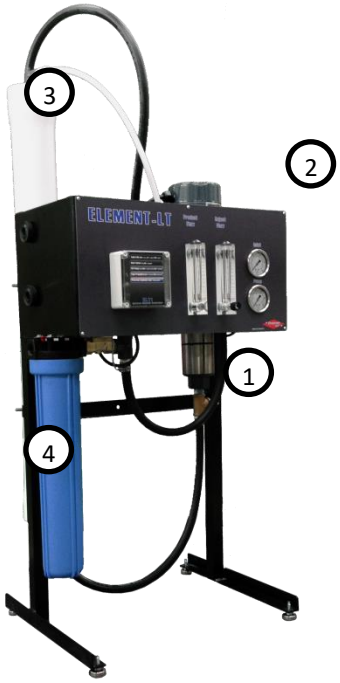
Element-LT Manual (ELE-2400-LT, ELE-4800-LT, ELE-7200-LT, ELE-800-LT, ELE-1600-LT)



Inspect the packaging of the equipment to confirm that nothing was damaged during shipping.

Remove the system from the packaging. Make sure everything is included and without damage. Below is a checklist of the major components to check. The system will already be assembled and should arrive in one piece.

_____ 1) Pump
_____ 2) Front Panel
_____ 3) Membrane Housing(s)
_____ 4) Filter Housing

Call Diamond H2O right away if anything is missing. Contact the freight company **immediately** if anything is damaged. Diamond H2O will not be liable for any damage received after shipping.

Packaged By: _____
Date: _____

Received By: _____ Date: _____

Warnings

1. **System produces Corrosive Water.**
   The element produces water with very low Total Dissolved Solids (TDS) and is *corrosive*. Product/Permeate water should not be exposed to metal piping like brass, copper, or steel. Systems installed on metallic plumbing must use Pro Products LLC Neutra 7 for protection from corrosion.

2. **System produces Concentrated Water.**
   The element produces water with very high TDS which can be dangerous. Concentrate/Reject water will contain a higher concentration of most contaminants than the source water and should not be used as drinking water.

3. **120/240V present in control box**
   To reduce the risk of electrical shock, the incoming power supply must include a protective earth ground.

4. **Pump will boost pressure by approximately 150psi.**

5. **Use on board TDS monitor as a secondary reference only.**
   TDS is a general indication of all the ions present in water. A reduction in TDS does not necessarily mean a reduction in a specific contaminant. Testing for specific contaminants at least annually is recommended.

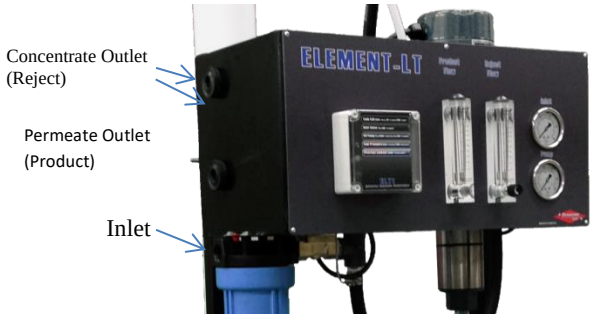
Contact **TG Analytical Labs** with any questions on testing coliform **bacteria, nitrate, arsenic**, and more.

Email: info@tgalabs.com **Phone: 920-757-1355** **Fax: 920-757-5819**

Setup Instructions

1. Find the location.

Decide where you would like to place the system. Allow at least 45 inches above the unit for membrane removal and loading. If the height is not available, allow at least 25 inches to the front of the unit for the removal of the entire membrane housing.



The unit will also need to be installed near a **120/240 VAC**, 60/50Hz power supply (Range: 90-145 VAC at 120VAC setting, 180-290 VAC at 240 VAC setting).

2. Install Float Switch (or other operation control)

If the system uses a holding tank, a float switch must be installed to control the system's production. Install the float switch in the holding tank and connect the switch to the correct terminals on the control (Check the Terminal Board Diagram).

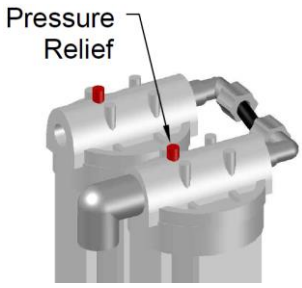
3. Plumb in the system.

Follow All Local Codes

a. Verify inlet water source meets requirements on page 4.
b. Turn off water from the supply water and make sure there is no pressure from the supply.
c. Plumb the water source to the ¾" FPT inlet ("Supply In").
d. Plumb the ½" MPT Permeate Outlet to its endpoint (this will contain product water)
e. Plumb the ½" MPT Concentrate Outlet to its endpoint (this will contain concentrate water)
f. Either the concentrate or permeate outlet must not be plumbed to a pressurized line. If both outlets are pressurized, the system will not prime properly.

4. Prime the system.

Turn on water from the supply and re-pressurize the incoming water line. Use the relief valves to help relieve any air pressure that may have built up in the water line. Once water begins coming out of the pressure relief valve, the system may be turned on. The control will automatically prime the pump.



5. Start up.

Most, if not all, of the programming will be set for the individual application during production. Plug the controller in and verify that the system has been programmed correctly and press System On/Off to turn on the system. During startup, the system will automatically prime the pump and begin operation after 15 seconds.

Feed Water Requirements

1. Plumbing feeding the element must be at least ¾" in diameter.
2. **Filtered water must be used on the membrane**. The element has a 5 micron filter to remove particles to drastically extend the life of the membrane. Changing these filters every month is recommended to extend the life of the membrane. Follow instructions on page 10 to change filters.

30-0021-XX	Replacement 5 Micron Filter
30-0122-XX	Alternate Replacement 5 Micron Filter

3. **Soft Water is recommended.** Excessive water hardness or iron concentrations may form scale over the membrane and cause clogging. This will drastically reduce the useful life of the membrane. Installing a water softener before each system to reduce hardness and iron is recommended.
4. **Anti-Scalent recommended.** Slightly soluble contaminants like calcium sulfate, silica, or colloidal clay will cause clogging. A continuous injection of an anti-scalent should be used if these contaminants are present.

Recommended Specifications:

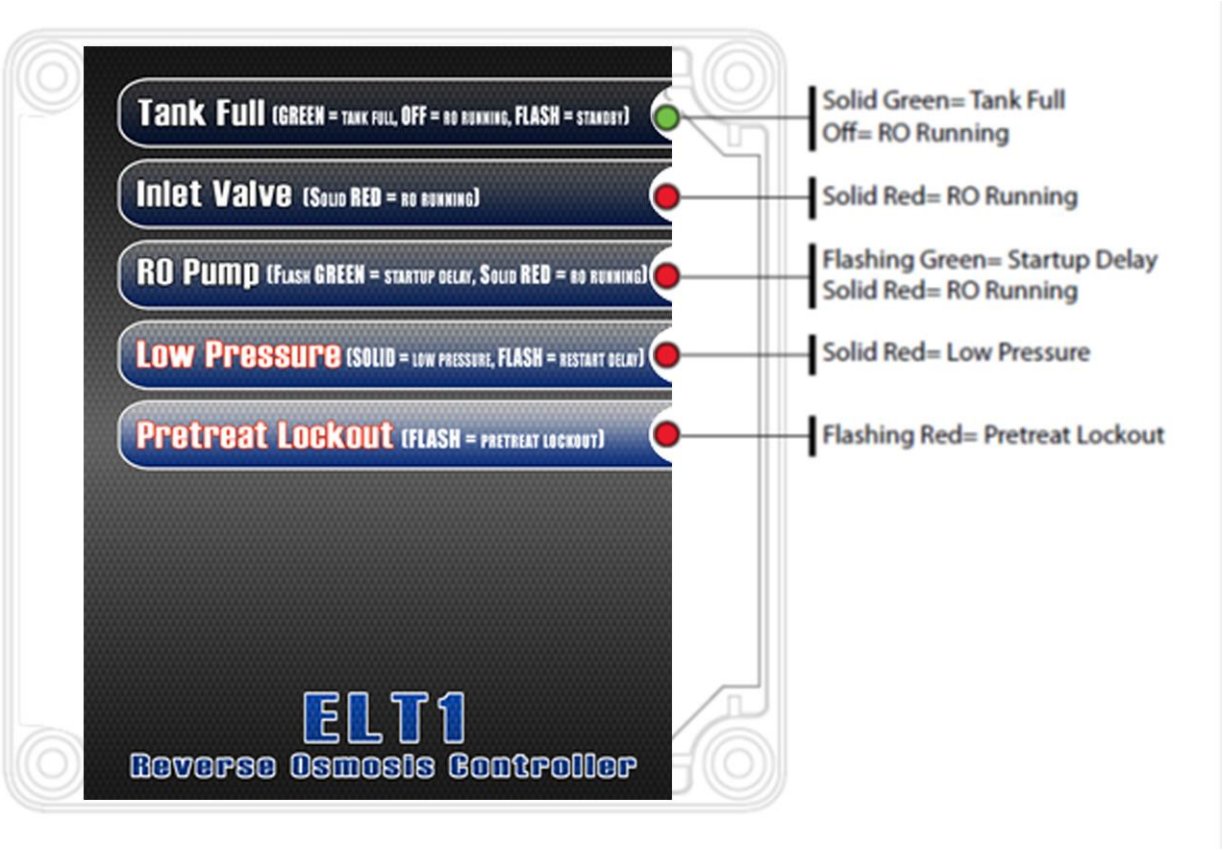
Total Dissolved Solids	< 2000 ppm	Hardness	< 17 ppm
Iron	< 0.1 ppm	Manganese	< 0.1 ppm
Silica	< 10 ppm	Hydrogen Sulfide	< 0.0 ppm
Organics	< 2 ppm TOC	Turbidity	< 0.1 NTU
Feed SDI	< 3.0	pH	3 – 10
Free Chlorine	0.1 ppm	Temperature	40-95°F
Inlet Pressure	20 – 80 psi		

Membrane Operating Parameters:

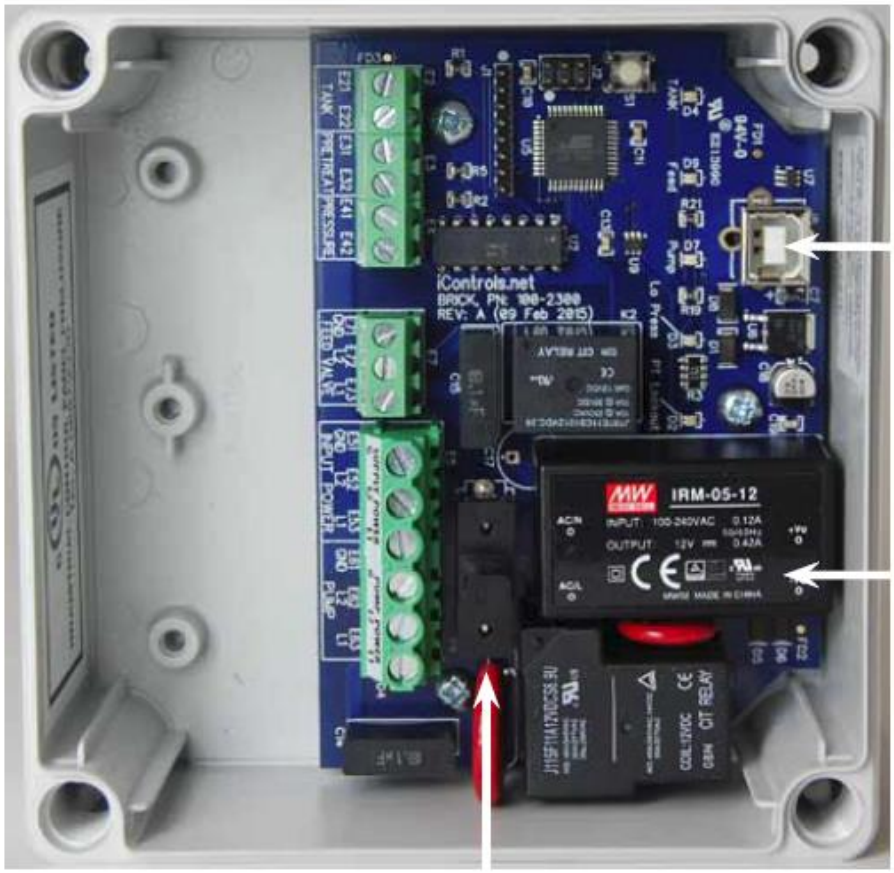
Membrane	Thin Film Composite		
Typical Operating Pressure	150-200 psig	Max Pressure:	400 psig
pH Range Continuous	3 – 10	pH Range, Cleaning	1 – 12
Max Pressure Drop	10 psig per membrane	Max Calcium Hardness	< 0.0 LSI
Nominal Rejection	98%	Max Temperature	113°F

Control

A diagram of the Element controller is shown below.



Inner Control Box

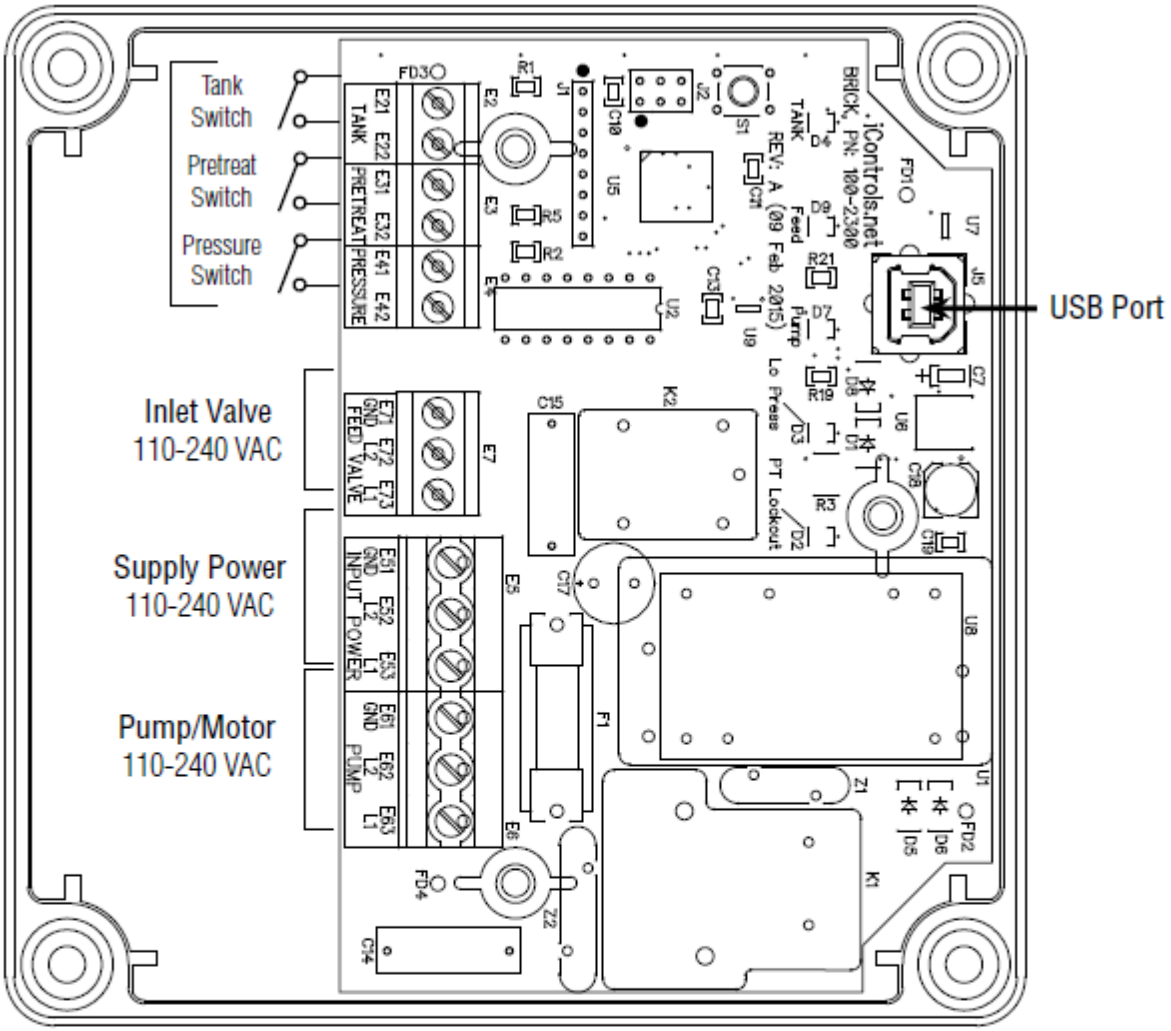


Programming Port
Standard USB port connects to computer for custom programming.

Switching Power Supply
Operates on 96-264VAC, automatically adjusts to operating voltage. Voltage at the supply terminals is the voltage for the pump and valves.

Fuse
1/8A, 5x20mm

CPU Board Diagram



About the Switch connections:

The switch terminals are all low voltage, dry contact connections. Do not apply voltage to these terminals or the controller will be damaged.

Tank Switch: Closing the tank switch connection causes the RO to run.

Pretreat Switch: Closing the tank switch stops the RO, creates Pretreat Lockout.

Pressure Switch: Closing the pressure switch allows the RO to run. Open switch=Low Pressure

DIP Switch Settings

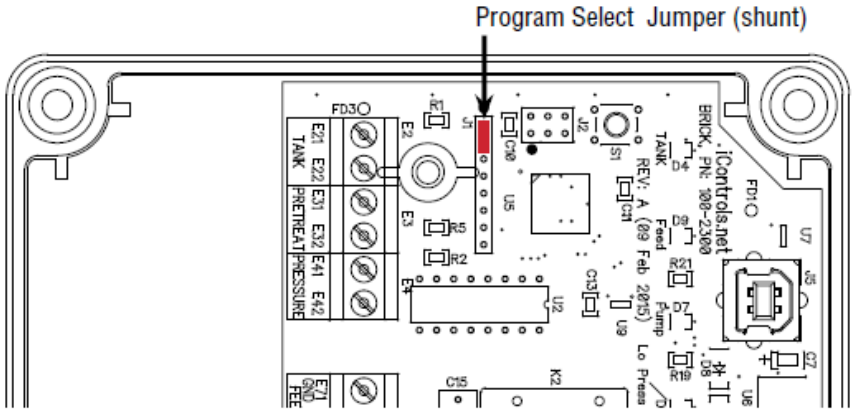
The Brick controller has 2 separate user-selectable sets of settings for configuring the RO. The factory default settings are shown below.

- **Program 1, "Normal" settings**
- **Program 2, Longer, (20 sec) pump start delay**
- See Appendix A for a detailed explanation of the Parameters and their affect on the RO's operation.
- See Appendix B for information on the programming interface for use in modifying these settings.

Parameter	Value	Program 1	Program 2
Tank Level Switch delay (actuation and de-actuation)	Seconds	2	2
Pressure Switch delay (actuation and de-actuation)	Seconds	2	2
Pretreat Switch delay (actuation and de-actuation)	Seconds	2	2
Pump start delay	Seconds	10	20
Inlet Solenid stop delay	Seconds	1	1
Pump start retry interval (restart delay after LP fault)	Seconds	60	60
Low pressure fault shutdown, # of faults	Faults	5	5
Low pressure fault shutdown, time period to count faults	Minutes	10	10
Low pressure fault shutdown, reset after shutdown	Minutes	60	60
Low pressure timeout fault	Seconds	60	60

Brick RO Program Selection

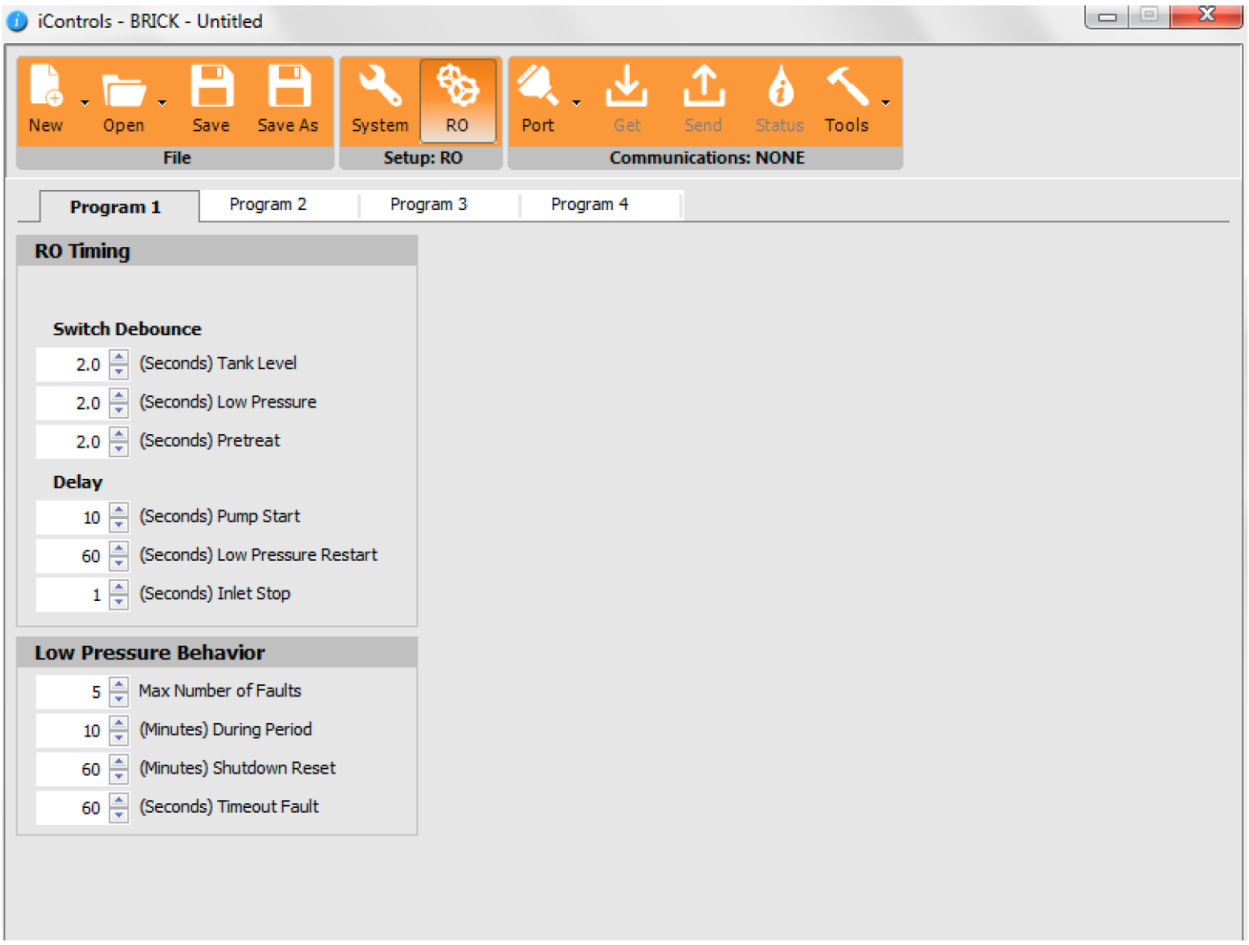
- **Program 1, no jumper (shunt)**
- **Program 2, add jumper (shunt) as shown below on pins 1&2 on header J1.**



Programming Guide

Parameter	Value	Range	Example
Input Switch Behaviors			
Tank Level Switch delay (actuation and de-actuation)	Seconds		2
This specifies the time that the tank switch must be closed or open before the controller accepts it as a valid condition. The function is to prevent nuisance tripping of the RO especially in small tanks or turbulent tanks			
Pressure Switch delay (actuation and de-actuation)	Seconds		2
This specifies the time that the pressure switch must be closed or open before the controller accepts it as a valid condition.			
Pretreat Switch delay (actuation and de-actuation)	Seconds		2
This is the time that the pretreat switch must be OPEN before the controller accepts it as a valid condition.			
Pump/Inlet Solenoid Behaviors			
Pump start delay	Seconds		10
On RO start-up, after the tank switch opens, the inlet solenoid valve is energized. When the inlet pressure switch closes the "Pump start delay" begins. If the pressure switch remains closed, the pump will start after 10 seconds.			
Inlet Solenid stop delay	Seconds		1
This value sets the delay for the inlet solenoid valve to be deenergized following the deenrgizing of the motor on RO shut down. The purpose is to prevent the pump from operating against a closed suction as the pump spins down.			
Low Inlet Pressure Behaviors			
Pump start retry interval (restart delay after LP fault)	Seconds		60
When the inlet pressure swith opens, the controller deenergizes the motor and the inlet solenoid valve remains open. The controller will continure to monitor the inlet pressure switch. After the switch is closed for the duration of the "Pump start retry interval" the motor is reenergized.			
Low pressure fault shutdown, # of faults	Faults		5
Low pressure fault shutdown, time period to count faults	Minutes		10
Low pressure fault shutdown, reset after shutdown	Minutes		60
These three values work together to determine how the RO handles Low Pressure conditions. The first two values, "# of faults" and "time period to count faults", sets the limit for the number of low pressure fault conditions over time that are required to place the RO in "Low Pressure Fault Shutdown". The third value sets the duration of the "Low Pressure Fault Shutdown" which is the period that the RO will remain idle before trying to restart. The purpose of the Low Pressure Fault Shutdown is to prevent an RO from turning OFF/ON repeatedly without any limit.			
Low pressure timeout fault	Seconds		60
If the inlet valve is open, but the pressure isn't sufficient to close the inlet pressure switch, the RO could run indefinitely on line pressure. This value sets the time limit for the RO to operate with the inlet valve open with Low Pressure as indicated by an Open inlet pressure switch before a Low Pressure Fault is added to the counter above.			

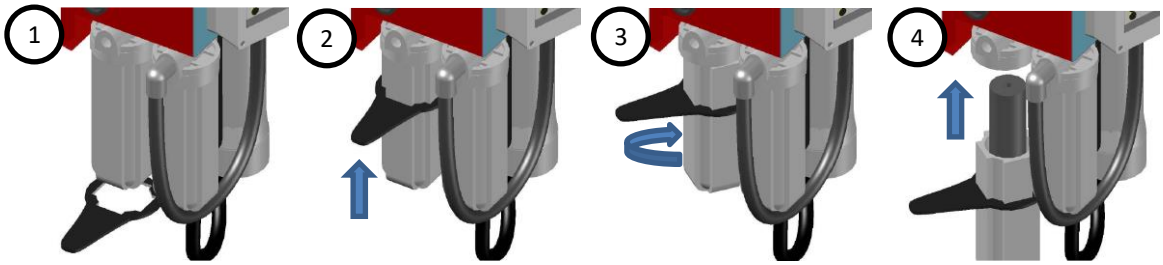
Programming Interface



The Programming interface is a Windows-based tool for making changes to the Brick software. This screen shows the RO settings available. There are 2 field-selectable sets of settings stored in the Brick.

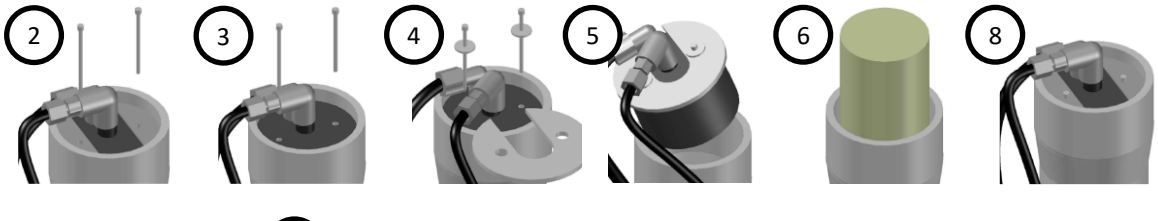
Changing a Filter

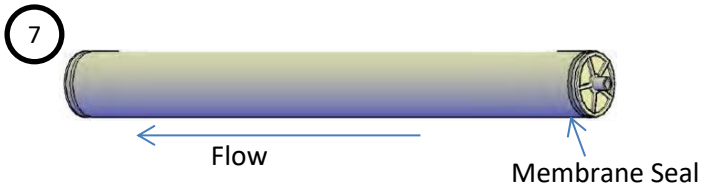
1. Turn off the control and the incoming water supply and depressurize the incoming water line.
2. Once the system is depressurized, place the housing tool onto the filter housing.
3. Twist the housing tool counter-clockwise to unscrew the bottom of the filter housing from the top of the filter housing.
4. Remove the original filter and replace with the correct filter. A 5 micron filter (30-0021-XX) or an alternate 5 micron filter (30-0122-XX) should be used.
5. Screw the bottom of the filter housing back on double checking while checking to make sure the top and bottom of the filter are aligned correctly. Tighten the bottom of the filter housing by rotating counterclockwise. Excessive force does not need to be used when tightening the housing, but the housing should be secure and snug.



Changing a Membrane

1. Turn off the control and the incoming water supply and depressurize the incoming water line.
2. Remove screws from top of membrane.
3. Remove 2 metal securing brackets from top of membrane.
4. Slide membrane changing tool into position.
5. Tighten screws through tool and into the membrane housing cap until it pulls cap is clear from housing. Remove cap and unscrew and remove changing tool.
6. Remove membrane.
7. Attach membrane seal on new membrane. O-Ring must be placed on side flow is going toward.
8. Reattach cap, securing brackets, and screws.





2.5” Replacement Membrane Part Number: 30-0116-XX
4.0” Replacement Membrane Part Number: 30-0115-XX

Notes: