drain.
- Repeat the wash if the wash solution is coloured or cloudy.
- Rinse the equipment with no less than 10 to 15 gallons of clean permeate

PROTECT FROM FREEZING

- Protect the equipment from freezing during temporary storage.
- If the equipment must remain in a cold place, remove the filters and drain the equipment properly. Reinstall filter housing and run the pump dry for a few minutes. This will partially remove water from the system and prevent frost damage to the pumps and other parts.
- Make sure there is no water remaining in the equipment and lines.
- The equipment may need to be thawed with warm water when it's ready to be used again.
- Make sure that all pumps are ice-free before using the equipment. Small pieces of ice may damage the pumps. Thaw the pumps with a hair dryer or by pouring warm water over them.

IMPORTANT NOTES

- It is always best to keep the equipment in an area that is above freezing temperature.
- If the equipment is moved through freezing weather, make sure it is drained properly before exposing it to cold temperature.

LONG-TERM STORAGE PROCEDURE

1. Properly clean RO membranes using CDL Super Flow Green membrane cleaner, following the instructions on the container. Repeated washes may be necessary if the wash solution is cloudy. A coloured wash solution means that the membrane is not entirely clean. The solution should be clear after the final wash.

   Replace filtration cartridges with new ones.

   5 gallons of permeate is sufficient for rinsing between washes. We recommend draining the wash solution, following the drainage procedure, before rinsing.

2. Rinse membranes with RO permeate or acceptable quality water. If permeate isn't available, see the water quality guidelines to determine which water is safe to use.

3. Citric acid treatment

   Treating with citric acid helps dissolve minerals that may partially block membrane pores. Following the washing procedure, add 1/4 cup of citric acid to a 5-gallon bucket of 80 °F permeate.

   Run the equipment in a closed loop for 1 hour or more, allow soaking overnight. If the water is cloudy, wash the system with CDL Super Flow Green, then rinse.

4. Storage solution

   - **Membranes in the RO:**

   You may leave membranes in the unit for storage as long the unit is protected from frost. Citric acid is a good preservative that prevents bacteria from developing in the system. Add 1/4 cup of CDL citric acid to a 5-gallon bucket of permeate, then run the RO in a closed loop for ½ hour to allow proper mixing. To prevent leaks, disconnect the suction **(yellow ☐)**, concentrate **(red ☐)**, and permeate **(blue ☐)** tubes and insert the provided plugs in the connectors.

   Store the equipment in a cool room where protected from frost.

Storage solution (continued)

- **Method of membranes storage in the freezer:**
  - Follow the washing and citric acid treatment steps for long-term storage.
  - Once the final rinse is complete, drain the device and remove the membranes from their housings.
  - Let the membranes drain for a few minutes.
  - Place the membranes in a large airtight bag and store in the freezer.

Note : This method eliminates the risk of membrane contamination by mold during the period of non-use. They will be ready for use again after a simple rinse of the device.

WATER QUALITY GUIDELINES

The quality of the water used for flushing and cleaning the membranes is of utmost importance, as unclean water can cause deposits on the membranes. In most cases, municipal water does not qualify as "clean water". Chlorinated water must not be used to rinse or clean the membranes.

Special attention should be paid to possible contaminants such as iron, manganese, and silicates. Clean water must meet the following specifications at all times:

CONTAMINANT	REQUIREMENT
Iron	< 0.05ppm
Manganese	< 0.02ppm
Silicate	< 5ppm
Aluminum	< 0.05ppm
Hardness	< 85ppm
Particles	< 5µm
Turbidity	< 1NTU

Important note:

When possible, RO permeate is always preferred for washing and rinsing membranes.

WARRANTY

Nano RO CDL Limited Warranty

This CDL product is offered with a limited warranty against any manufacturing defects. Breakages related to frost, wear, abuse, poor maintenance or abnormal use are not covered.

This warranty covers only this equipment. CDL isn't responsible for product lost and any other damages that may result from the use of this product. This warranty will not cover products whose installations do not comply with the installation instructions in the CDL manual and whose use has been made under abnormal mechanical or environmental conditions.

Filter and membranes are not covered by this warranty. Parts found to be defective are subject to inspection by CDL which will confirm or deny that said product is subject to a manufacturing defect. If so, the product will be replaced or repaired at CDL's sole discretion.

Transport costs and all other freight charges associated with replacing or repairing products shipped to CDL's factory must be prepaid by Customer.

For technical assistance or support, contact your CDL representative, your local CDL store, or the CDL technical support team at 1-800-361-5158.

CDL Maple Sugaring Equipment
257 route 279
Saint-Lazare-de-Bellechasse, QC G0R 3J0
Canada

418-883-5158 | 1-800-361-5158
cdlinc.ca

CDL USA
3 Lemnah Drive
St. Albans VT 05478
United States

802-527-0000 | 1-800-762-5587
cdlusa.com

NOTES

CDL SUGARING EQUIPMENT