CDL SUGARING EQUIPMENT

OWNER'S MANUAL

Version 2.0 | 10/04/2024

81015-MAN-EN

NANO RO MAX
REVERSE OSMOSIS SYSTEM

nanoROmax

FINDING INFORMATION

Make a record for future use.

Brand: _____

Purchase Date: _____

Model Number: _____

Serial Number: _____

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INTRODUCTION

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

The CDL 2 membranes Nano RO MAX is a simple and effective tool for maple and birch sap concentration. Its two-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 this RO system.
2. To avoid damage to the system, do not disassemble it unnecessarily. Disassembling and reassembling parts may cause damages and fluid leaks.
3.  For your safety, we recommend plugging the unit into a GFCI electrical outlet (not provided with the equipment).
4. To make sure that the system runs properly, 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 on page 19).
8. During concentration, do not exceed the recommended pressure of 150 psi. Respecting this procedure helps reduce yield loss due to membrane fouling.
9. This system is not designed for concentrations exceeding 5 to 6 degrees Brix in batch mode. Concentration capacity varies depending on the condition of the membranes, the temperature and quality of the sap, it's level of concentration as well as the tangential circulation 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 ¼ 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 = permeate outlet).**

12. Rinse the equipment before resuming concentration.

13. Always protect the equipment from freezing.

FILTRATION AND CONCENTRATION

- 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).**

- The 5-micron filter absorbs harmful substances in the water, such as colorants and organic substances. The filter effectively removes sediments, rust, suspended matter, and other substances from the water **(3/8" yellow feed tube)**.

- The 4020 RO membranes of 0.0001 µm generate the reverse osmosis process. Reverse osmosis is a separation process which only lets through pure water molecules and dissolved oxygen. The organic molecules like sugar, polyphenols and good minerals are concentrated. **(1/2'' red tube on the recirculation circuit and 1/4'' red tube on the concentrate outlet).**

- A regulating valve on the 1/4" concentrate outlet **(red tube)** increases and reduces the pressure to control the level of concentration. **Maximum operating pressure: 150 psi.**

Recirculation pump

The 2-membrane Nano RO MAX 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 a higher concentration. This pump must be running at all times when processing sap, washing or rinsing the equipment.

PARTS

PP Filter 600 gal
6682101

4020 Membrane
6606001

Filter Housing Wrench

3/8'' Feed Line Strainer

1/4" – 1/2" Tube

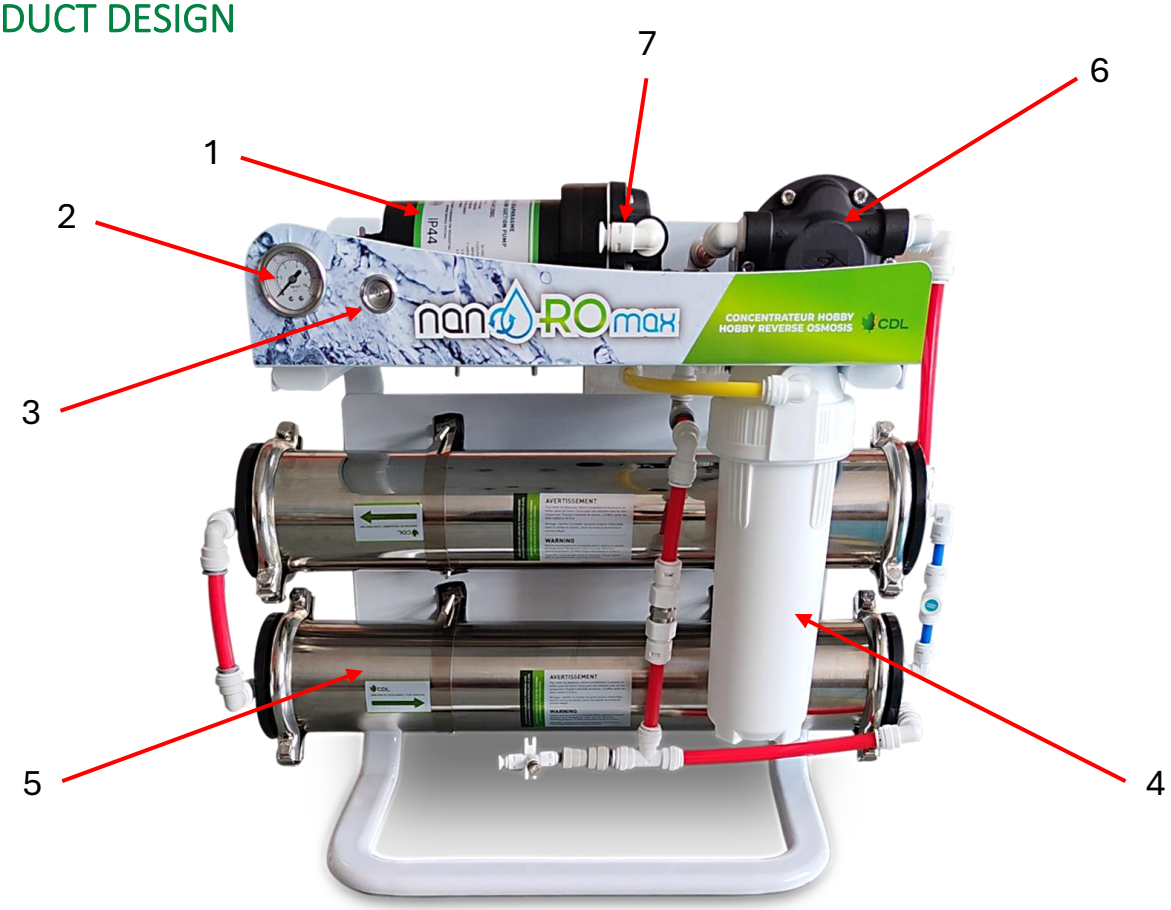
Cleaning products (not included)

Citric acid 1 kg (powder)
66994

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

CDL SUGARING EQUIPMENT

PRODUCT DESIGN



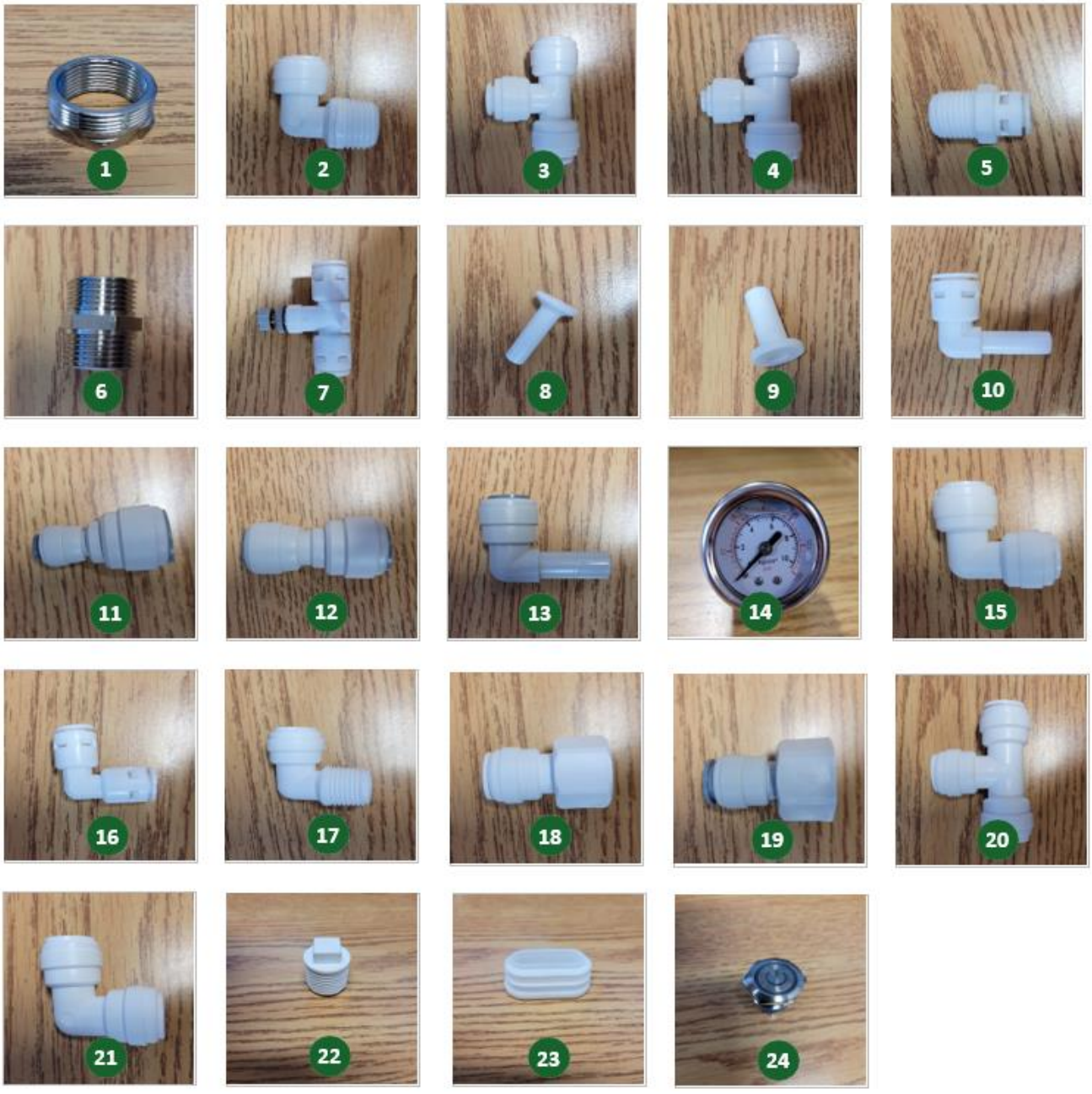
	Description		Description
1	1200G 36V Feed Pump (717700)	5	4020 Membrane Housing (66821004)
2	Pressure Gauge (664697)	6	1200G Recirculation Pump (717700)
3	On-Off Button (521271) (Quick press and release)	7	Feed Port
4	5 Micron PP Filter Housing (66821003)		

TECHNICAL SPECIFICATIONS

REVERSE OSMOSIS CONCENTRATOR WITH RECIRCULATION PUMP AND 2 MEMBRANES

Model #:	81015
Number of taps:	250 - 750
Membranes	Two 4''x 20'' Membranes
Water removal:	At 150 psi: 35 GPH @ 5-6 Brix concentrate
Pump rating max flow:	50 GPH
Recirculation pump:	36V – 1200 GPD
Power consumption at 150 psi:	8 A
Energy consumption at 150 psi:	960W
Transformer:	110 volts, transformer included
Shipping weight:	31,75 kg
Shipping dimensions:	32'' x 29'' x 16''
Included:	• 2x 4020 membrane • 1x pre-filter cartridge 2''x10'' • Tool for pre-filter housing • 10' 3/8" suction tubing with strainer (yellow) • 10' 3/8" permeate tubing (blue) • 10' 1/4" concentrate tubing (red) • 10' 1/4" pressure tubing (yellow) • 10' 1/2" concentrate tubing (red) • Spare fitting kit • Spare O-ring kit • Silicone lubricant • PTFE Sealing tape
Test conditions:	Sap temperature 42 °F, 2 Brix, water reduction 65/35, 150 psi

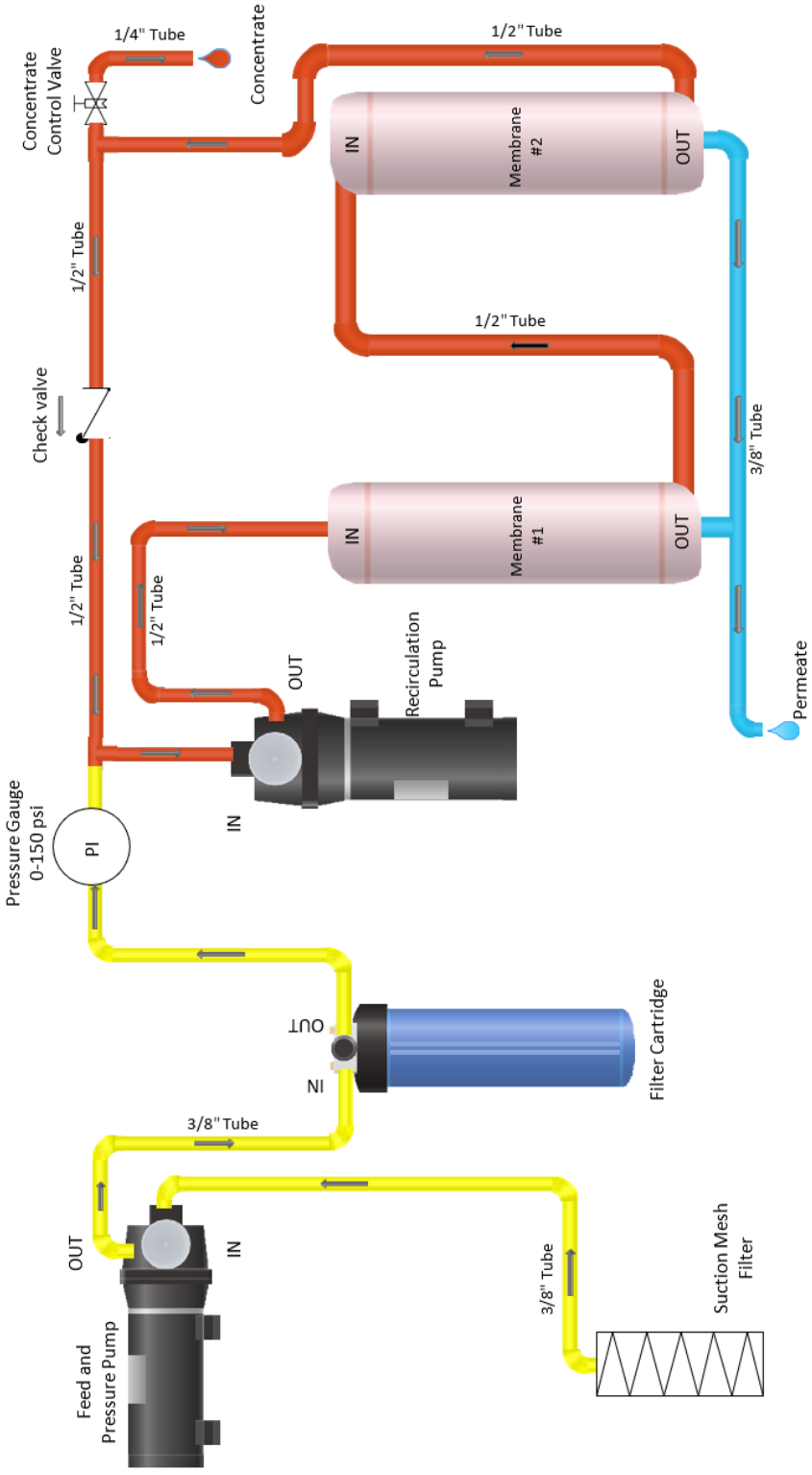
FITTINGS



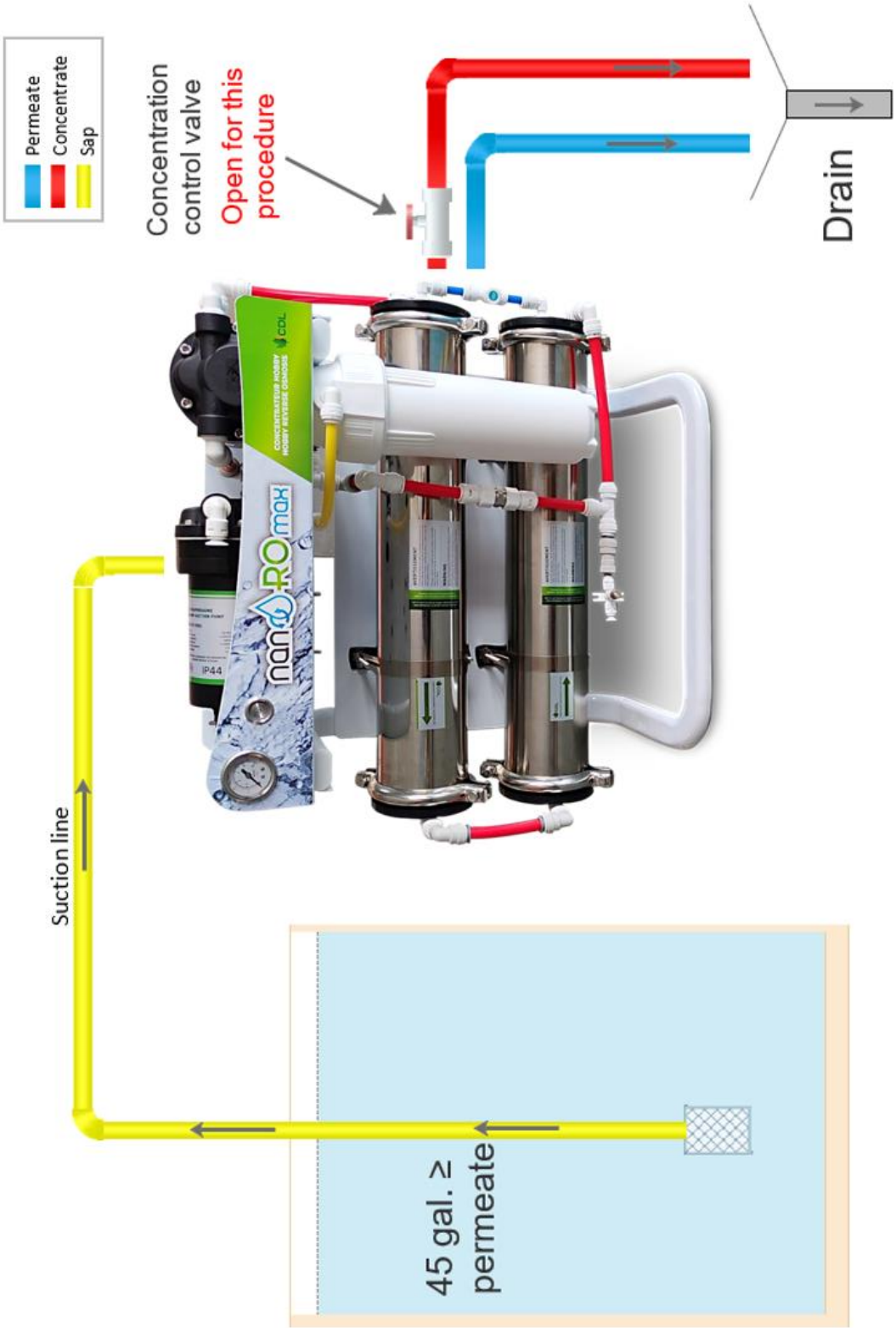
	DESCRIPTION	ITEM NUMBER
1	ADAPTER 3/4'' x 1/2'' MIPT-FIPT	664649
2	ELBOW 3/8" x 1/2" TUBE-MIPT	664640
3	TEE 3/8" x 3/8" x 3/8" TUBE	664666
4	TEE 3/8" x 1/4" x 3/8" TUBE	664637
5	ADAPTATER 3/8" x 1/2" TUBE-MIPT	664652
6	CHECK VALVE 1/2'' MIPT	661703
7	VALVE 1/4" TUBE	664667
8	CAP 1/4" TUBE	664655
9	CAP 3/8" TUBE	664654
10	ELBOW 3/8" x 3/8" TUBE-STEM	664659
11	ADAPTER 1/2'' x 1/4'' TUBE	664648
12	ADAPTER 1/2'' x 3/8'' TUBE	664646

	DESCRIPTION	ITEM NUMBER
13	ELBOW 1/2" x 1/2" TUBE-STEM	664642
14	MANOMETER 0-150 PSI - 1/4'' STEM	664697
15	ELBOW 3/8'' x 3/8'' TUBE	664639
16	ELBOW 1/4'' x 1/4'' TUBE	664641
17	ELBOW 1/2" x 1/2" TUBE-MIPT	664643
18	ADAPTER 1/2'' x 1/2'' TUBE-FIPT	664645
19	ADAPTER 1/2" x 3/4'' TUBE-FIPT	664647
20	TEE 1/2" x 1/2" x 1/2" TUBE	664636
21	ELBOW 1/2'' x 1/2'' TUBE	664644
22	CAP 1/2'' MIPT	664695
23	OVAL PLUG FOR FRAME	664694
24	ON/OFF SWITCH	521271

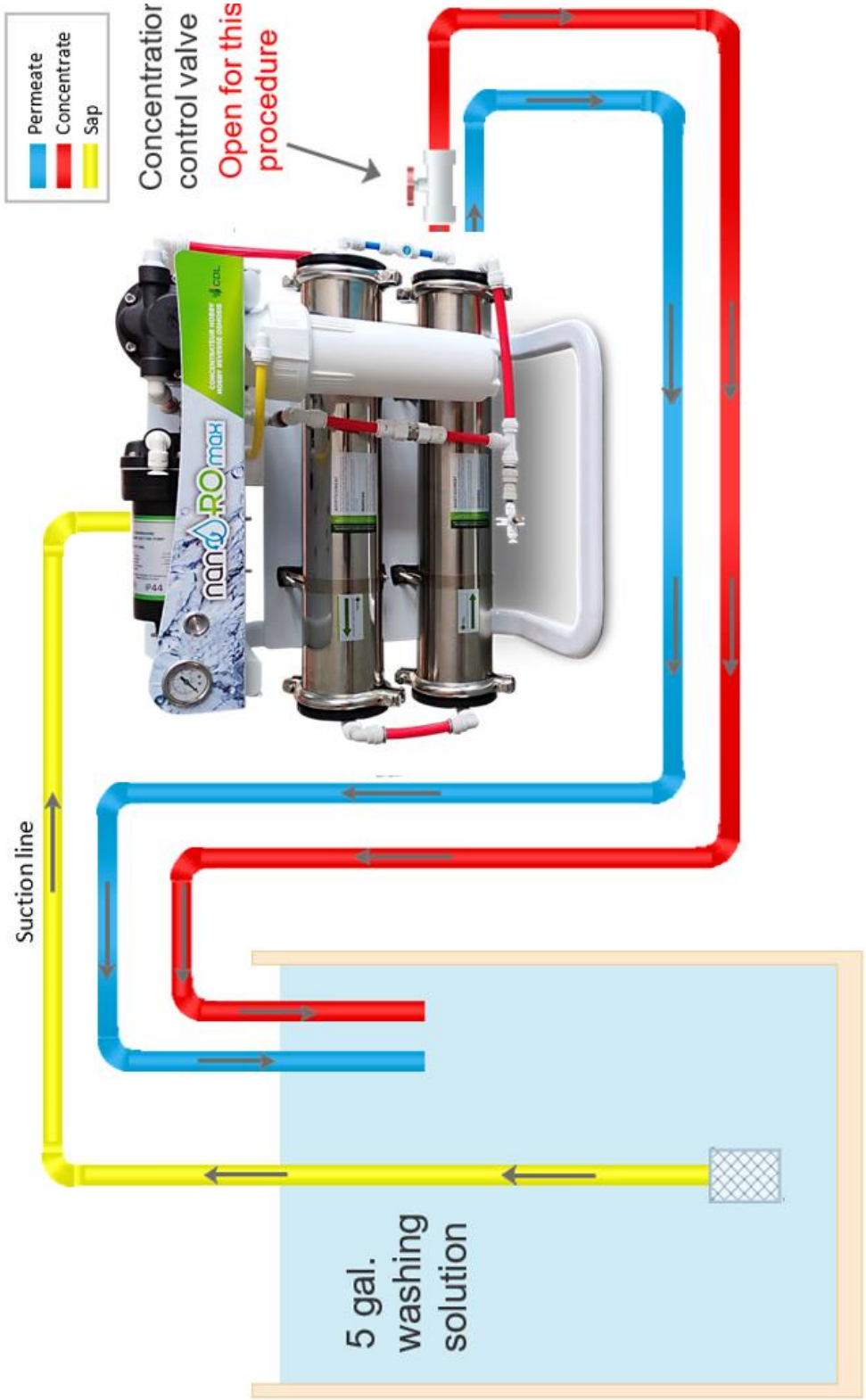
FLOW DIAGRAM



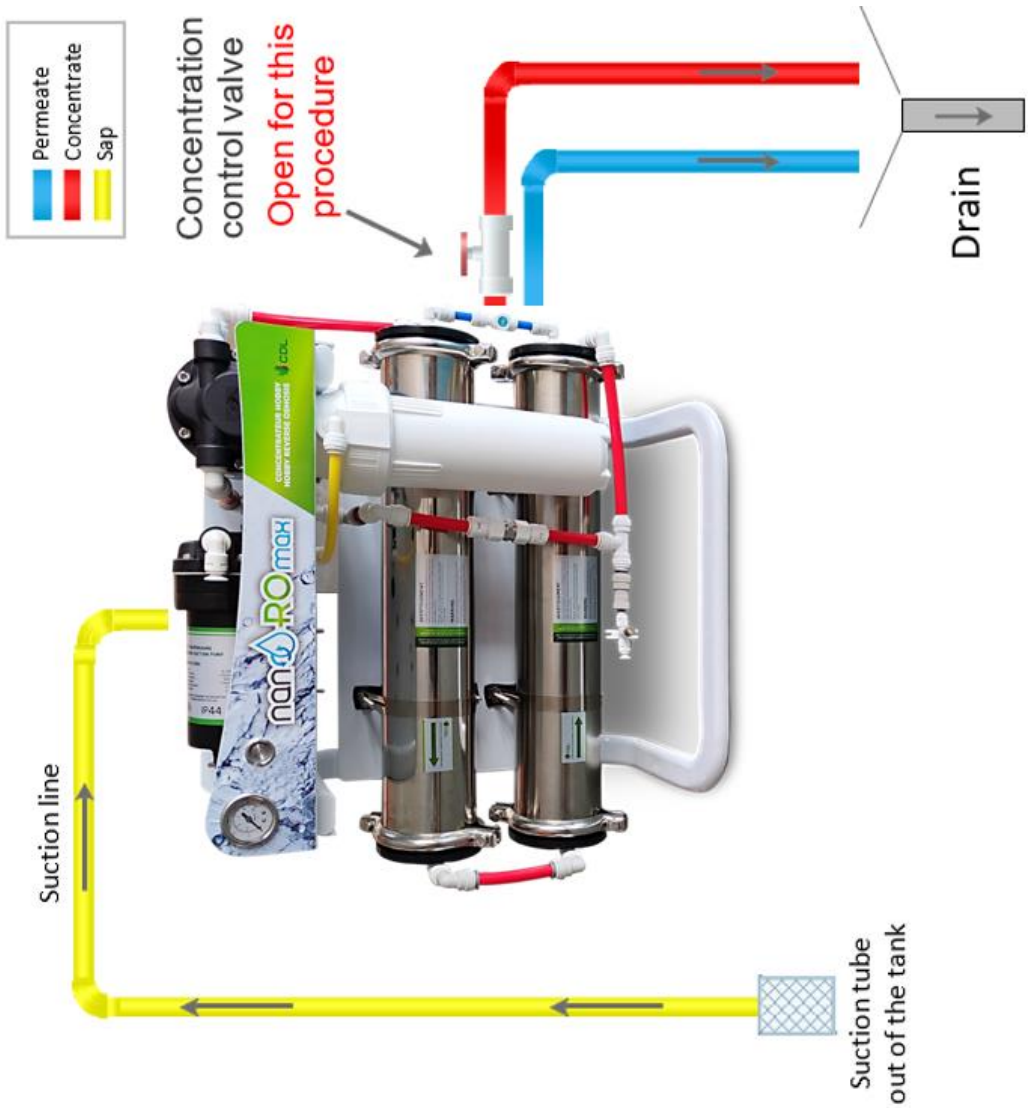
RINSE


Permeate
Concentrate
Sap
Concentration control valve
Open for this procedure
Drain
Suction line
45 gal. ≥ permeate

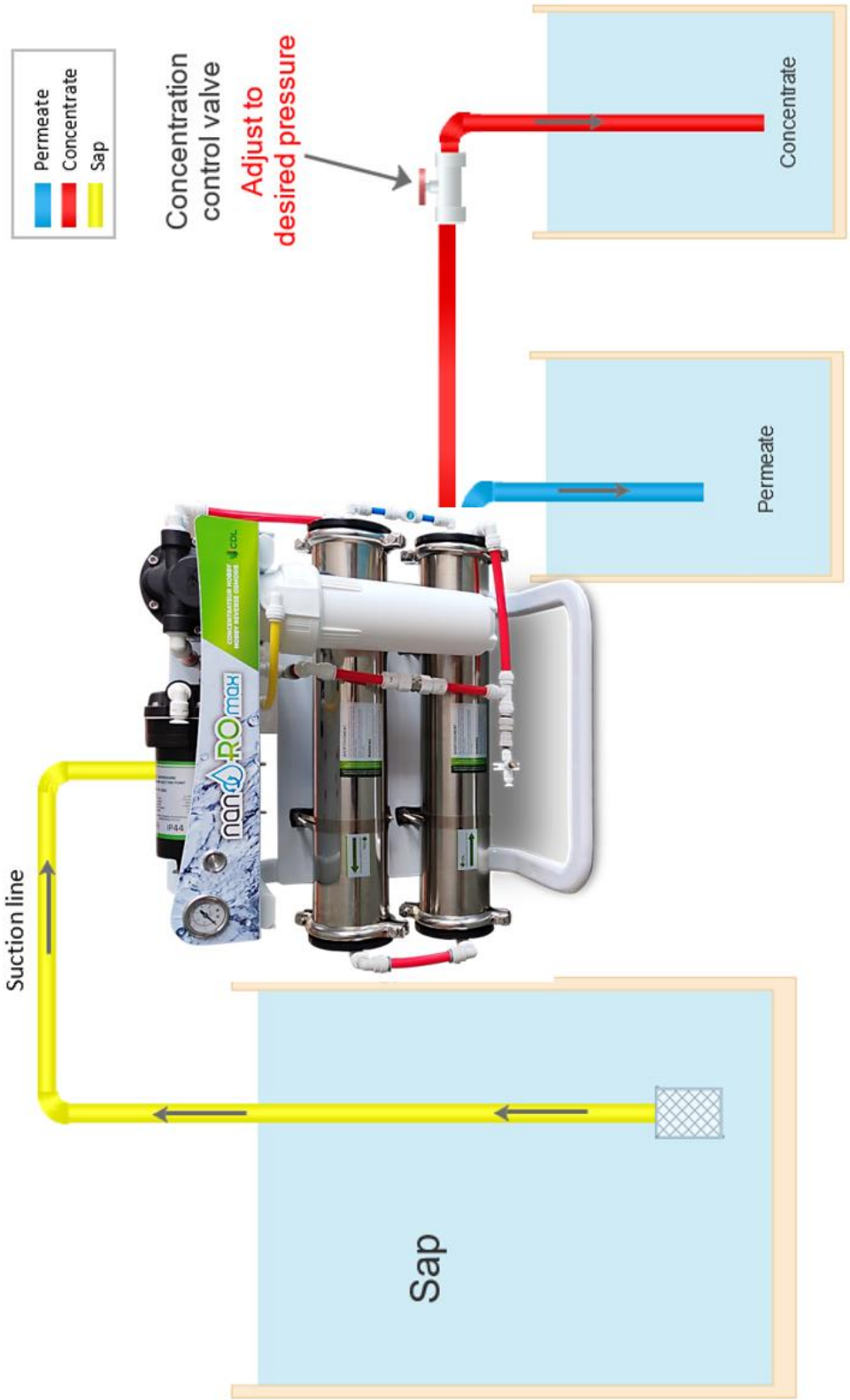
WASH


Permeate
Concentrate
Sap
Concentration control valve
Open for this procedure
Suction line
5 gal. washing solution

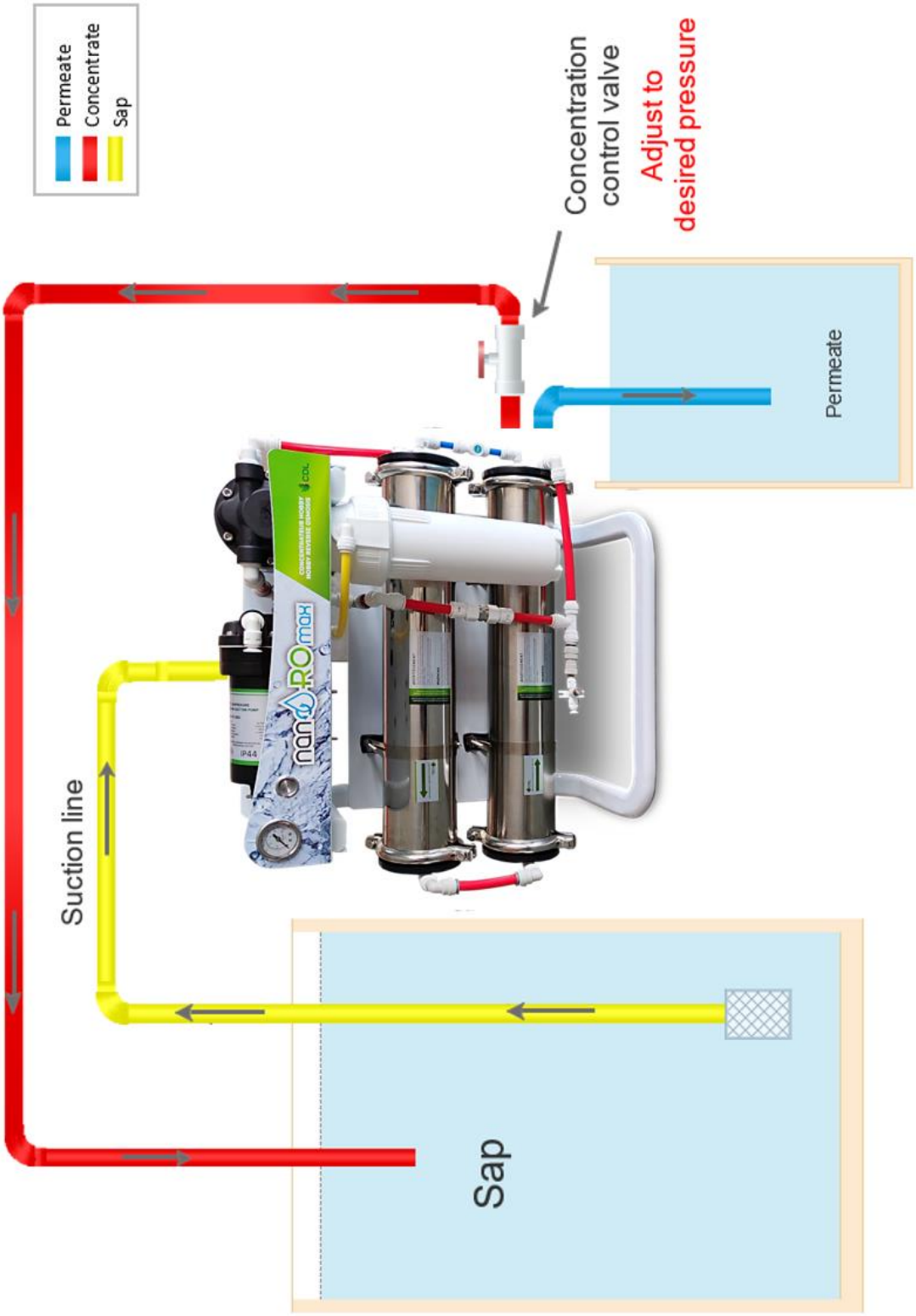
DRAIN


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

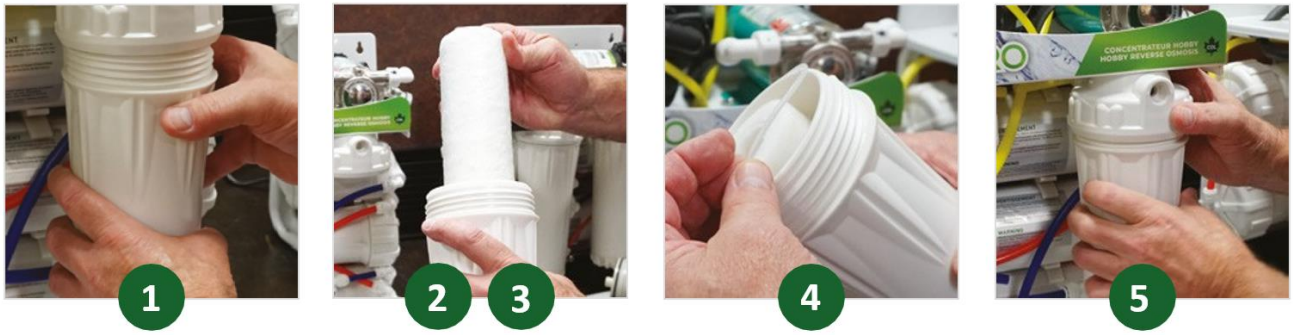
CONCENTRATION (1 PASS)



CONCENTRATION (BATCH)



HOW TO REPLACE PRE-FILTER 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. Fasten the housing into place.

HOW TO INSTALL MEMBRANES

1. Unscrew and remove the clamping collars on each side of the membranes that need to be changed.
2. On the left side of the membranes, remove the orange ties visible in step 1 and carefully remove the red concentrate tube connecting the membranes by pushing the white quick-connector collars inward.
3. Once the concentrate tube has been removed, use a pry bar or a flathead screwdriver at the interface of the cover and the membrane housing in the two cover notches. Gently pry off the cover and remove it from the housing.
4. On the other side, remove the orange ties to then remove the system inlet and the outlet tubes from the covers as in step 2. Remove the blue permeate tube between the membranes and remove the cover as in step 3.
5. Push the membrane through the housing in any direction to make it come out.

   Note: It is possible that the membrane remains stuck in one of the two covers. Use a pry bar or flathead screwdriver to carefully remove the membrane cover.
6. Lightly lubricate all gaskets on new membranes and covers with food-grade silicone grease. **Insert the new membrane into the housing according to the direction indicated in the following section**.
7. Insert the covers, making sure they rest well on the stainless-steel housing.
8. Reinstall all the connector tubes and clamping collars.

Membrane direction

When putting a new membrane in the concentrator, it's important to install it in the right direction to make sure there are no leaks, and that the concentrator is working properly. Each membrane has a brine seal on its concentrate inlet end. We therefore rely on the position of this brine joint to install the membranes the right way.

In the Nano RO MAX, the membranes are installed as follows (See picture below):

- The brine seal of the upper membrane must be on the right, as the concentrate inlet is on the right.
- the brine seal of the lower membrane must be on the left, as the concentrate inlet is on the left.

DAILY MEMBRANE CLEANING

OPEN THE PRESSURE CONTROL VALVE (red tube)

- Rinse the sugar water out of the equipment using 10 gallons of permeate and recover it in the sap tank.
- Complete the rinse with 10 more 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)**, the permeate tube **(blue)** and the 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, drain the solution and rinse.
- Repeat the wash if the wash solution is coloured or cloudy.
- Rinse the equipment with at least 20 to 25 gallons of clean permeate.

PROTECT FROM FREEZING

Protect the equipment from freezing during storage.

- If the equipment must remain in a cold place, remove the filter and drain the equipment properly. Reinstall the 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. Empty the filter housing once again.
- 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 needs to be relocated in 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 (follow the cleaning procedure). 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.

   10 gallons of permeate is sufficient for rinsing between washes. Before rinsing, we recommend draining the wash solution, following the drainage procedure.

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

3. Citric acid treatment

   Treating with citric acid helps dissolve minerals that can partially block membrane pores. After completing 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. Let the equipment soak overnight. If the water is cloudy, wash the system with CDL Super Flow Green, then rinse.

4. Storage solutions

- Membranes in the RO:

The washing and acid treatment procedures (Steps 1 to 3) must be completed before proceeding with this solution.

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)**, permeate **(blue)** tubes, and insert the provided plugs in the connectors.

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

Storage solutions (continued)

-Storage of membranes in the freezer:

- Follow the washing and citric acid treatment steps for long-term storage.
- Once the final rinse is complete, drain the equipment and remove the membranes from their housings.
- Let the membranes drain for a few minutes. Do not allow them to dry.
- Place the membranes in a large airtight bag and store them in the freezer.

Note : This method eliminates contamination risks of the membranes by molds during the non-use period. 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 always meet the following specifications:

CONTAMINANT	REQUIREMENT
Iron (Fe)	< 0,05 ppm
Manganese (Mn)	< 0,02 ppm
Silicate (SiO_2)	< 5 ppm
Aluminum (Al)	< 0,05 ppm
Hardness	< 85 ppm in $CaCO_3$
Particle Size	< 10 µm
Turbidity	< 1 NTU

Important Note:

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

WARRANTY

Nano RO MAX 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 does 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.

The pre-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

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

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