

**WATERMAKER
SYSTEM
CONTROLLER
OPERATION
MANUAL**

**SEA-R.O.
WATERMAKERS**



Table 1. Specifications

Inputs

Tank level switches	(2) Normally-Closed. <i>Can be used with a single level switch.</i>
Start/Stop	Momentary contact, normally open (RJ45 connector, 8 conductor)
Pretreat lockout switch	Normally-Open.
High Pressure switch	Normally-Open.
Controller Power	110/240 VAC, 60/50Hz
Permeate Conductivity	0-3000 PPM, 0-6000 μ s (standard sensor, CP-1, K=.75)
Feed Conductivity	not applicable on Seawater

Output Relay Ratings (*relays are fused with a 5A fuse so ratings reflect capacity of the relay only*)

Feed Valve (Boost Pump Coil)	10A @ 250VAC (with NO and NC contacts for motorized valves)
Flush Valve	10A @ 250VAC.
Divert Valve	10A @ 250VAC (with NO and NC contacts)
Alarm	10A @ 250VAC
HP Pump Motor Coil	10A @ 250VAC

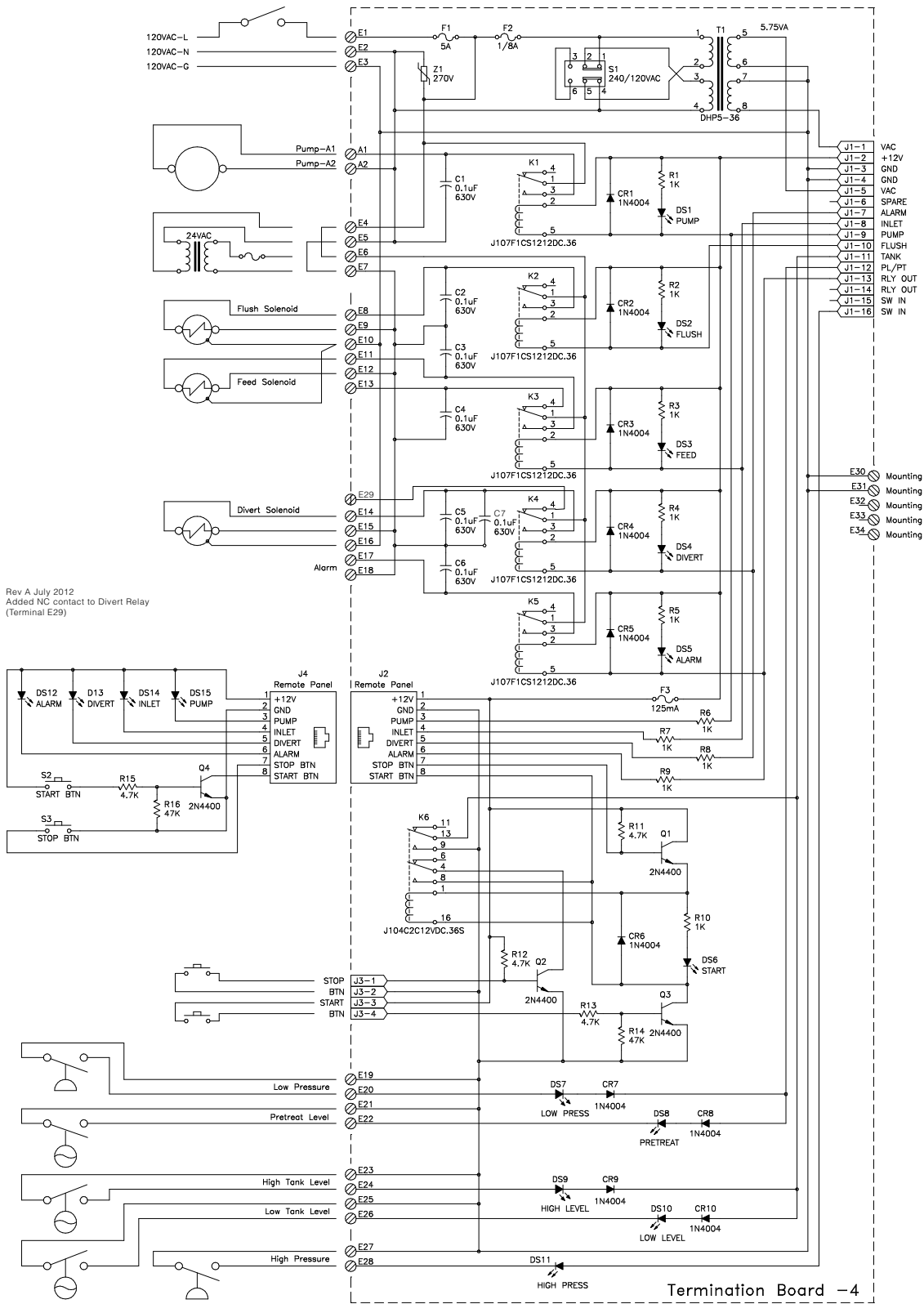
Circuit Protection

Main Power Fuse	F1	5 Amp	5x20mm	LittleFuse F234.005 or Buss GMC-5R
Transformer Fuse	F2	1/8 Amp	5x20mm	LittleFuse O218.125MXP

Other

Dimensions	10.5" tall, 9.5" wide, 5.0" deep. Nema 4X non-metallic (10x8x4) 12.5" tall, 11.25" wide, 7.0" deep. Nema 4X non-metallic (12x10x6) 14.5" tall, 13.5" wide, 7.0" deep. Nema 4X non-metallic (14x12x7)
Weight	4.2 lb. (10.5x9.5) (<i>Enclosure, CPU-4 and TB-4 only.</i>) 6.0 lb. (12.5 x 11.25) (<i>Enclosure, CPU-4 and TB-4 only.</i>) 10.6 lb. (12.5 x 11.25) (<i>Enclosure, CPU-4 and TB-4 only.</i>)
Environment	0-50°C, 10-90%RH (non-condensing)

Figure 1. Terminal Board Schematic



Rev A July 2012
Added NC contact to Divert Relay
(Terminal E29)

Figure 2. Controller Overview

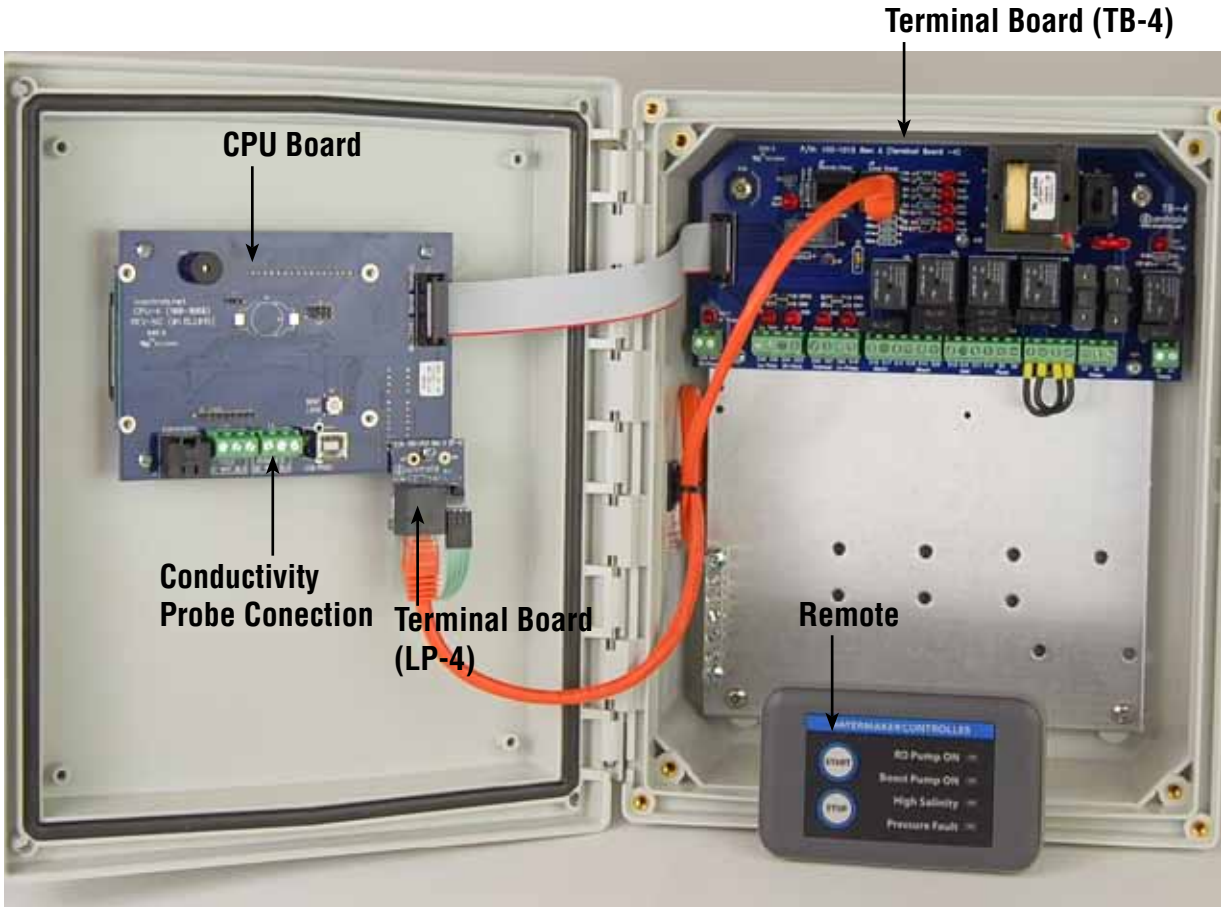
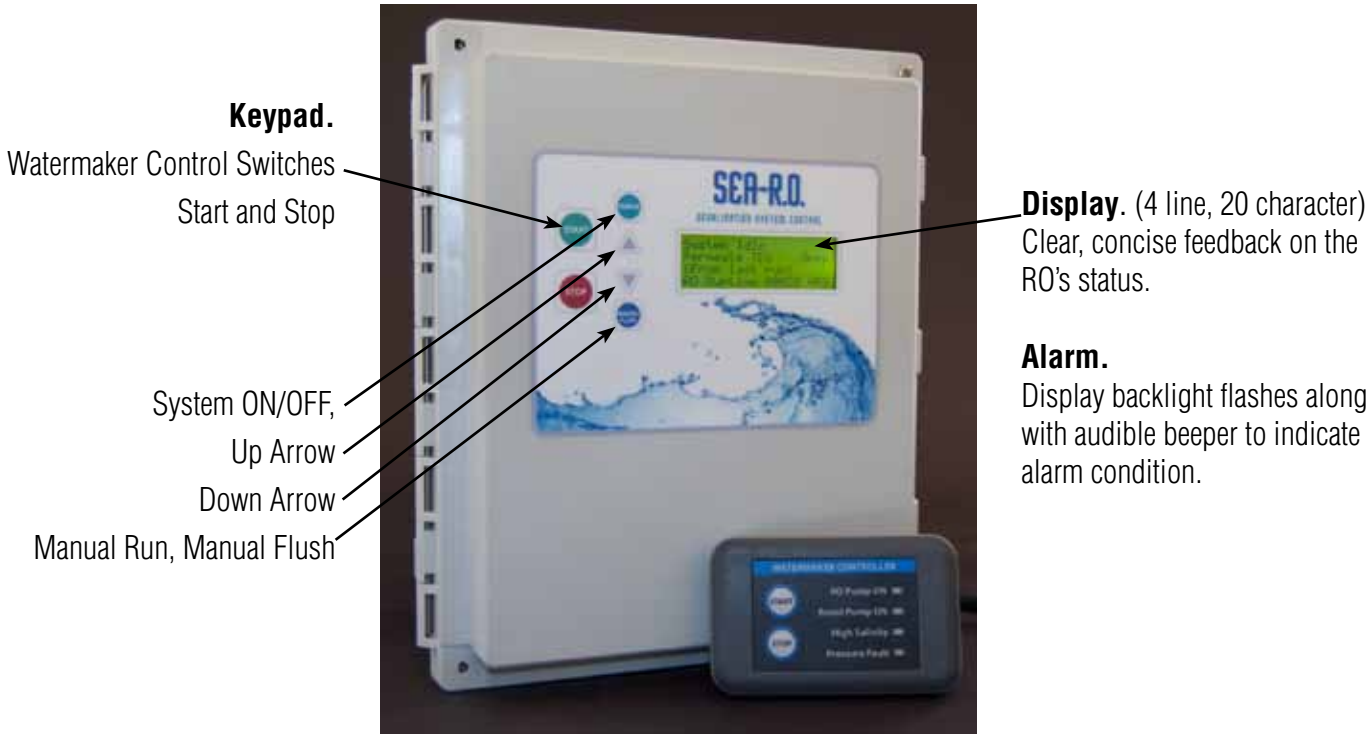
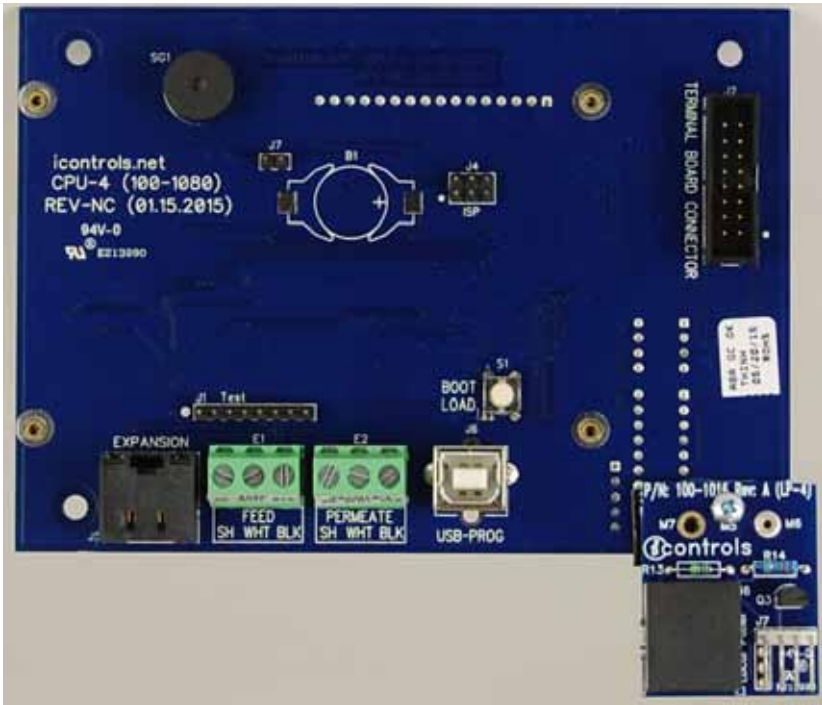


Figure 3. Controller Detail: CPU-4/LP-4

Typical Configuration



Detailed View

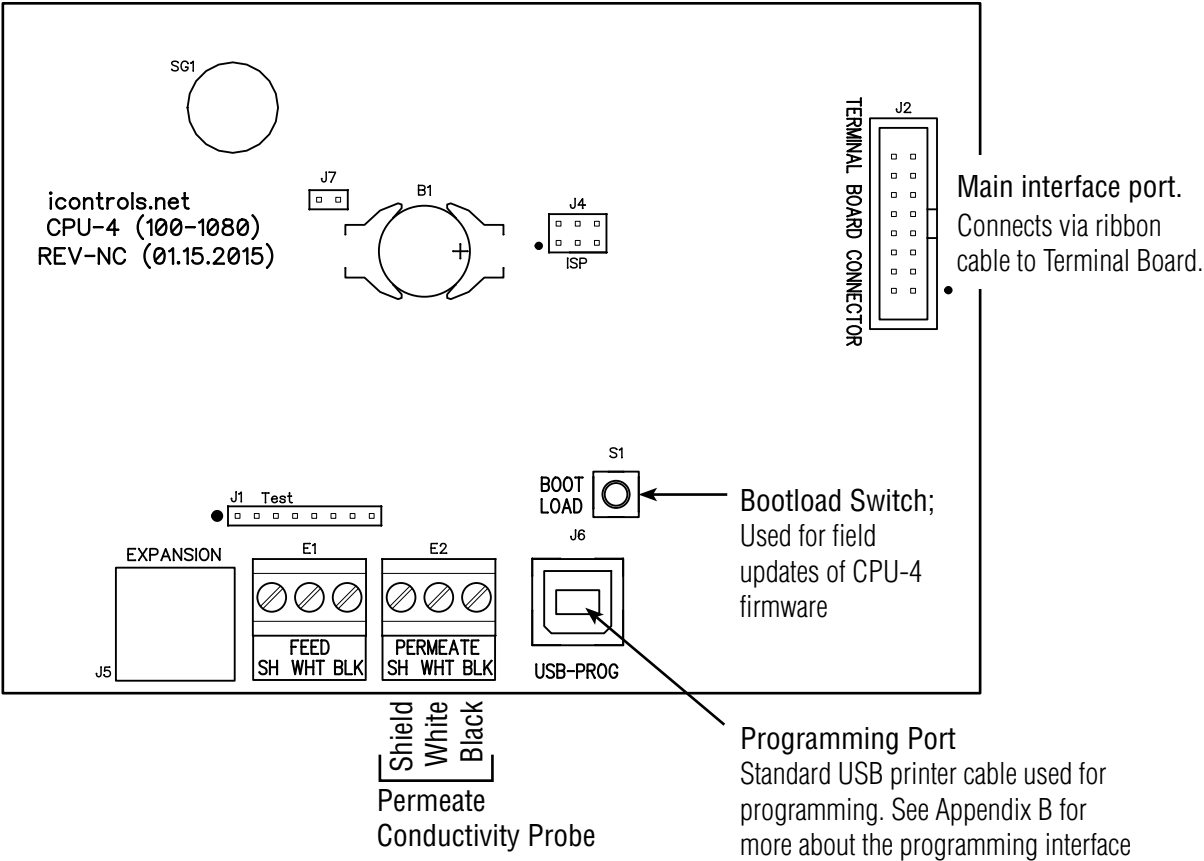


Figure 4. Controller Detail: Terminal Board, TB-4 (See Fig. 1 for schematic)

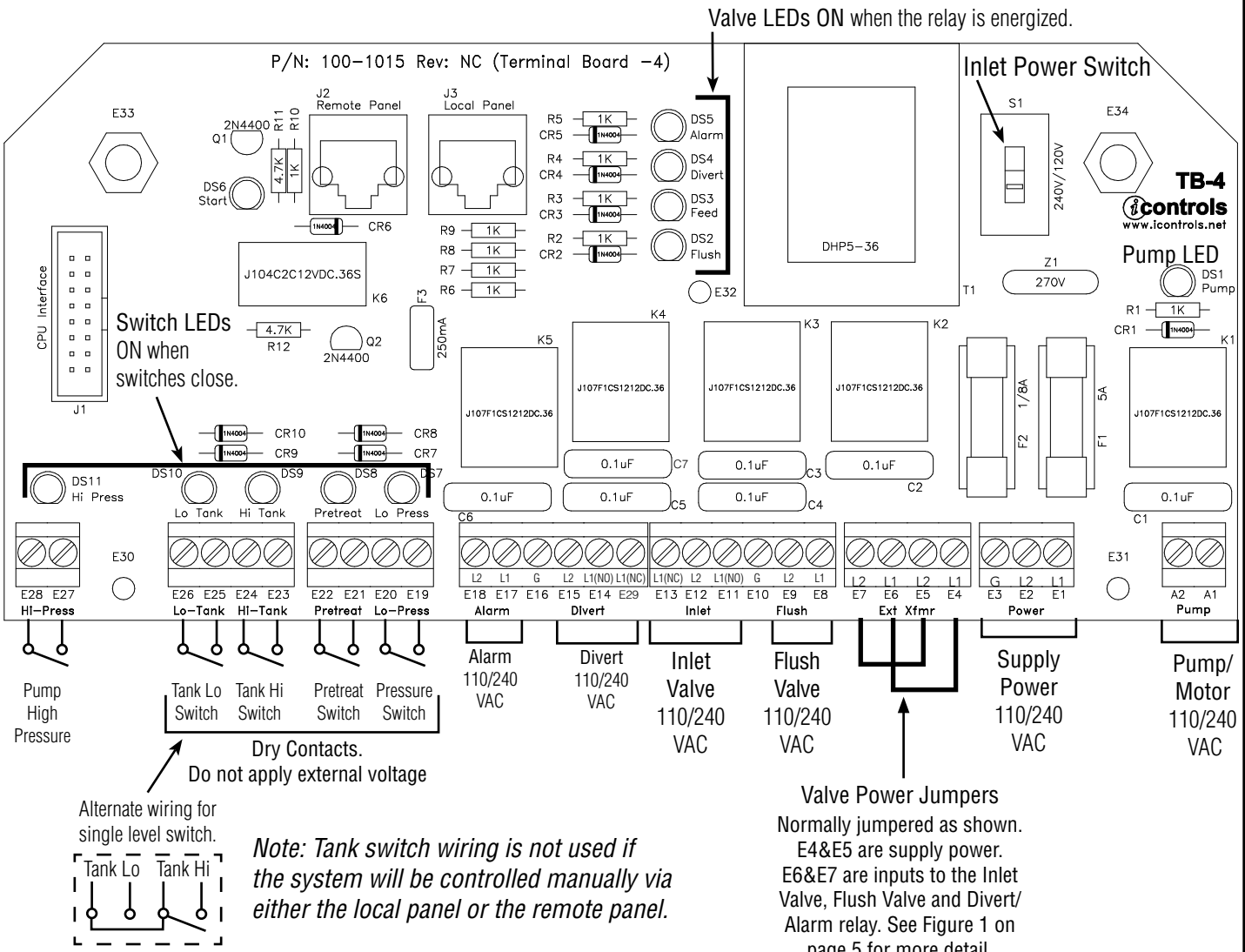


Figure 5. Conductivity Probe Installation



Install the Conductivity Probe in the "Run" of a Tee or equivalent location. Orient the probe so that air can not become trapped in the area near the probe.

Conductivity Probe Calibration

Because the conductivity measurement is affected by the physical environment in which it operates, it is best to calibrate while installed in the system and operating under normal conditions. This requires an external conductivity measurement device that is known to be accurate to serve as a reference.

1. Operate the RO long enough for the membranes, operating temperature and permeate conductivity reading to stabilize.
2. Take a sample of the permeate and measure it with the reference meter.
3. See Figure 7 for instructions on how to access the Permeate Calibration Menu.
4. Enter the Permeate Calibration menu and use the UP or Down arrow until the value on the controller matches the value obtained on the reference meter.
5. Exit and Save the calibration.
6. The same procedure applies to the Feed Probe calibration.

NOTE: The probe calibration must be performed using solutions with conductivity of less than 900 ppm or μs . The conductivity calibration circuit will behave erratically if you attempt to calibrate using a higher value. When using a standard calibration solution, the NaCl PPM value can be used in place of the μs value if desired.

Installation

1. Drill the enclosure as needed and install liquid-tight fittings for the wiring.
NOTE: The Controller can be ordered pre-drilled or with fittings installed, or with fittings and wiring installed. Contact SEA-RO for details.
2. Mount the enclosure in the desired location on the RO system.
3. Bring the wires from the peripheral devices into the enclosure and connect them to the appropriate terminals. (See Figure 1, Figure 3 and Figure 4.)
4. Set the voltage selector switch on the Terminal Board to the desired voltage (110VAC or 240VAC) (See Figure 4.)
5. Install the conductivity cell in the permeate line. (See Figure 5 for conductivity cell installation instructions.)
6. Connect the conductivity cell to the terminals on the CPU Board. (See Figure 3)
7. Provide power to the RO system.
8. Press the System On/Off switch to turn the system ON.
9. The controller is now ready for service.

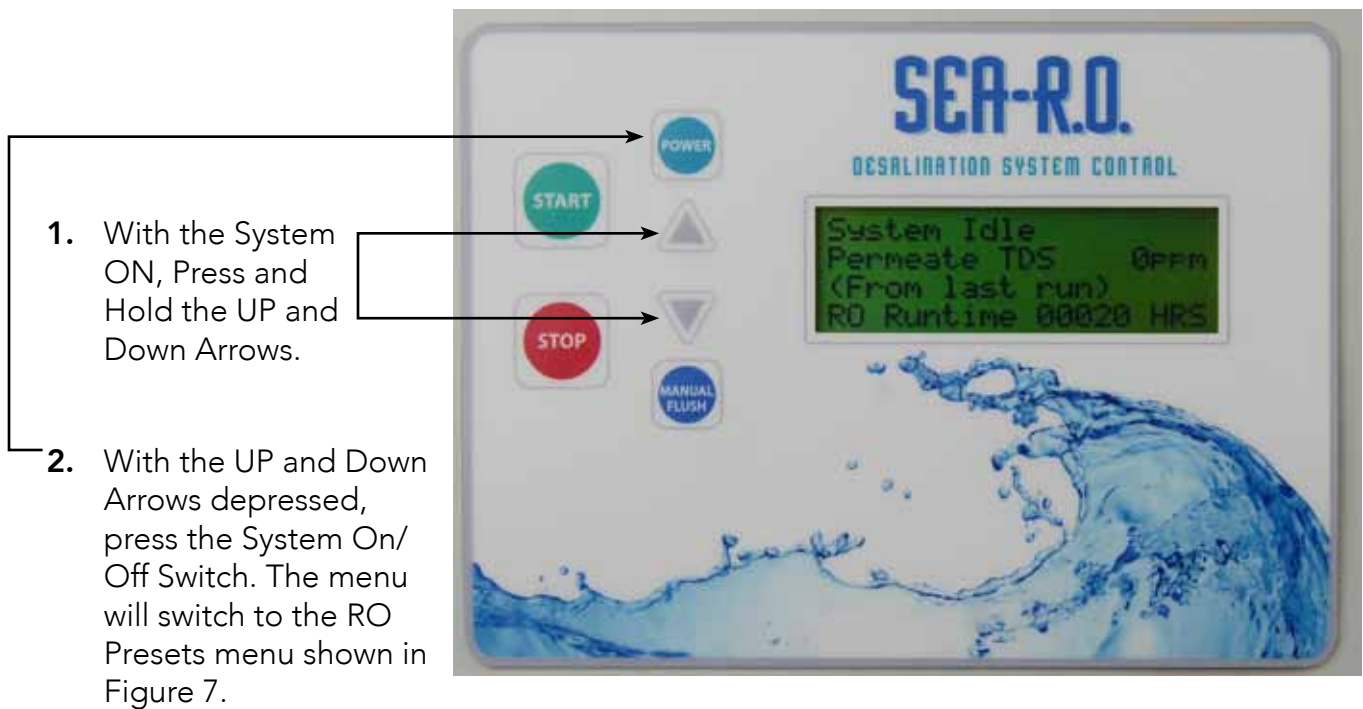
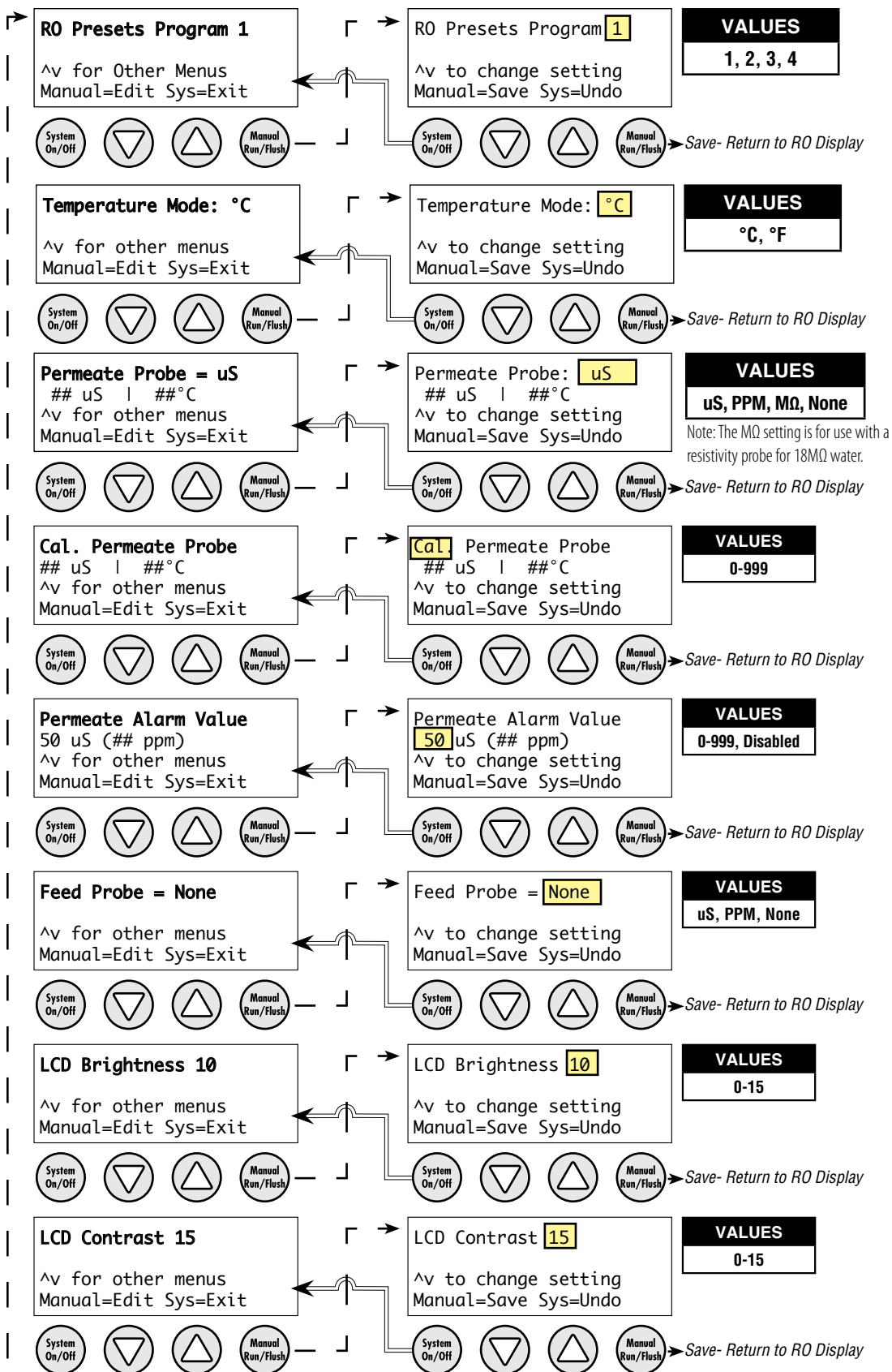
Figure 6. Controller Programming. Accessing the hidden menus.

Figure 7. Controller Programming: Menu Navigation



Controller Fault Condition Displays

Below are examples and explanations of the displays which accompany the fault conditions possible in the ROC-3. Fault conditions always indicated a problem of some sort which requires corrective action. the displays provide sufficient information to recognize the source of the fault and the required corrective action.

High Pressure Fault: *(Occurs when High Pressure Switch Closes)*

Line 1 "Service Fault"
 Line 2 "High System Pressure"
 Line 3
 Line 4 "To Reset Push OFF/ON"

Low Pressure Fault: *(System is responding to low pressure condition per system settings)*

Line 1 "Service Fault"
 Line 2 "Low Feed Pressure"
 Line 3
 Line 4 "Restart in MM:SS"

Pre Treat Fault: *(Pretreat Switch is closed indicating problem with pretreat system).*

Line 1 "Service Fault"
 Line 2 "Pretreat"
 Line 3
 Line 4 "Check Pretreat Sys."

Permeate Conductivity Fault: *(Permeate conductivity is higher than the alarm setpoint.)*

Line 1 "Service Fault"
 Line 2 "Permeate TDS xxx ppm" or "Permeate Cond xxx uS"
 Line 3 "Alarm SP xxx ppm" or "Alarm SP xxx uS"
 Line 4 "To Reset Push OFF/ON"

Feed Conductivity Fault: *(Feed conductivity is higher than the alarm setpoint.)*

Line 1 "Service Fault"
 Line 2 "Feed TDS xxx ppm" or "Feed Cond xxx uS"
 Line 3 "Alarm SP xxx ppm" or "Alarm SP xxx uS"
 Line 4 "To Reset Push OFF/ON"

Conductivity Probe Error messages:

Line 2 "Over-range" - Measurement is out of range for the circuit, probe may also be shorted
 Line 2 "Probe shorted" - Short circuit detected on temperature sensor in probe
 Line 2 "Probe not detected" - Open circuit detected on temperature sensor in probe
 Line 2 "Probe Startup 1" - Internal reference voltage too high to make valid measurement
 Line 2 "Probe Startup 2" - Internal reference voltage too low to make valid measurement
 Line 2 "Probe Startup 3" - Internal excitation voltage too high to make valid measurement
 Line 2 "Probe Startup 4", - Internal excitation voltage too low to make valid measurement

Appendix C. Warranty

SEA-RO Limited Warranty

What the warranty covers:

SEA-RO warrants the WMC-1 to be free from defects in materials and workmanship during the warranty period. If a product proves to be defective during the warranty period, SEA-RO will at its sole option repair or replace the product with a like product. Replacement product or parts may include remanufactured or refurbished parts or components.

How long the warranty is effective:

The WMC-1 is warranted for one (1) year for parts and labor from the date of the first consumer purchase or 15 months from ship date, whichever comes first.

What the warranty does not cover:

1. Damage, deterioration or malfunction resulting from:
 - a. Accident misuse, neglect, fire, water lightning or other acts of nature, unauthorized product modification or failure to follow instructions supplied with the product.
 - b. Repair or attempted repair by anyone not authorized by *i-controls*
 - c. Any damage of the product due to shipment.
 - d. Causes external to the product such as electric power fluctuations.
 - e. Use of supplies or parts not meeting SEA-RO's specifications.
 - f. Normal wear and tear.
 - g. Any other cause which does not relate to a product defect.
2. Transportation costs necessary to obtain service under this warranty.
3. Labor other than factory labor.

How to get service:

1. To obtain warranty service, contact SEA-RO for a Return Material Authorization (RMA).
2. You will be required to provide:
 - a. Your name and address
 - b. A description of the problem
3. Package the controller carefully for shipment and return it to SEA-RO, freight prepaid.

Limitation of implied warranties:

There are no warranties, expressed or implied, which extend beyond the description contained herein including the implied warranty of merchantability and fitness for a particular purpose.

Exclusion of damages:

SEA-RO's liability is limited to the cost of repair or replacement of the product. SEA-RO shall not be liable for:

1. Damage to other property caused by any defects in the product, damages based upon inconvenience, loss of use of the product, loss of time, loss of profits, loss of business opportunity, loss of goodwill, interference with business relationships or other commercial loss, even if advised of the possibility of such damages.
2. Any other damages, whether incidental, consequential or otherwise.
3. Any claim against the customer by any other party.

Effect of state law:

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state. Some states do not allow limitations on implied warranties and/or do not allow the exclusion of incidental or consequential damages, so the above limitations and exclusions may not apply to you.

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