



Spot Free Rinse Installation Guide

Spot-Free Rinse / RO Installation & Product Guide

Version December 2025

Applies to all CRS Shaft RO models (79, 190, 285, 538, 887)

1. Overview

Installing a CRS Shaft nanobubble generator on your spot-free rinse system improves RO machine efficiency, extends membrane life, and enhances drying performance.

There are **two installation modes**:

A) Single-Pass Install (Upstream of RO Pre-Filter)

- Improves pre-filtration
- Protects membranes
- Reduces scaling & biofilms
- Mild drying improvement (baseline upgrade)

B) Multi-Pass Install (Recirculation Loop Inside RO Tank)

- Generates high nanobubble concentration
- Raises ORP significantly
- Produces **super-hydrophobic, extremely fast-drying spot-free water**
- Optional ozone injection for maximum effect

Both installation types can be used individually or together.

2. System Sizing & Model Selection

To select the correct Shaft model, measure the **total RO flow**:

Permeate Flow + Reject Flow = Total Flow

(Measure directly with flowmeters or use RO machine specifications.)

Choose the CRS model whose **upper flow band is within ~10-20% above your total flow.**

Model Selection Chart

Total RO Flow (Permeate + Reject)	Recommended Shaft
1–2 GPM	CRS 79
3–4 GPM	CRS 190
5–7 GPM	CRS 285
8–13 GPM	CRS 538
14–20 GPM	CRS 887

Sonny's RO Machine	Recommended Shaft
VROF- 2	CRS 285
VROF-4	CRS 538
VROF-6	CRS 887
VROF-8	CRS 887
VROF-12	CRS 1585

Rule of thumb:

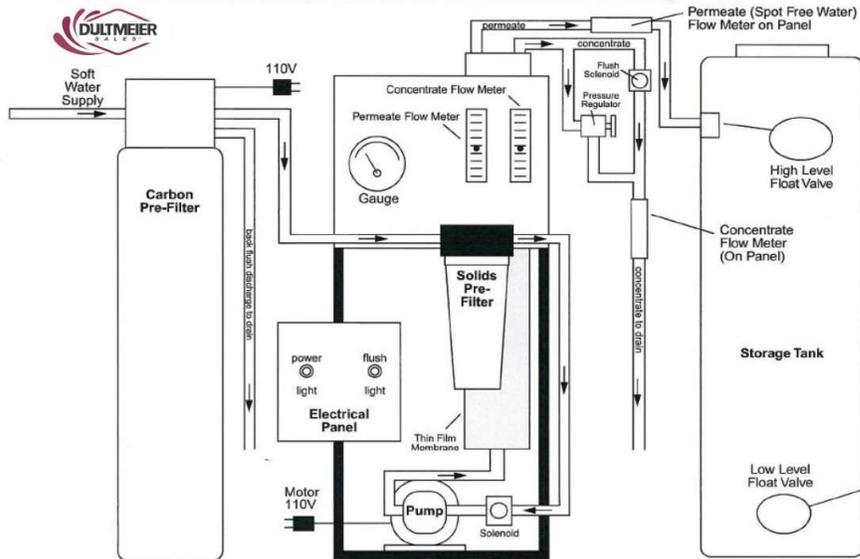
You generally want to be **above the middle of the flow band** for maximum cavitation & nanobubble yield.

**3. Installation Type A — Single-Pass Install

(Upstream of the Earliest RO Pre-Filter)**

This installation is **mandatory for all RO systems** because it conditions water prior to filtration and protects your membranes.

Reverse Osmosis Spot Free Rinse Production System



Where to Install

Install the Shaft **before the earliest pre-filter** (GAC, sediment filter, bag filter, etc.).

Step-by-Step Instructions

Step 1 — Measure Flow

Verify permeate + reject flow to confirm model selection.

Step 2 — Mount the Shaft

Use either:

- Hard piping (close nipples, unions recommended)
- Flexible hose with barbs
Use whichever simplifies your mechanical layout.

Step 3 — Apply Proper Thread Sealant

Use **Loctite 55 Cord** (recommended).

Avoid Teflon tape on stainless threads—it can cause micro-leaks and galling.

Step 4 — Pressure Test & Purge

- Pressurize system

- Check for leaks
- Run RO system for several hours
This flushes out loosened scale & biofilm.

Step 5 — Replace the Pre-Filter

As the system purges, the pre-filter will load with released debris; replace it for best performance.

Expected Results

- Immediate drop in permeate TDS
- Continued improvement over several days
- Membrane differential pressures stabilize
- Reduced need for annual chemical cleanings

****4. Installation Type B — Multi-Pass Install**

(Inside RO Permeate Tank Using a Submersible Pump)**

This option produces **maximum drying performance** and converts your spot-free rinse into **super-hydrophobic nanobubble water**.

System Overview

- Place a submersible pump into your RO permeate holding tank.
- Plumb the pump discharge into the Shaft.
- Return the Shaft outlet back into the same tank.
- This creates a continuous recirculation loop.

Why This Works

Nanobubble concentration increases **exponentially with every pass**, raising:

- ORP (Oxidation Reduction Potential)
- Dissolved oxygen

- Cavitation-induced colloidal stability
Leading to extremely fast drying.

ORP Targets

- **250 mV+** is the target for elite drying performance.
- Most systems achieve **200–260 mV** using only a Shaft + recirculation.

Optional: Gas Injection (Ozone)

If ORP does not reach 250 mV:

- Inject a **small dose of ozone** before the Shaft.
- Use a venturi or gas injection port.
- Recommended ozone generator:
Oxidation Tech OZX-300 .

Diagram (Conceptual)

Inputs:

- Submersible pump
- Gas injection port (optional)
- Shaft nanobubble generator

Outputs:

- Highly oxygenated, high-ORP nanobubble water

5. Performance Verification

A. ORP Measurement

Use a handheld ORP meter.

- Measure directly in the RO tank
- ORP should hold stable for hours due to nanobubble persistence

B. Drying Comparison

Do a simple test:

- Apply spot-free rinse to a hood or panel
- Compare air-dry time before vs after install
- Most customers report **30–70% faster drying**

C. RO Machine Metrics

- Lower permeate TDS
- Lower scaling on pressure vessels
- Lower biofilm formation
- Longer membrane lifespan
- Reduced anti-scalant usage (in many cases eliminated)

6. Troubleshooting

Issue	Possible Cause	Solution
Low ORP	Flow too low	Verify flow is within model spec and tank is turning sufficiently (i.e., circulating flow must be higher than use flow)
No drying improvement	Only single-pass installed	Add multi-pass recirculation loop
Pre-filter plugging	Normal flushing behavior	Replace filter after initial purge
Pump cavitation noise	Entrained air from tank	Lower pump in tank

7. Benefits Summary

Operational Benefits

- **Reduced Membrane Fouling**
Less scale & biofilm → longer membrane life
- **Lower TDS Permeate**
Improved RO performance
- **Cleaner Pre-Filters**
Filters load more uniformly and last longer
- **Reduced Chemical Costs**
Anti-scalants and membrane cleaners often reduced 25–60%

Customer-Facing Benefits

- **Much Faster Drying Times**
Nanobubbles + ORP = extremely rapid breakup & evaporation
- **Better Shine & Clarity**
Water sheets thinner → enhanced finishing quality
- **Less Spotting Risk**
Higher purity + hydrophobic effect

Maintenance & Longevity Benefits

- Fewer membrane cleanings
- Less pump wear due to cleaner feed water
- Reduced tank biofilm
- Less need to replace spray-arch nozzles clogged with scale

8. One-Page Summary (for technicians)

Technician Quick-Start

1. Measure permeate + reject flow
2. Select the Shaft size
3. Install before first pre-filter
4. Seal threads with Loctite 55
5. Flush system for several hours
6. Replace pre-filter
7. (Optional) Install submersible pump loop in tank
8. Check ORP—target 250 mV+

Installation Pictures

Shaft Installed Upstream of RO Pre-Filter:



Shaft on Submersible Pump:



Proper Set Up for Gas Injection with Shaft on Submersible Pump:

