

Element (ELE-800, ELE-1600, ELE-1800, ELE-2400, ELE-4800, ELE-7200) Manual

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 <u>right away</u> 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	y 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 ³/₄" FPT inlet ("Supply In").
- d. Plumb the 1/2" MPT Permeate Outlet to its endpoint (this will contain product water)
- e. Plumb the 1/2" 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 values to help relieve any air pressure that may have built up in the water line. Once water begins coming out of the pressure relief value, 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 ³/₄" in diameter.
- 2. Filtered water must be used on the membrane. The element has a 5 micron filter to remove particles and will 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	рН	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



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Control

A diagram of the Element controller is shown below.



Standby/ON Switch

Capacitive touch switch. Tank Full LED turns Red to confirm button contact. To turn controller OFF/Standby, hold for 1-2 seconds. Momentary contact turns controller On.



Inner Control Box





CPU Board Diagram





DIP Switch Settings

See Page 8 for details on RO Program settings.



RO Program Settings

Switch 1	Switch 2	Program
OFF	OFF	1
ON	OFF	2
OFF	ON	3
ON	ON	4



Programming Guide

The element has four programs which determine the flush behavior or the system.

Program 1: High Pressure Flush

Program 2: No Flush

Program 3: Permeate flush, (low pressure, inlet valve closed)

Program 4: Low pressure feed water flush

The program details are shown below.

Parameter	Value	Program 1	Program 2	Program 3	Program 4
Tank Level Switch delay (actuation and de-actuation)	Seconds	2	2	2	2
Pressure Switch delay (actuation and de-actuation)	Seconds	2	2	2	2
Pretreat Switch delay (actuation and de-actuation)	Seconds	2	2	2	2
Pump start delay	Seconds	10	10	10	10
Inlet Solenid stop delay	Seconds	1	1	1	1
Pump start retry interval (restart delay after LP fault)	Seconds	60	60	60	60
Low pressure fault shutdown, # of faults	Faults	5	5	5	5
Low pressure fault shutdown, time period to count faults	Minutes	10	10	10	10
Low pressure fault shutdown, reset after shutdown	Minutes	60	60	60	60
Low pressure timeout fault	Seconds	60	60	60	60
Flush Behavior		High Pressure	No Flush	Permeate Flush	Low Pres- sure Flush
Startup Flush: Minutes from last flush	Minutes	0	0	0	0
Startup Flush: Duration	Seconds	0	0	0	30
Periodic Flush: Interval	Minutes	60	0	0	0
Periodic Flush: Duration	Seconds	30	0	0	0
Shutdown Flush: Time from last flush	Minutes	10	0	0	0
Shutdown Flush: Minumum operation	Minutes	30	0	0	0
Shutdown Flush: Duration	Seconds	60	0	60	60
Idle Flush: Interval *	Minutes	0	0	0	0
Idle Flush: Duration *	Seconds	0	0	0	0
Timed Manual Run	Minutes	5	5	5	5
Timed Manual Flush	Minutes	5	0	5	5

* These features are disabled by default due to the potential for confusion on the part of end-users in the field. They can be enabled when needed via the OEM PC programming interface which allows changes to all of the values shown above.



Control Programming: Parameters Explained

Parameter	Value	Range	Example		
Input Switch Behaviors					
Tank Level Switch delay (actuation and de-actuation)	Seconds		2.0		
This specifies the time that the tank switch must be closed or open before the co tion. The function is to prevent nuisance tripping of the RO especially in small tan	This specifies the time that the tank switch must be closed or open before the controller accepts it as a valid condi- tion. 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		3		
This specifies the time that the pressure switch must be closed or open before the condition. Since pressure switches usually have built-in hysteresis this value is s	e controller et at 0.	accepts it as	a valid		
Pretreat Switch delay (actuation and de-actuation)	Seconds		2		
This is the time that the pretreat switch must be OPEN before the controller acce	ots it as a va	alid condition	Ι.		
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 this begins the "Pump start delay". If the pressure switch remains closed, the pump will start after 10 sec- onds.					
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 would run indefi- nitely on line pressure. This value sets the time limit for the RO to operate with the inlet valve open with Low Pres- sure as indicated by an Open inlet pressure switch before a Low Pressure Fault is added to the counter above					



Control Programming: Parameters Explained (Continued)

Flush Behavior					
Time from last flush before Flush on Shutdown	Minutes		15		
Minimum operation before Flush on Shutdown	Minutes		60		
Flush duration on Shutdown	Seconds		60		
Periodic Flush interval	Minutes		60		
Periodic Flush duration	Seconds		30		
Unit Idle Flush interval *	Minutes		0		
The Unit Idle Flush Interval sets a time after which the RO will start-up and run in the flush mode. This is disabled by default because of the danger of over-flowing a tank if not properly implemented. It is intended for environments where leaving the RO idle for long periods would invite bio-fouling. (0)=disabled					
Unit Idle Flush duration *	Seconds		0		
Sets the duration of the Idle Flush. (0)=disabled					
Timed Manual Run - Duration of Manual Run	Minutes		5		
Timed Manual Flush - Duration of Manual Flush	Minutes		5		



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



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Notes: