



# **User's Manual**

**SE MODELS** 



### **SEA XCHANGE**

SE-350 SE-600-1 SE-600-2 SE-800

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## **PART 1: INTRODUCTION**

## **ACRONYMS AND DEFINITIONS**

ACRONYM/SYMBOL	DEFINITION
FWF	FRESH WATER FLUSH
RO	REVERSE OSMOSIS
PSI	POUNDS PER SQUARE INCH
GPM	GALLONS PER MINUTE
GPD	GALLONS PER DAY
TDS	TOTAL DISSOLVED SOLIDS
PPM	PARTS PER MILLION
TCF	TEMPERATURE CORRECTION FACTOR
LP SWITCH	LOW PRESSURE SWITCH
HP SWITCH	HIGH PRESSURE SWITCH
Ф	PHASE

### **CONGRATULATIONS**

Your Dometic SeaXchange SE-Series Reverse Osmosis System is a durable piece of equipment that, with proper care, will last for many years. This User's Manual outlines installation, operation, maintenance, and troubleshooting details vital to the sustained performance of your system.

### **SAFETY**

The safety section of this User's Manual outlines the various safety headings used throughout this manual's text and are enhanced and defined below:

NOTE: INDICATES STATEMENTS THAT PROVIDE FURTHER INFORMATION AND CLARIFICATION.

NOTE: PRIOR TO OPERATING OR SERVICING YOUR REVERSE OSMOSIS SYSTEM, THIS USER'S MANUAL MUST BE READ AND FULLY UNDERSTOOD. KEEP THIS AND OTHER ASSOCIATED INFORMATION FOR FUTURE REFERENCE AND FOR NEW OPERATORS OR QUALIFIED PERSONNEL NEAR THE SYSTEM.

CAUTION: INDICATES STATEMENTS THAT ARE USED TO IDENTIFY CONDITIONS OR PRACTICES THAT COULD RESULT IN EQUIPMENT OR OTHER PROPERTY DAMAGE.

CAUTION

CAUTION

DO NOT UNDER ANY CIRCUMSTANCE; REMOVE ANY CAUTION, WARNING, OR OTHER DESCRIPTIVE LABELS FROM THE SYSTEM.

WARNING: INDICATES STATEMENTS THAT ARE USED TO IDENTIFY CONDITIONS OR PRACTICES THAT COULD RESULT IN INJURY OR LOSS OF LIFE. FAILURE TO FOLLOW WARNINGS COULD RESULT IN SERIOUS INJURY OR EVEN DEATH.

### PRINCIPLES OF REVERSE OSMOSIS

#### **REVERSE OSMOSIS**

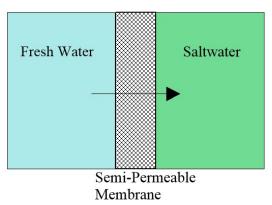
#### **How Fresh Water Is Produced**

Reverse Osmosis or "RO" is a process where freshwater water is produced by pumping saltwater through a semi-permeable membrane.

#### **Osmosis**

Osmosis is a naturally occurring process where a weak solution will cross a semipermeable membrane to mix with a highly concentrated solution. For example a freshwater solution will naturally want to mix with a saltwater solution.

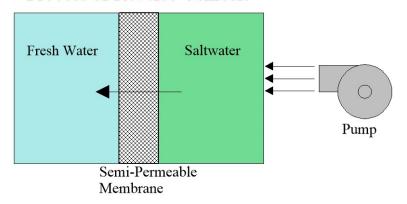




#### **Reverse Osmosis**

To reverse this process work is put into the system using a pump. The pump causes pressure to build up on the saltwater side of the membrane. This pressure forces water across the semi-permeable membrane. The membrane is designed to allow the water molecules to pass while preventing the salt and other solids from doing so. Fresh water is collected on the other side of the membrane as a result.

#### Process of Reverse Osmosis



## **UNIT SPECIFICATIONS**

SE MODEL	350	600-1	600-2	800
Configuration	1 Vessel	1 Vessel	2 Vessel	2 Vessel
Feed Water Source	Sea Water	Sea Water	Sea Water	Sea Water
Rated production gpd	350(0.24)	600(0.41)	600(0.41)	800(0.55)
(gpm)	` '	000(0.41)	000(0.41)	000(0.33)
Rejection and Flow Ra	tes			
Nominal Salt	99.4%	99.4%	99.4%	99.4%
Rejection %	00.170	00.170	00.170	00.170
Minimum Feed Flow	2.5 (9.5)	2.5 (9.5)	2.5 (9.5)	2.5 (9.5)
gpm (lpm)	()		=== (===)	
Minimum Concentrate	2.26 (8.3)	2.1 (7.9)	2.1 (7.9)	1.94 (7.3)
Flow gpm (lpm)	, ,	, ,		
Connections	3/211	3/"	3/211	3/211
Feed inch	<sup>3</sup> / <sub>4</sub> " Hose	3/4" Hose	3/4" Hose	<sup>3</sup> / <sub>4</sub> " Hose
Product inch	3/8" QC 9.5mm	3/8" QC 9.5mm	3/8" QC 9.5mm	3/8" QC 9.5mm
Concentrate inch	1/2" QC 12.7mm	1/2" QC 12.7mm	1/2" QC 12.7mm	1/2" QC 12.7mm
Membranes	T .	T .	T .	T .
Membrane Per Vessel	1	1	1	1
Membrane Quantity	1	1	2	2
Membrane Size	2521	2540	2521	2540
Pumps	1			
High Pressure Pump	Piston	Piston	Piston	Piston
Туре				
HP motor amps	14.0/7.0	14.0/7.0	14.0/7.0	14.0/7.0
High Pressure Motor HP (kw)	1.5	1.5	1.5	1.5
Booster motor amps	7.2/4.3	7.2/4.3	7.2/4.3	7.2/4.3
Booster Pump RPM @ 60	1750	1750	1750	1750
Electrical			•	
Voltage	115/230V 60Hz	115/230V 60Hz	115/230V 60Hz	115/230V 60Hz
	1Ф	1Ф	1Ф	1Ф
Amp Draw	21.2/11.3	21.2/11.3	21.2/11.3	21.2/11.3
System Dimensions			•	
L x W x H inch (cm)	25.75"x16.99"x	25.75"x16.99"x	44.85"x16.99"x	44.85"x16.99"x
`	14.09"	14.09"	14.09"	14.09"
	(65.4x43.2x35.8)	(65.4x43.2x35.8)	(113.9x43.2x35.8)	(113.9x43.2x35.8)
Weight lb. (kg)	117.5 (53.3)	120.5 (54.65)	125 (56.7)	131 (59.4)

#### **BEFORE STARTING**

The reverse osmosis process causes the concentration of impurities. The impurities may precipitate (fall out of solution) when their concentration reaches saturation levels when operated beyond rated production. This precipitation can scale or foul the membranes. In order to prevent this, your SE unit should never be operated over the **rated production** listed in the **UNIT SPECIFICATIONS** chart (page 8) and also should not be run above **850psi pump pressure**. Water temperature and inlet water ppm are variables that affect flow rate and pump pressure

CAUTION: THE RATED PRODUCTION WILL HAVE TO BE CORRECTED FOR TEMPERATURE OF THE SEA WATER WHEN DETERMINING RATED FLOW FOR YOUR UNIT. SEE 'TEMPERATURE CORRECTION FACTORS FOR WATER PRODUCTION' CHART (PAGE 12-13) FOR AN EXAMPLE ON CORRECTING THE RATED FLOW RATE.

#### PRE-FILTRATION

CAUTION

SE-Series systems are supplied with a 25-micron (part number 252404292) and 5-micron (part number 252404291) HIGH CAPACITY sediment filters. These filters are made from Typar™ filter media and contain 30% more media than most 2.5" x 10" pleated sediment cartridges. To prevent damage to the system, we recommend using the sediment filters supplied with this system. Change the pre-filters once the pressure gauge labeled **FILTER OUT** is 15psi or lower.

#### **BOOSTER PUMP**

SE-series systems are supplied with a centrifugal pump. The pump must be located below the water line to maintain a positive suction head for priming purposes. Refer to page 94 for the booster pump manual.

THE BOOSTER PUMP MUST NEVER BE RUN DRY. OPERATING THE PUMP WITHOUT SUFFICIENT FEED WATER WILL DAMAGE THE PUMP.

#### **HIGH PRESSURE PUMP**

The pump used on the SE-Series systems is a piston type constructed of stainless steel. Follow these guidelines to ensure proper operation of the pump:

- Refer to the WM series General Pump in manufacturer's index for recommended maintenance (page 88).
- The pump must **NEVER** be run dry. Operating the pump without sufficient feed water will damage the pump.
- **ALWAYS** use the required filters when operating the unit. The high pressure pump is susceptible to damage from sediment and debris.
- If any damage occurs to your system's pump, a re-build kit is available. Contact
  your local dealer or distributor and inform them of your system's model and pump
  size.
- Follow the instructions in the FWF section on page 42.

#### **MEMBRANES**

SE-Series reverse osmosis systems come pre-loaded with DOW FILMTEC<sup>™</sup> sea water membranes unless otherwise specified. For the best longevity of membranes, use the manufacturer's recommended prefilters, operate it within it limits, and ensure the system is performing its regular FWF. Membrane element guidelines can be found in the Dow FILMTEC<sup>™</sup> on page 110.

#### **DIVERSION VALVE**

The diversion valve controls the product water after the membranes. If the controller determines that the salinity of the water is acceptable, (based on the salinity set point) it will energize the diversion valve solenoid, causing the water to flow to the vessels tank. If the electrical portion of the solenoid fails or the controller fails to energize the solenoid, a manual bypass on the diversion valve may be utilized if the product water is found to be acceptable. Refer to picture on page 55 and the Diversion Valve Manual on page 114.

#### SYSTEM CONTROLLER

The controller is a logic based pc board that can analyze and control the electrical components within the system. Its primary functions are to monitor safety switches (high and low pressure), perform the program sequence of operations to optimize the start, normal operation, and shutdown sequence. Refer to the Watermaker System Controller Manual on page 76.

#### **PRODUCT WATER**

Dometic SeaXchange SE-Series Reverse Osmosis Systems are designed to produce product water at the capacities indicated. For example, the SE 800 produces 800 gallons per day or 0.55 gallons per minute (800gpd ÷ 24hrs/day ÷ 60mins/hr=0.55gpm) of product water at the listed operating test conditions.

#### Rejection

The amount of total dissolved solids (TDS) rejected by the membrane is expressed as a percentage. For example, a 99.4% rejection rate means that 99.4% of total dissolved solids do not pass through the membrane. To calculate the % rejection, use the following formula:

% Rejection = [(Feed TDS – Product TDS) / Feed TDS] x 100

Example:

**99.4%** =  $[(35,000-210)/35,000] \times 100$ 

#### Recovery

The amounts of product water recovered for use is expressed as a percentage. To calculate % recovery, use the following formula:

% Recovery = (Product Water Flow Rate / Feed Water Flow Rate) x 100

Example:

 $36\% = (1.52/4.22) \times 100$ 

NOTE: ALL TDS FIGURES MUST BE EXPRESSED IN THE SAME UNITS, TYPICALLY PARTS PER MILLION (PPM) OR MILLIGRAMS PER LITER (MG/L).

### **TEMPERATURE CORRECTION FACTORS FOR WATER PRODUCTION**

To find your SE-series unit's rated flow at a given temperature, refer to the chart to find the **T**emperature **C**orrection **F**actor (TCF). Divide the rated product flow at 77°F by the TCF. The result is the corrected product flow at current water inlet temperature. The water temperature can be found on the main screen. See the example on the next

page.

page.			-		-				-
Temperature	Temperature Correction								
°F (°C)	Factor								
50.0 (10.0)	1.711	57.2 (14.0)	1.475	64.4 (18.0)	1.276	71.6 (22.0)	1.109	78.8 (26.0)	0.971
50.2 (10.1)	1.705	57.4 (14.1)	1.469	64.6 (18.1)	1.272	71.8 (22.1)	1.105	79.0 (26.1)	0.968
50.4 (10.1)	1.698	57.6 (14.1)	1.464	64.8 (18.2)	1.267	72.0 (22.1)	1.103	79.2 (26.2)	0.965
50.5 (10.3)	1.692	57.7 (14.2)	1.459	64.9 (18.3)	1.262	72.0 (22.2)	1.097	79.3 (26.3)	0.962
50.7 (10.4)	1.686	57.9 (14.4)	1.457	65.1 (18.4)	1.258	72.1 (22.3)	1.093	79.5 (26.4)	0.959
50.9 (10.4)	1.679	58.1 (14.5)	1.448	65.3 (18.5)	1.254	72.5 (22.4)	1.093	79.7 (26.5)	0.957
51.1 (10.6)	1.673	58.3 (14.6)	1.443	65.5 (18.6)	1.234	72.7 (22.6)	1.096	79.9 (26.6)	0.954
				, ,		- '			
51.3 (10.7)	1.667	58.5 (14.7)	1.437	65.7 (18.7)	1.245	72.9 (22.7)	1.082	80.1 (26.7)	0.951
51.4 (10.8)	1.660	58.6 (14.8)	1.432	65.8 (18.8)	1.240	73.0 (22.8)	1.078	80.2 (26.8)	0.948
51.6 (10.9)	1.654	58.8 (14.9)	1.427	66.0 (18.9)	1.236	73.2 (22.9)	1.075	80.4 (26.9)	0.945
51.8 (11.0)	1.648	59.0 (15.0)	1.422	66.2 (19.0)	1.232	73.4 (23.0)	1.071	80.6 (27.0)	0.943
52.0 (11.1)	1.642	59.2 (15.1)	1.417	66.4 (19.1)	1.227	73.6 (23.1)	1.067	80.8 (27.1)	0.940
52.2 (11.2)	1.636	59.4 (15.2)	1.411	66.6 (19.2)	1.223	73.8 (23.2)	1.064	81.0 (27.2)	0.937
52.3 (11.3)	1.630	59.5 (15.3)	1.406	66.7 (19.3)	1.219	73.9 (23.3)	1.060	81.1 (27.3)	0.934
52.5 (11.4)	1.624	59.7 (15.4)	1.401	66.9 (19.4)	1.214	74.1 (23.4)	1.056	81.3 (27.4)	0.932
52.7 (11.5)	1.618	59.9 (15.5)	1.396	67.1 (19.5)	1.210	74.3 (23.5)	1.053	81.5 (27.5)	0.929
52.9 (11.6)	1.611	60.1 (15.6)	1.391	67.3 (19.6)	1.206	74.5 (23.6)	1.049	81.7 (27.6)	0.926
53.1 (11.7)	1.605	60.3 (15.7)	1.386	67.5 (19.7)	1.201	74.7 (23.7)	1.045	81.9 (27.7)	0.924
53.2 (11.8)	1.600	60.4 (15.8)	1.381	67.6 (19.8)	1.197	74.8 (23.8)	1.042	82.0 (27.8)	0.921
53.4 (11.9)	1.594	60.6 (15.9)	1.376	67.8 (19.9)	1.193	75.0 (23.9)	1.038	82.2 (27.9)	0.918
53.6 (12.0)	1.588	60.8 (16.0)	1.371	68.0 (20.0)	1.189	75.2 (24.0)	1.035	82.4 (28.0)	0.915
53.8 (12.1)	1.582	61.0 (16.1)	1.366	68.2 (20.1)	1.185	75.4 (24.1)	1.031	82.6 (28.1)	0.913
54.0 (12.2)	1.576	61.2 (16.2)	1.361	68.4 (20.2)	1.180	75.6 (24.2)	1.028	82.8 (28.2)	0.910
54.1 (12.3)	1.570	61.3 (16.3)	1.356	68.5 (20.3)	1.176	75.7 (24.3)	1.024	82.9 (28.3)	0.908
54.3 (12.4)	1.564	61.5 (16.4)	1.351	68.7 (20.4)	1.172	75.9 (24.4)	1.021	83.1 (28.4)	0.905
54.5 (12.5)	1.558	61.7 (16.5)	1.347	68.9 (20.5)	1.168	76.1 (24.5)	1.017	83.3 (28.5)	0.902
54.7 (12.6)	1.553	61.9 (16.6)	1.342	69.1 (20.6)	1.164	76.3 (24.6)	1.014	83.5 (28.6)	0.900
54.9 (12.7)	1.547	62.1 (16.7)	1.337	69.3 (20.7)	1.160	76.5 (24.7)	1.010	83.7 (28.7)	0.897
55.0 (12.8)	1.541	62.2 (16.8)	1.332	69.4 (20.8)	1.156	76.6 (24.8)	1.007	83.8 (28.8)	0.894
55.2 (12.9)	1.536	62.4 (16.9)	1.327	69.6 (20.9)	1.152	76.8 (24.9)	1.003	84.0 (28.9)	0.892
55.4 (13.0)	1.530	62.6 (17.0)	1.323	69.8 (21.0)	1.148	77.0 (25.0)	1.000	84.2 (29.0)	0.889
55.6 (13.1)	1.524	62.8 (17.1)	1.318	70.0 (21.1)	1.144	77.2 (25.1)	0.997	84.4 (29.1)	0.887
55.8 (13.2)	1.519	63.0 (17.2)	1.313	70.2 (21.2)	1.140	77.4 (25.2)	0.994	84.6 (29.2)	0.884
55.9 (13.3)	1.513	63.1 (17.3)	1.308	70.3 (21.3)	1.136	77.5 (25.3)	0.991	84.7 (29.3)	0.882
56.1 (13.4)	1.508	63.3 (17.4)	1.304	70.5 (21.4)	1.132	77.7 (25.4)	0.988	84.9 (29.4)	0.879
56.3 (13.5)	1.502	63.5 (17.5)	1.299	70.7 (21.5)	1.128	77.9 (25.5)	0.985	85.1 (29.5)	0.877
56.5 (13.6)	1.496	63.7 (17.6)	1.294	70.9 (21.6)	1.124	78.1 (25.6)	0.982	85.3 (29.6)	0.874
56.7 (13.7)	1.491	63.9 (17.7)	1.290	71.1 (21.7)	1.120	78.3 (25.7)	0.979	85.5 (29.7)	0.871
56.8 (13.8)	1.486	64.0 (17.8)	1.285	71.2 (21.8)	1.116	78.4 (25.8)	0.977	85.6 (29.8)	0.869
57.0 (13.9)	1.480	64.2 (17.9)	1.281	71.4 (21.9)	1.112	78.6 (25.9)	0.974	85.8 (29.9)	0.866

### TEMPERATURE CORRECTION FACTORS FOR MEMBRANE (FORMULA)

If a system is rated to produce 1.25 gpm of product water @ 77° F. The same system will produce more water at a higher temperature. It will also produce less water at a lower temperature. Use the temperature correction table to obtain the correct flow.

Corrected Flow Rate = (Measured Rated Flow) ÷ (TCF @ Feed Water Temp.)

Example:

1.25 gpm @ 59° F (1.25÷1.42=.88 gpm)

1.25 gpm @ 77° F (1.25÷1=1.25 gpm)

1.25 gpm @ 84° F (1.25÷0.89=1.4 gpm)

**NOTE:** Fahrenheit/Celsius conversion:  $F = (^{\circ}C \times 9/5) + 32$ 

PART 2:	INSTALLA	TION ANI	O COMMISS	SIONING

### **INSTALLATION KIT**

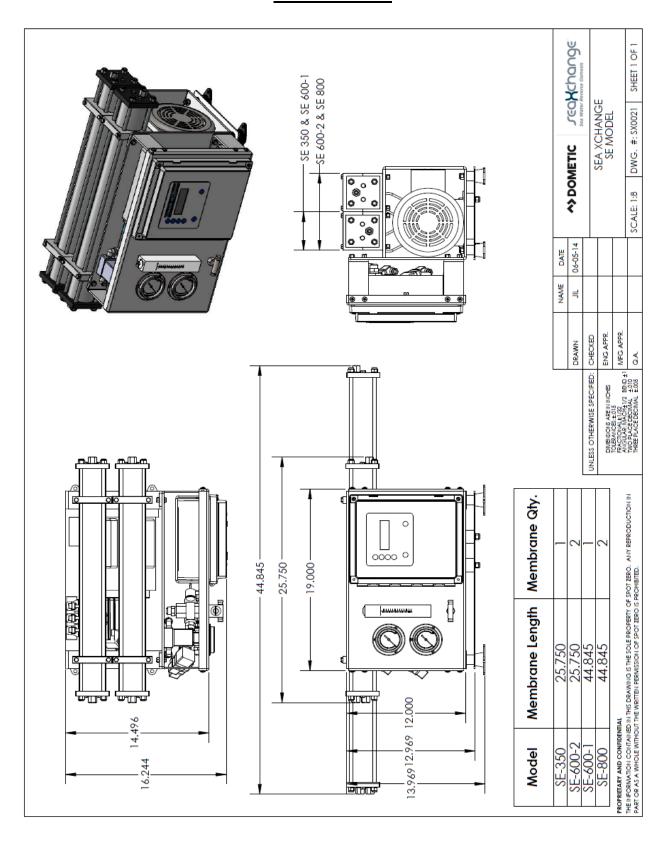
### ITEMS INCLUDED WITH EACH SYSTEM

### MAIN INSTALLATION ITEMS

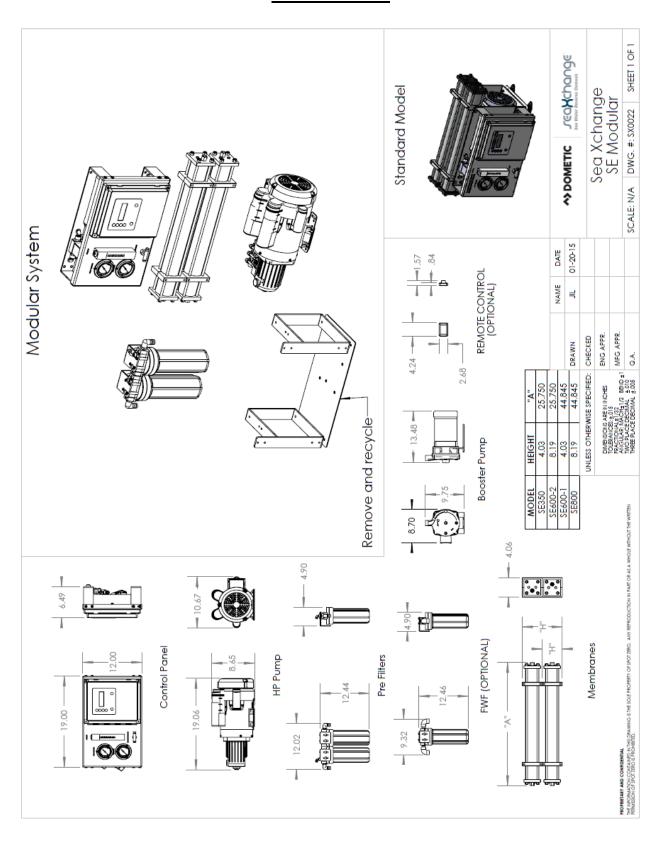
	252404461 – booster pump and motor assembly
	252404295 - 2.5" x 10" carbon block filter
	252404172 - 2.5"x 10" double pre-filter assembly
	252404326 – 2.5" filter housing wrench
	$252404202-20^{\circ}$ of $\%$ white double walled hose. (Not to be used on the suction side of feed pump. Always use wire reinforced hose from the seacock to the suction side of the feed pump.)
	$252404004 - 50$ ' of $\frac{1}{4}$ " Spot Zero white nylon tubing (for Pre-Filter Inlet)
	252404003 – 50' of ½" Spot Zero white nylon tubing (for overboard)
	252404002 - 50' of 3/8" Spot Zero white nylon tubing (for product)
	252404099 - (2) 3/8" x 1/2" connectors
	252404114 - (2) 3/8" tee
	252404109 – (3) 3/8"QC x 3/8"QC 90° elbow
	252404118 - (18) 3/8" red locking clip
	254404094 - (3) ½" elbow tube
	252404093 -(1) 1/2" connector male
	252404115 - (2) ½" tee
	252404115 - (10) ½" red locking clip
	(10) – Blue clamp aid safety covers
	(8) – Stainless steel 5/16" x 1" lag bolts
CONSUM	(8) – Stainless steel 5/16" flat washers  MABLE ITEMS
	252404192 – 2.5" x 10" 25 micron pre-filter
	252404191 – 2.5" x 10"5 micron pre-filter
	252404401 – 16oz. bottle pump oil
	252404179 - SW30 2540 membrane
OPTION	252404178 - SW30 2521 membrane <b>AL ITEMS</b>
	252404298 - high capacity prefilter (4.5" X 20")
	252404317 – high capacity prefilter assembly
	252404225 - remote control and 50' cable
	252404121 – spare fitting kit
	252404040 – hand held TDS meter
	Membrane and vessel array upgrade

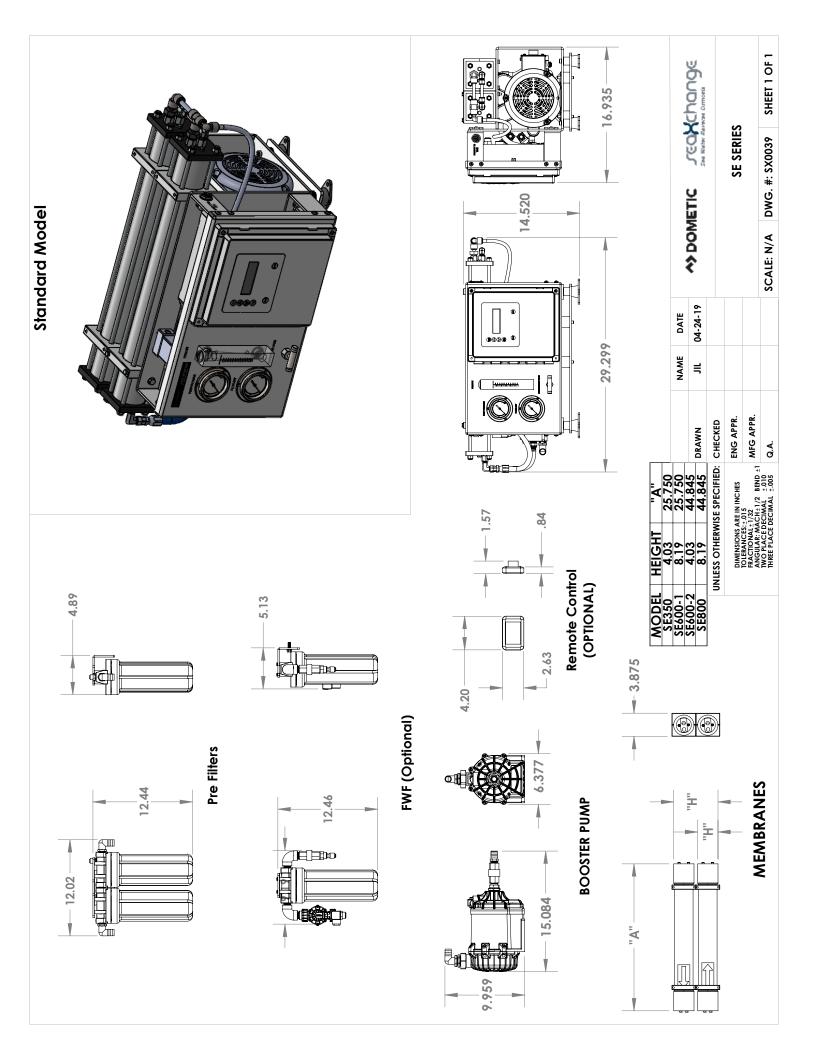
**NOTE**: Items listed are 1 unit supplied unless noted within parentheses.

### **DIMENSIONS**



### **DIMENSIONS**

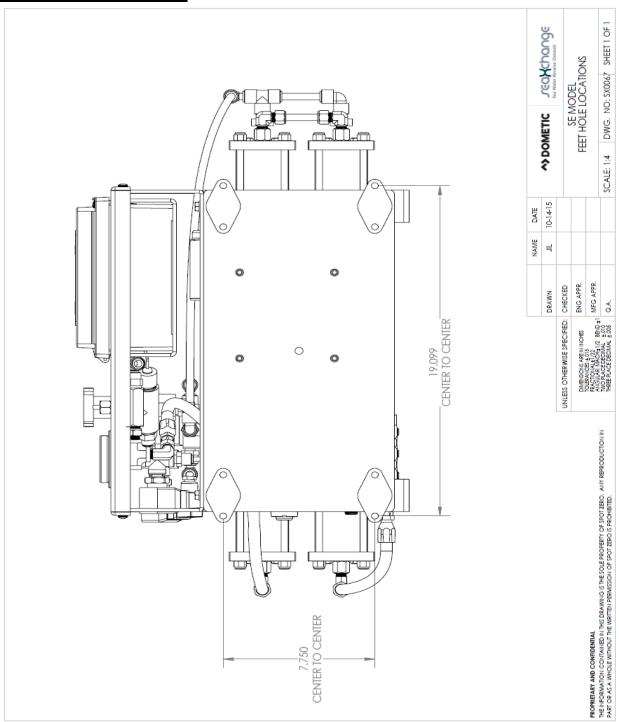




### **MOUNTING**

The freestanding system should be bolted down and securely fastened. Refer to mounting template below.

### **FEET/HOLE LOCATIONS**



### **ELECTRICAL REQUIREMENTS**

### **ELECTRICAL**

The SE-Series systems are available in 1Φ (phase).

- 115 volts at 21.2 amps (including booster pump)
- 230 volts at 11.3 amps (including booster pump)
- 60 Hertz available in both the 115 volt and 230 volt units

NOTE: IT'S RECOMMENDED THAT A QUALIFIED ELECTRICIAN WIRE YOUR SYSTEM IN ACCORDANCE WITH ALL APPLICABLE CODES, RULES, AND REGULATIONS.

WARNING: TO REDUCE THE RISK OF ELECTRICAL SHOCK, THE INCOMING POWER SUPPLY MUST INCLUDE A PROTECTIVE GROUND.

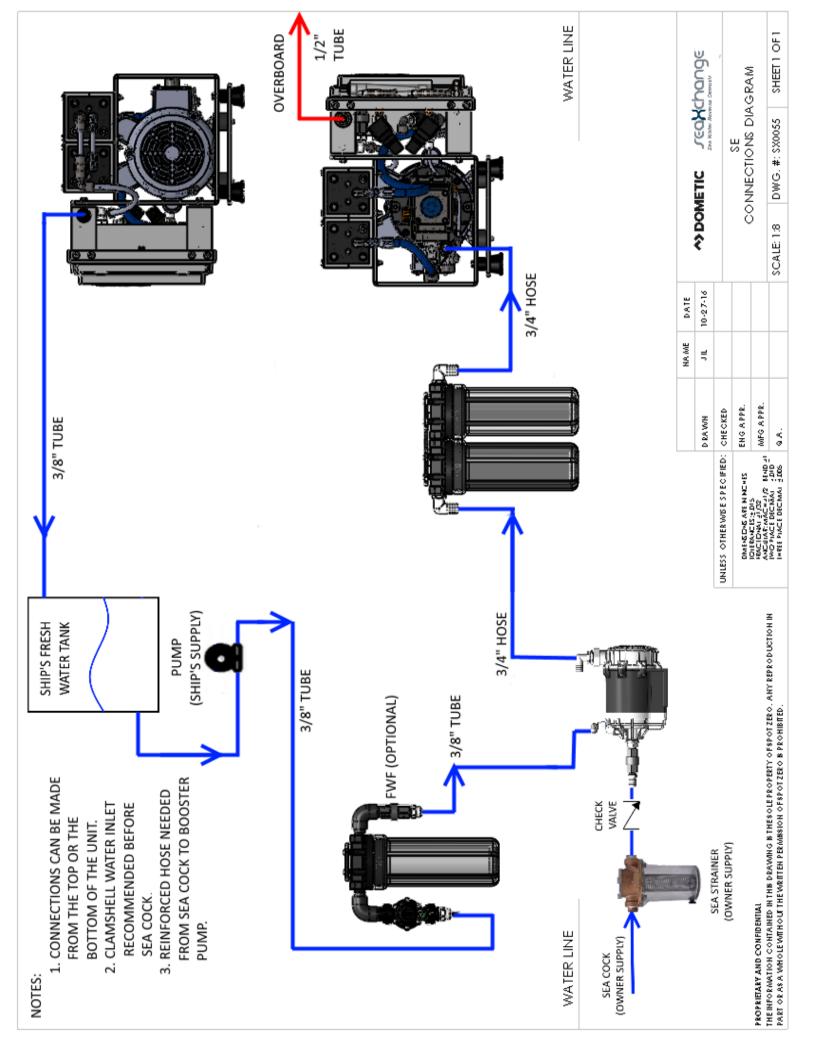
### PLUMBING AND PIPING CONNECTIONS

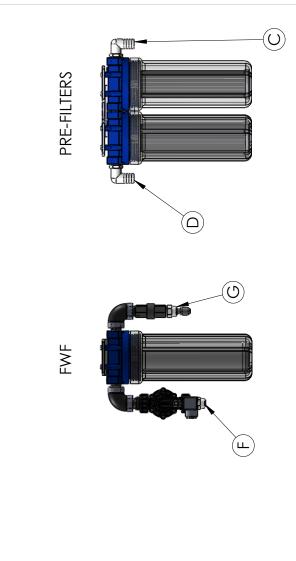
### **PLUMBING**

CAUTION

The membranes and high pressure pumps used on SE-Series Reverse Osmosis Systems require a continuous flow of water with a maximum temperature not to exceed 113°F. *Please see Complete Install Guide and the connection drawings on the following pages.* 

CAUTION: ANY RESTRICTIONS OR BLOCKAGE IN THE CONCENTRATE LINE CAN CAUSE BACKPRESSURE, WHICH WILL INCREASE THE SYSTEM'S OPERATING PRESSURE. THIS CAN RESULT IN DAMAGE TO THE SYSTEM'S MEMBRANES AND COMPONENTS.





 $\bigcirc$ 

	INLETS & OUTLETS	
LOCATION	DESCRIPTION	SIZE
∢	OVERBOARD OUTLET	1/2" TUBE
В	PRODUCT WATER OUTLET	3/8" TUBE
O	SEA WATER INLET	3/4" HOSE
О	TO HP PUMP	3/4" HOSE
Ь	SHIPS FRESH WATER TANK INLET	3/8" TUBE
Ŋ	FWF TO BOOSTER PUMP	3/8" TUBE

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**PROPRIETARY AND CONFIDENTIAL**THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF SPOT ZERO. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF SPOT ZERO IS PROHIBITED.

		DRAWN	╣	10-27-16
	UNLESS OTHERWISE SPECIFIED: CHECKED	CHECKED		
	DIMENSIONS ARE IN INCHES	ENG APPR.		
-	IOLEKANCES:±.015 FRACTIONAL±1/32 ANGULAR: MACH±1/2 BEND±1	MFG APPR.		
z	TWO PLACE DECIMAL ±.010 THREE PLACE DECIMAL ±.005	Q.A.		

SCALE: N/A DWG. #: SX0054 SHEET 1 OF 1

SE INLET &OULET LOCATIONS

Jeakchange

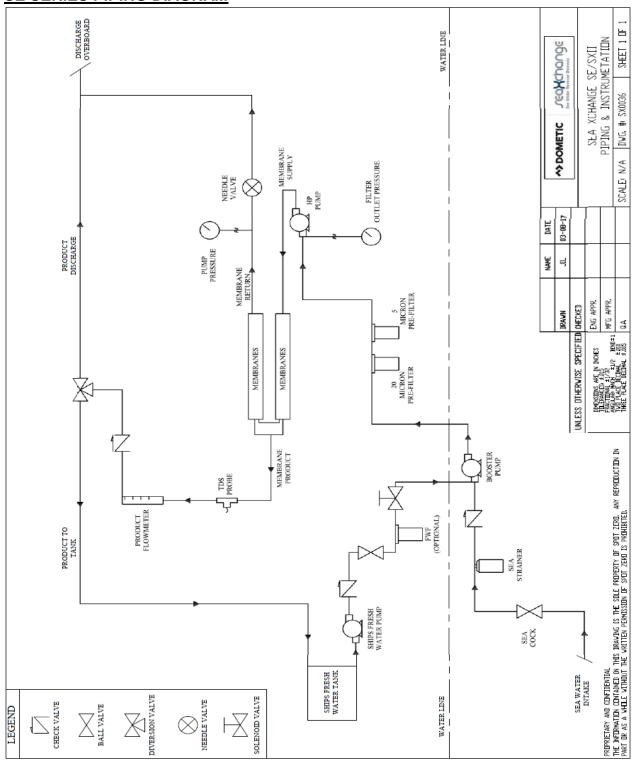
**◆** DOMETIC

DATE

NAME

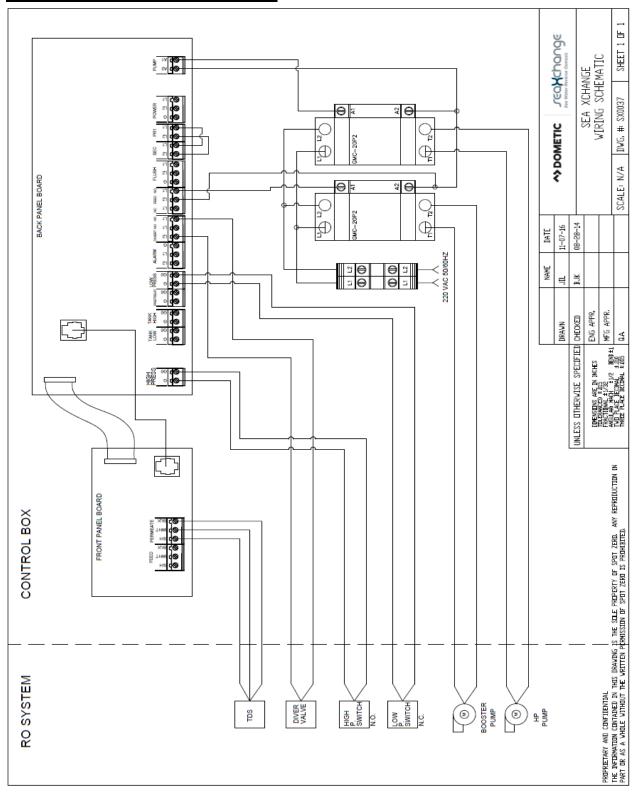
### **SYSTEM LAYOUT AND SCHEMATICS**

### **SE SERIES PIPING DIAGRAM**



### **SYSTEM LAYOUT AND SCHEMATICS**

### **SE SERIES ELECTRICAL DIAGRAM**



### **SEA WATER PLUMBING CONNECTIONS**

- 1. Locate a dedicated sea cock to be used for booster pump supply. Sea cock should be a minimum of 3/4" with a speed scoop to prevent a Venturi effect while vessel is underway.
- 2. Install a sea strainer with at least a 50 mesh rating after sea cock.
- 3. Install supplied booster pump below water line.



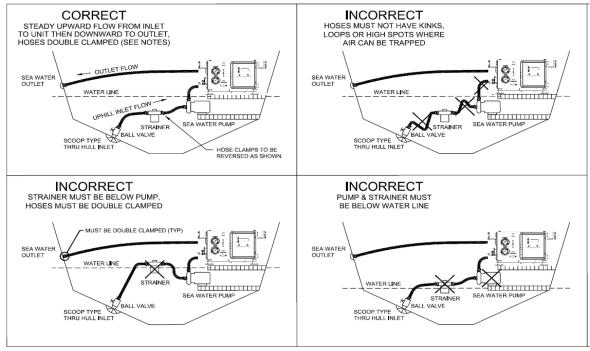






### NOTE - BOOSTER PUMP OUTLET MUST REMAIN THE HIGHEST POINT OF PUMP AND CANNOT BE ROTATED 90 OR 180 DEGREES.

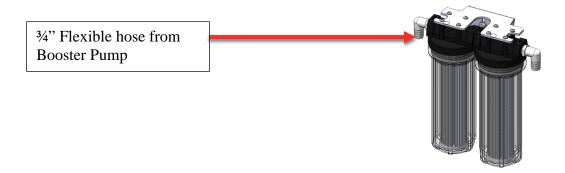
4. Run reinforced suction hose from sea cock to sea strainer to booster pump in an upward flow manner to prevent air traps.



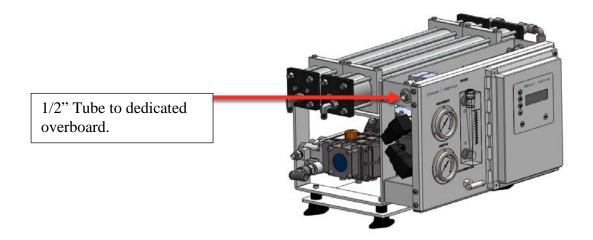
- 1) THRU HULL INLET, BALL VALVE, HOSE AND STRAINER SHOULD BE SIZED NO SMALLER THAN PUMP INLET. 2) INSTALL THRU HULL FITTING AS FAR BELOW THE WATER LINE AS POSSIBLE.
- 3) PUMP NEEDS DEDICATED THRU HULL NOT SHARED WITH OTHER PUMPS.
- 4) AVOID OR MINIMIZE 90° ELBOW FITTINGS AS MUCH AS POSSIBLE, ROTATE PUMP HEAD TOWARDS DIRECTION OF WATER FLOW.

### **SEA WATER PLUMBING CONNECTIONS**

5. Use supplied white 3/4" flexible hose from discharge of booster pump to **Pre-Filter Inlet** connection on **Sea Xchange Sediment** filter assembly located on left side of system. Filter assembly may be remote mounted if desired. Be sure that there are no kinks in hose run and avoid 90's where possible to prevent restricted flow.



- 6. Double clamp all sea water hose connections to prevent potential leaks.
- 7. Locate connection labeled "**Overboard**" on lower left side of system. Run supplied white 1/2" tube to a dedicated overboard connection.



WARNING - SEA WATER OVERBOARD MUST NEVER BE CLOSED OR OBSTRUCTED WHILE SYSTEM IS OPERATIONAL. CLOSING OR OBSTRUCTING THE OVERBOARD FLOW ON SYSTEM MAY CAUSE PERMANENT DAMAGE TO SYSTEM.

### PRODUCT TO TANK CONNECTION

1. Locate the fitting labeled **Product to Tank** on left side of system. Connect supplied white 3/8" tubing from system to the highest point of the vessels fresh water tank.



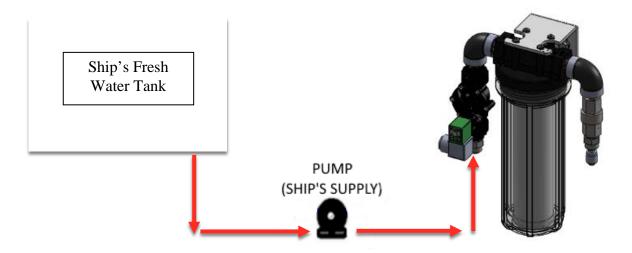
WARNING - SHIPS FRESH WATER TANK MUST BE VENTED PROPERLY TO AVOID BACK PRESSURE ON SYSTEM. FAILURE TO DO SO MAY CAUSE PERMANENT DAMAGE TO SYSTEM AND/OR TO NOT FUNCTION PROPERLY.

WARNING - PRODUCT TO TANK MUST NEVER BE CLOSED OR OBSTRUCTED WHILE SYSTEM IS OPERATIONAL. CLOSING OR OBSTRUCTING THE PRODUCT FLOW ON SYSTEM MAY CAUSE PERMANENT DAMAGE TO SYSTEM AND/OR TO NOT FUNCTION PROPERLY.

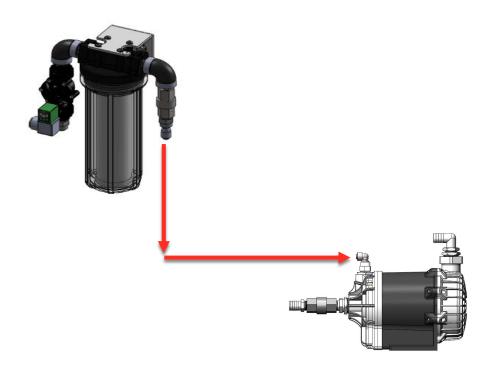
### **FRESH WATER FLUSH CONNECTION**

1. Locate filter assembly labeled **Fresh Water Flush** and connect the inlet of fresh water flush solenoid to the ship's pressurized fresh water system.

## NOTE - A SHUT OFF VALVE IS RECOMMENDED TO BE INSTALLED ON SUPPLY LINE TO FRESH FLUSH ASSEMBLY FOR SERVICE.

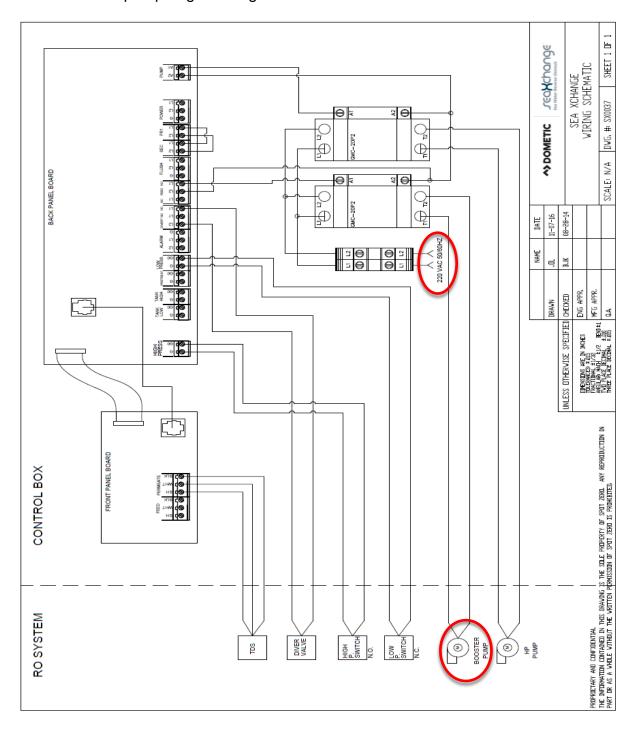


2. Run supplied white 3/8" tubing from outlet filter assembly labeled **Fresh Water Flush** and connect to 3/8" tubing fitting on face of booster pump.



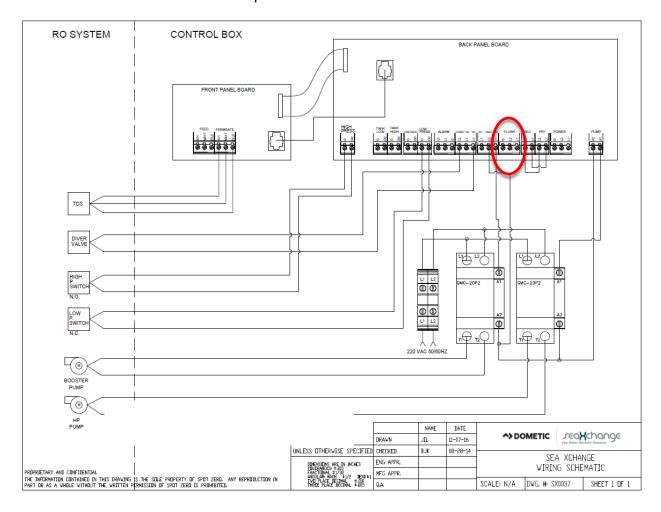
### **ELECTRICAL CONNECTIONS**

1. Connect main power supply to main power terminal blocks, connect power to booster pump from contactor as shown below. Ground main power supply and booster pump to grounding bus bar located inside control box.



### **ELECTRICAL CONNECTIONS**

2. Connect fresh water flush power leads as shown below.



### **NEW SYSTEM START-UP**

### **INSPECTION**

Carefully inspect your system before initial start-up. Check that all plumbing and electrical connections are not loose or have not come undone during shipment. A User's Manual, Test Results, and Filter Housing Wrench will accompany your SE-Series Reverse Osmosis System.

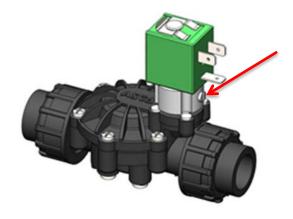
## NOTE: LEAVE THE POWER TO THE SYSTEM OFF FOR THE SYSTEM PURGE PROCEDURE.

#### SYSTEM PURGE

- 1. Redirect product water to the drain for this procedure.
- 2. Fully open the concentrate valve by turning it counter clockwise.



3. With a flat head screw driver, turn set screw ¼ turn clockwise on the Fresh Water Flush solenoid valve (see drawing below). Allow the system to purge 30 minutes to flush the preservative solution from the system.



### **NEW SYSTEM START-UP**

### SYSTEM PURGE

4. Turn the RO system on and adjust the concentrate valve by turning it clockwise to the specified system's production as noted on page 8, or until system reaches 850 psi: whichever occurs first.



- 5. Inspect the system for leaks.
- 6. After 30 minutes, shut down the system.
- 7. Re-direct the product water back to the tank or point-of-use.
- 8. Record the readings daily for a week; after one week record the readings regularly.

NOTE: USE THE COMMISSIONING REPORT FORM ON THE NEXT PAGE

### SEA XCHANGE COMMISSIONING REPORT FORM

System Information: Serial number - \_\_\_\_\_ Model number - \_\_\_\_\_ Date of Commission -Commissioned by-Installed by - \_\_\_\_\_ Vessel hull number-First step to commissioning a new system is to look over the install to be sure everything is installed correct. This checklist must be gone through prior to powering up the system. — Have all plumbing connections have been made, and secured? Have all plumbing lines been run to the correct locations? \_\_\_\_ Is the boost pump installed below the water line? \_\_\_\_ Has wire reinforce hose been used on the suction side of the boost pump? \_\_\_ Is raw water intake open? \_\_\_ Is the overboard open and free of obstructions? \_\_\_ Is the system \_\_\_\_voltage, \_\_\_\_hertz, and \_\_\_\_phase correct? \_\_\_ Is the circuit breaker sized properly with sufficient wire gauge? \_\_\_ Is the power cable connected to the power inlet terminals of the system? Now power up the system, Are all displays on and functional? At this time follow the start-up procedure in the manual and operate the system for an hour at its rated capacity, then record the following data. System operating readings Pre-filter inlet \_\_\_\_\_ psi Pre-filter outlet \_\_\_\_\_ psi Concentrate flow \_\_\_\_\_ gpm Concentrate pressure \_\_\_\_\_ psi Product TDS \_\_\_\_\_ ppm Product flow \_\_\_\_\_ gpm Feed water TDS \_\_\_\_\_ ppm Feed water temperature \_\_\_\_\_ F or C Amp draw \_\_\_\_\_ Voltage \_\_\_\_\_ Hours on system \_\_\_\_\_ hrs Location system was tested\_\_\_\_\_

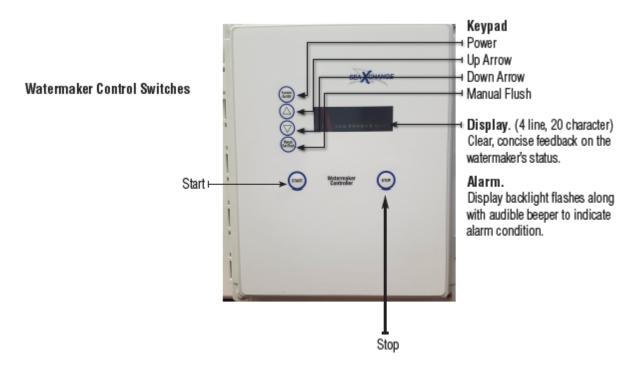
Problems or other notes:

		S	Systems S	Standard	Operatin	0	Parameters			
Fresh Water RO Systems	Product Flow (gpm/lpm)	Concentrate Flow (gpm/lpm)	Recycle Flow (gpm/lpm) (+/-10%)	Total Flow (gpm/lpm)	Pump Pressure (psi/bar) MAX	Concentrate Pressure (psi/bar) MAX	Pre-filter Inlet Pressure Minimum (psi/bar)	Pre-filter Inlet Pressure Maximum (psi/bar)	Pre-filter Outlet Pressure Minimum (psi/bar)	Pre-filter Outlet Pressure Maximum (psi/bar)
Model/GPD SZ/ZTC/XZ (FW-RO) SERIES										
	1.4/5.3	1.0/3.8	2.0/7.6	4.4/16.7	150/10.3	150/10.3	15/1	85/4	15/1	85/4
GPD 3000	2.0/7.5	1.0/3.8	2.0/7.6	5/18.9	150/10.3	150/10.3	15/1	85/4	15/1	85/4
SZ-HD/XZ-HD (FW-RO) SERIES	10									
GPD 4000	2.7/10.2	1.5/5.7	2.0/7.6	6.2/23.5	150/10.3	150/10.3	15/1	85/4	15/1	85/4
GPD 5000	3.47/13.1	1.5/5.7	2.0/7.6	7.0/26.5	150/10.3	150/10.3	15/1	85/4	15/1	85/4
GPD 6000	4.16/15.7	2.0/7.6	2.0/7.6	8.2/31	150/10.3	150/10.3	15/1	85/4	15/1	85/4
	Product	Concentrate	Recycle		Pump	Concentrate	Pre-filter Inlet	Pre-filter Inlet	Pre-filter Outlet	Pre-filter Outlet
Salt Water RO Systems	Flow (gpm/lpm)	Flow (gpm/lpm)	Flow (gpm/lpm)	lotal Flow (gpm/lpm)	<b>a</b> •	Pressure (psi/bar)	Pressure Minimum (psi/bar)	Pressure Maximum (psi/bar)	Pressure Minimum (psi/bar)	Pressure Maximum (psi/bar)
SE SERIES										
GPD 350	.24/.9	2.26/8.6	N/A	2.5/9.5	A/N	850/58.6	15/1	85/4	15/1	85/4
GPD 600	.41/1.5	2.09/7.9	N/A	2.5/9.5	N/A	850/28.6	15/1	85/4	15/1	85/4
GPD 800	.55/2.0	1.95/7.4	N/A	2.5/9.5	N/A	850/28.6	15/1	85/4	15/1	85/4
GPD 1200	.83/3.1	1.67/6.3	N/A	2.5/9.5	N/A	850/28.6	15/1	85/4	15/1	85/4
SX/XTC/XZ (SW-RO) SERIES										
GPD 600	.41/1.5	3.79/14.3	N/A	4.2/15.9	A/A	850/58.6	15/1	85/4	15/1	85/4
GPD 1200	.83/3.1	3.37/12.8	A/N	4.2/15.9	∀/Z	850/58.6	15/1	85/4	15/1	85/4
GPD 1800	1.25/4.7	2.95/11.2	A/N	4.2/15.9	∀N.	850/58.6	15/1	85/4	15/1	85/4
GPD 2200		2.68/10.1	A/N	4.2/15.9	A/N	850/58.6	15/1	85/4	15/1	85/4
ODD 3600	2 5/0 46	6/10.0	<	7 6/20 4	<u> </u>	960/606	15/1	05/1	1 1 / 1	05/1
GPD 4300	2 98/11 28	7 5/28 4	Z/Z	10 5/39 7	<b>√</b>	850/58.6	15/1	85/4	15/1	85/4
GPD 5000	3.47/13.13	7.0/26.5	X/X	10.5/39.7	N/A/N	850/58.6	15/1	85/4	15/1	85/4
CX SERIES										
GPD 20000	13.88/52.54	46/174	A/N	60/227	N/A	850/28.6	15/1	85/4	15/1	85/4
Standard Parameters										
Total Dissolved Solids For Fresh Water Systems (PPM) Product Water Side	Water Systerr	ıs (PPM)	səl %06	90% less than feed water	water					
Total Dissolved Solids For Sea Water Systems (PPM) Product Water Side	Vater Systems	(PPM)	ress	Less than 500 PPM	Mc					
Temperature (F/C)				77/25						

## **PART 3: OPERATION AND MAINTENANCE**

## **CONTROLLER OVERVIEW**

The Watermaker System Controller Documentation can be found in the manufacturer's index on page 76. The following is a quick overview of the front panel. Refer to this manual before starting to familiarize yourself with Watermaker Control Switches.



## **START-UP**

- 1. Make sure the sea cock to the booster pump is fully open.
- 2. Fully open the concentrate valve by turning counter clockwise (Figure 1).

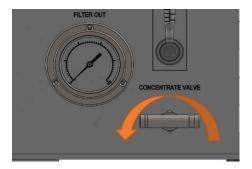


Figure 1

3. Turn the system ON (Figure 2)



Figure 2

4. Press the START button (Figure 3)



Figure 3

5. Wait 30 seconds for high pressure pump to turn ON

### **START-UP**

6. Pressurize the system to the rated flow turning the concentrate valve clockwise or 850 psi, whichever comes first. (Figure 4).



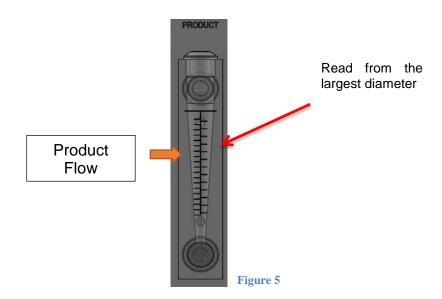
Figure 4

#### Note:

- Product water production varies depending on the temperature of the feed water. Refer to temperature correction chart on page 12-13
- 2. Regulate concentrate valve to reach the rated flow (Figure 5) or 850PSI on the Pump Pressure gauge, whichever comes first.
- 3. See Table 1 for rated flows by model.

Table 1

MODEL	GPD	RATED FLOW (GPM)
SE350	350	.24
SE600-1 & SE600-2	600	.41
SE800	800	.55



#### SHUTDOWN

- 1. DO NOT leave vessel unattended while the machine is operating!
- 2. Once the vessel's tank is full, press the STOP button (Figure 6).



Figure 5

3. Fully open the concentrate valve in order to allow the FWF to clean the membrane and for the next start up (Figure 7).



Figure 6

NOTE: NORMAL OPERATION IS RECOMMENDED WHEN STARTING AND STOPPING THE UNIT. THE REMOTE CONTROL CAN BE USED TO REMOTELY OPERATE THE UNIT IF THE TEMPERATURE AND THE CONCENTRATION (PPM) OF THE SUPPLY WATER DOES NOT CHANGE.

#### FRESHWATER FLUSH

- 1. The unit will FWF 10 seconds at the beginning of operation.
- 2. The FWF will automatically start after the high pressure pump turns off after each use.
- FWF lasts for 10 minutes after the unit shuts down.
- 4. Leave the system power ON and vessel's fresh water system pressurized for the FWF to flush periodically (occurs automatically and set to happen every 7 days).

#### **OPERATIONAL DO'S AND DON'TS**

#### <u>DO</u>

- 1. Change the FWF filter every 4 months.
- 2. Change sediment filters when **FILTER OUT** gauge reads less than 15psi.
- 3. Monitor the system and keep a daily log.
- 4. Adjust the system concentrate valve to recommended values.
- 5. Always run system with the recommended filters.

#### DON'T

- 1. Operate above (temperature corrected) rated production.
- 2. Operate above 850psi on pump pressure.
- 3. Permit chlorine to be present in the feed water.
- 4. Shut down the system for extended periods without preservation.
- 5. Close the concentrate valve completely.
- 6. Operate the system with insufficient feed flow.
- 7. Operate the high pressure pump or booster pump dry.

### FRESH WATER FLUSH

#### **AUTOMATIC FRESH WATER FLUSH**

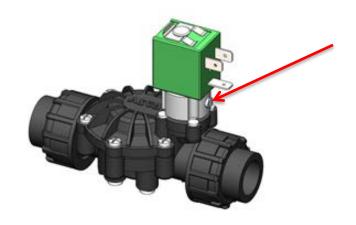
An automatic fresh water flush occurs when:

- The unit starts (10 second duration).
- The unit is shut down and the high pressure pump shuts off (duration is 10 minutes).
- Every 7 days when the unit power is left ON.

## **MANUALLY FLUSHING THE SYSTEM** (Manual Bypass on solenoid)

The system should be flushed weekly to remove sediment from the surface of the membranes. To manually flush the system, follow the preceding steps:

- 1. Unit not in operation.
- 2. Unit electrical supply does not have to be secured.
- 3. With a flat head screw driver, turn set screw ¼ turn clockwise on the FWF solenoid valve (see picture below).



#### STORAGE OR WINTERIZATION OF UNIT

#### **Option 1: Storage with Fresh Water Flush**

When a system will not be used for a significant period of time (i.e. 3 months – 1 year), the best practice for storage of the system is to allow the automatic fresh water flush to operate by leaving the power to the system on and ensuring that the vessels fresh water system is ON and pressurized. Normal replacement of fresh water flush filter is still required every 4 months.

#### **Option 2: Storage without Fresh Water Flush:**

If the vessel will not be able to allow for fresh water flushing over the duration of the storage period, the membrane vessels must have static water replaced with membrane storage chemical solution. Membrane storage chemical part # is 252404263.

#### **Option 3: Winterization**

**Option 3a: Winterization with membrane rack removal** - The best practice for winterization is to remove membrane rack and store with membrane storage chemical in heated storage climate. The remainder of the system should be stored with propylene glycol from sea cock to overboard to prevent freeze damage (propylene glycol can be purchased at most hardware or automotive retailers).

**Option 3b: Winterization without membrane rack removal** - If the system will be exposed to freezing or near freezing temperature while being stored and the membrane rack can not be removed and stored in heated climate, the following should be done. A 50% solution of storage chemical and 50% propylene glycol, (propylene glycol can be purchased at most hardware or automotive retailers), should be run through the entire system from sea cock to overboard and then close both sea cock and overboard. Membrane storage chemical part # is 252404263.

WARNING: DO NOT USE ETHYLENE GLYCOL, ONLY NON-TOXIC PROPYLENE GLYCOL SHOULD BE USED.

#### Re-commissioning of System after Storage or Winterization

After storage or winterization, the system must be completely voided of all storage chemical and or propylene glycol. To do this, follow the new system startup guide on page 32.

# MEMBRANE REMOVAL AND REPLACEMENT

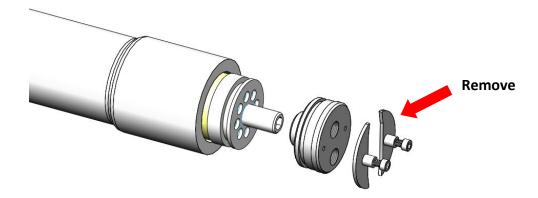
#### REMOVAL AND REPLACEMENT

Removing and replacing membranes in the pressure vessels is an easy process if you have the proper information and tools at hand. Please refer to the following instructions when removing and replacing membrane elements.

WARNING: ALL PRESSURE GAUGES MUST READ ZERO BEFORE PROCEEDING. BEFORE ATTEMPTING, DISCONNECT THE POWER FROM THE SYSTEM AND BLEED ALL WATER PRESSURE FROM THE SYSTEM.

# NOTE: WEAR GLOVES FOR THE FOLLOWING STEPS IN ORDER NOT TO CONTAMINATE THE MEMBRANE.

1. Remove the end plugs from the side of the pressure vessels. This is done by removing the four 3/8" nuts and washers; the end plugs should then freely slide out of the pressure vessel.



- 2. Remove the replacement membrane element(s) from the shipping box; the membrane(s) should be contained within a plastic oxygen barrier bag.
- 3. Cut the bag open as close as possible to the seal at one end of the bag, so the bag may be re-used if necessary.
- 4. Make sure that all parts are clean and free from dirt. Examine the brine seal, and product tube for nicks or cuts. Replace the O-rings or brine seal if damaged.

### MEMBRANE REMOVAL AND REPLACEMENT

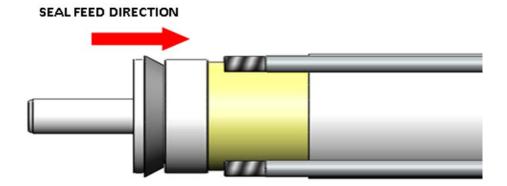
#### REMOVAL AND REPLACEMENT

5. Flow directions should be observed for installation of each element into its respective pressure vessels.



#### **INSERT DIRECTION**

- 6. Remove one membrane element at a time from the pressure vessels, from the side of each housing. Long nose pliers may be necessary to pull the old membrane element out of the membrane element housing.
- 7. Lubricate the brine seal with a non-petroleum based lubricant, such as Dow Corning® 111 part # 252404879.
- 8. Install membranes with brine seal at the supply side of the vessel



WARNING: THE BRINE SEAL MUST BE IN THE SAME POSITION FOR EACH MEMBRANE ELEMENT HOUSING, SO MARK EACH HOUSING PRIOR TO REMOVING THE MEMBRANE ELEMENTS. THE BRINE SEAL IS A RUBBER SEAL THAT PROTRUDES ON ONE SIDE OF THE MEMBRANE AND IS ALWAYS ON THE FEED SIDE OF THE MEMBRANE ELEMENT.

#### MEMBRANE REMOVAL AND REPLACEMENT

#### REMOVAL AND REPLACEMENT

CAUTION

- 9. With a smooth and constant motion, push the membrane element into the housing so the brine seal enters the housing without coming out of the brine seal groove.
- 10. Re-install the end plugs by gently twisting the end cap while pushing it onto the housing. Ensure that you do not pinch or fatigue any O-rings while re-installing the end plug. Push the end plug on until the plug is flush with the pressure vessel.
- 11. Insert the four rods through the plate and fasten using a 3/8 wrench and a flat screw driver.
- 12. Reconnect any fittings that may have been disconnected when the membrane pressure vessels were disassembled.
- 13. To Start-Up the system, please refer to the Normal Start-Up section of this manual. (See page 38)

CAUTION: WET MEMBRANES ARE SHIPPED IN A PRESERVATIVE SOLUTION. THE MEMBRANES MUST BE FLUSHED FOR AT LEAST 30 MINUTES TO REMOVE THE PRESERVATIVE FROM THE MEMBRANE. DISCARD ALL OF THE PRODUCT AND CONCENTRATE, WHICH IS PRODUCED DURING THE FLUSH PERIOD

#### HIGH PRESSURE PUMP OIL CHANGE

[LC: This section is a terrific improvement and extremely useful. Two questions: When should this oil be changed? What kind of oil should be used?]

#### **OIL CHANGE STEPS**

- 1. Run unit for 30 minutes prior to draining oil
- 2. Drain or pump the oil out of the pump. If draining, locate and remove the drain plug, then use a small container that can be placed under the pump casing. (A small hand pump can be used to pump the oil out through the oil fill cap instead of draining the oil through the drain plug.) Dispose of oil properly.



Drain Plug

- 3. Install the drain plug back in the high pressure pump.
- 4. Locate and remove oil fill cap.

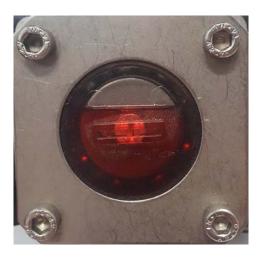
Oil Fill Cap



## **HIGH PRESSURE PUMP OIL CHANGE**

## **OIL CHANGE STEPS**

5. Fill oil above the center of sight glass not exceeding the very top of the site glass. (refer to picture below)



6. Screw fill cap back onto top of high pressure pump

NOTE: OIL LEVEL CAN ONLY BE CHECKED WITH THE UNIT NOT RUNNING

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# **PART 4: TROUBLESHOOTING**

## **REVERSE OSMOSIS TROUBLESHOOTING**

SYMPTOMS	POSSIBLE CAUSES	CORRECTIVE ACTION
	Low supply pressure	Increase Inlet Pressure
LOW INLET PRESSURE	Cartridge filters plugged	Change Filters
	Leaks	Fix any visible leaks
	Cold feed water	See temperature correction sheet
	Low operating pressure	Adjust throttle and concentrate valve
LOW PRODUCT FLOW	Defective membrane brine seal/ Membrane installed backwards	Replace brine seal and / or Reposition membranes
	Fouled or Scaled membrane	Clean membranes
	Damaged product tube O-rings	Inspect and/or replace
	Damaged or oxidized membrane	Replace membrane
HIGH PRODUCT FLOW	Exceeding maximum feed water temperature	See temperature correction sheet
	Low operating pressure	Adjust concentrate valve
	Damage product tube O-rings	Inspect and/or replace
POOR PRODUCT QUALITY	Damaged or oxidized membrane	Replace membrane
	Scaling (CaSO4, CaSO3, BaSO4, SiO2)	Reduce recovery. Clean with Acid Cleaners
	Biological Fouling	Clean Membranes
MEMBRANE FOULING	Organic Fouling	Clean with high pH cleaner.
	Chlorine Oxidation	Check Chlorine feed equipment and de-chlorination system.

NOTE: CONTACT YOUR LOCAL DOMETIC SERVICE DEALER IF FURTHER TROUBLESHOOTING IS NEEDED.

#### ABNORMAL PRODUCT FLOW

As time progresses, the efficiency of the membrane will be reduced. In general, the salt rejection does not change significantly until two or three years after installation when operated on properly pretreated feed water. The product flow rate will begin to decline slightly after one year of operation, but can be extended with fresh water flushing of the system. A high pH and/or precipitation of hardness can cause premature loss in rejection.

Product flow should be within 20% of the rated production, after correcting the feed water temperatures above or below 77°F. Check your product flow meter and correction chart to determine the product flow rate.

NOTE: TO DETERMINE THE TEMPERATURE CORRECTION FACTOR, LOCATE THE TEMPERATURE CORRECTION TABLE IN THIS USER'S MANUAL ON PAGE 12 AND FOLLOW THE DIRECTIONS.

## PRESSURE SWITCH ADJUSTMENT

The low and high pressure switch come factory calibrated. The setting for each switch is the following:

- LP 5psi
- HP 950psi

If field calibration is necessary then follow the steps below to adjust the switch.

# NOTE: THE SWITCH ADJUSTMENT STEPS ARE THE SAME FOR BOTH LP AND HP SWITCHES

1. Locate the switches on the left side of the unit just behind the main panel.



# PRESSURE SWITCH ADJUSTMENT

2. Remove the sealed cap from pressure switch



3. Adjust set point with 5/64<sup>th</sup> Allen wrench, clockwise to increase setting and counterclockwise to lower the setting.



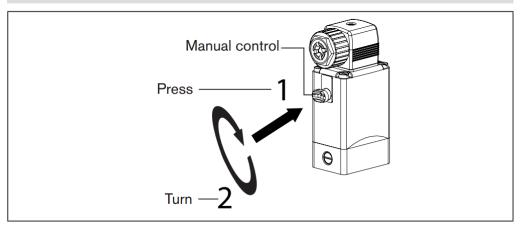
## **DIVERSION VALVE**

### **BY-PASS**

If the electrical portion of the solenoid fails or the controller fails to energize the solenoid, a manual bypass on the diversion valve may be utilized if the product water is found to be acceptable. Refer to picture below and the Diversion Valve manual on page 114.

#### **NOTE!**

► When the manual control is locked, the valve cannot be actuated electrically.



# **PART 5: PARTS**

DRAWING	ITEM	PART	DESCRIPTION
		NUMBER	
	1	252404800	5/16" x 1" SS HEX FLAT BOLT
	2	252404801	MOUNT, VIBRATION, 5/16'-18, 1" H X 1-3/8" W
	3	252404802	VIBRATION ISOLATOR, 50 LB MAX, 5/16-18
	4	252404803	MOUNT, VIBRATIONA2 , 5/16"-18 THREAD, 160LB CAPACITY
	5	252404804	GAUGE, 0-60 PSI, 2.5" DIA, SS, SG, 1/4" MNPT
SE MODEL GENERAL EXPLOSION	6	252404310	GAUGE, 0-1500 PSI, 2.5" DIA, SS, SG, 1/4" MNPT
<u>PAGE 62</u>	7	252404806	316 SS Flat Washer 5/16"
	8	252404807	5/16" LOCK WASHER SS
	9	252404162	2.5 GPM STAINLESS STEEL GENERAL PUMP
	10	252404154	1.5 HP MOTOR
	11	SEE DWG SX0105	VESSEL ARRAY ASSEMBLY
	12	252404051	WATERMAKER CONTROLLER
	1	252404179	SW MEMBRANE 40" LONG
SEA EXCHANGE	2	252404312	SW PRESSURE VESSEL 40" LONG
EXPLODED VIEW <u>PAGE 63</u>	3	252404178	SW MEMBRANE 20" LONG
	4	252404281	SW VESSEL 20" LONG
	1	252404814	END PLUG ONE PORT
	2	252404815	BEARING PLATE ONE PORT
	3	252404816	1/4-20 X BOLT SET OF 4
0010511734753155	4	252404817	HEX PORT
CONCENTRATE SIDE PARTS	5	252404818	1/4MNPT X 3/8 COMP. ELBOW SS
<u>PAGE 64</u>	6	252404868	3/8 SS S HP TUBING FOR CONC. SIDE 3" LONG
	7	252404819	3/8-16 LOCK NUT SET OF 8
	8	252404820	END PLUG O-RING
	9	252404821	1/4 SS WASHER

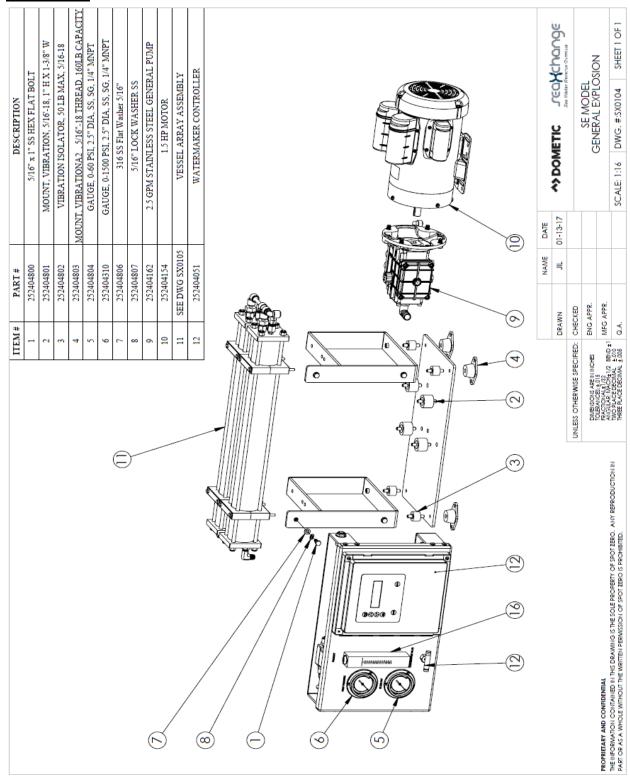
DRAWING	ITEM	PART NUMBER	DESCRIPTION
			END PLUG TWO PORT
	1	252404822	TWO PORT BEARING PLATE
	2	252404823	
	3	252404816	1/4-20 X BOLT SET OF 4(B1)
	4	252404817	HEX PORT
PRODUCT SIDE PARTS	5	252404274	1/4MNPT X 3/8 FLARE ELBOW SS
<u>PAGE 65</u>	6	252404125	1/4MNPT X 3/8QC ACETAL
	7	252404819	3/8-16 LOCK NUT SET OF 8
	8	252404821	3/8 WASHERS SET OF 8
	9	252404824	3/8QC X 3/8QC ELBOW ACETAL
	10	252404825	3/8QC TEE ACETAL
	1	252404826	PORT SEAL O-RING
SW VESSEL O-RINGS <u>PAGE 66</u>	2	252404827	END PLUG SEAL O-RING
	3	252404828	HUB SEAL O-RING
	1	252404154	1.5HP MOTOR
	2	252404162	GP 2.5 GPM PUMP
	3	252404808	3/8 SSP COUNTERSUNK PLUG
	4	252404809	3/8QC x 1/4QC PLUG IN ELBOW
SE MOTOR AND PUMP PARTS	5	252404810	MALE CONNECTOR 3/8"X1/2" MNPT ACETAL
<u>PAGE 67</u>	6	252404273	SSP 3/8 MNPT X 3/8 FLARE STRAIGHT
	7	252404811	3/4" x 1/2" REDUCER NIPPLE NYLON
	8	252404812	3/4" FNPT TO 3/4" BARB ELBOW
	9	252404813	3/8" x 3/4" SS HEX BOLTB1
	10	252404805	GP VENT OIL CAP

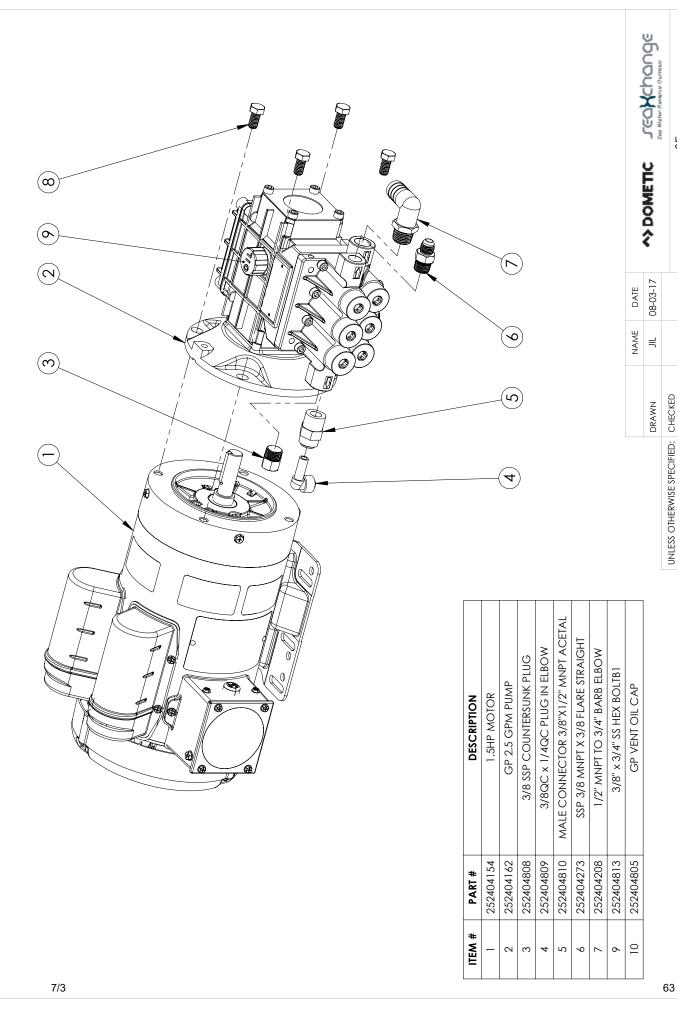
DRAWING	ITEM	PART	DESCRIPTION
		NUMBER	1/AMPRE V 2/00C ACCETAL
	1	252404125	1/4MNPT X 3/8QC ACETAL
	2	252404829	PLUG IN ELBOW 3/8QC ACETAL
	3	252404002	3/8 TUBING
	4	252404828	3/8QC X 3/8QC ELBOW ACETAL
	5	252404831	1/4 HP SS TEE
	6	252404076	HIGH PRESSURE SWITCH 950PSI
SXII/SE CONTROL PANEL PARTS	7	252404075	LOW PRESSURE SWITCH 5PSI
<u>PAGE 68</u>	8	252404832	3/8MNPT X 3/8QC ACETAL
	9	252404833	3/8 SS NEEDLE VALVE
	10	252404834	3/8 X 1/4 REDUCER HEX BUSHINGSS
	11	252404274	1/4MNPT X 3/8 FLARE HP SS ELBOW
	12	252404835	1/4" MNPT X 1/4" COMPRESSION ELBOW
	13	252404836	PLUG IN ELBOW 1/4 ACETAL
	14	252404837	1/4 SCHEDULE 80 SS REINFORCED TEE
	1	252404829	PLUG IN ELBOW 3/8QC ACETAL
	2	252404832	3/8MNPT X 3/8QC ACETAL
SXII/SE CONTROL PANEL PARTS	3	252404838	1/2 SCHEDULE 80 SS REINFORCED TEE
<u>PAGE 69</u>	4	252404839	TDS PROBE SENSOR-SP5
	5	252404821	1/4 X 1/4 COMP SS HP ELBOW
	6	252404869	3/8 HP SEAMLESS TUBING BENT fore P.GAUGE SXII-SE
	1	252404002	3/8 TUBING
	2	252404829	PLUG IN ELBOW 3/8QC ACETAL
	3	252404840	1/2QC TO 3/8QC REDUCER STRAIGHT
	4	252404841	1/2QC TEE ACETAL
SXII/SE CONTROL PANEL PARTS	5	252404003	1/2 TUBING
<u>PAGE 70</u>	6	252404842	1/2QC TO 3/8QC REDUCING ELBOW
	7	252404843	PLUG IN ELBOW 1/2QC ACETAL
	8	252404844	1/2QC ELBOW ACETAL
	9	252404845	3/8QC CHECK VALVE ACETAL
	10	252404846	1/2QC TO 1/2QC BULKHEAD

DRAWING	ITEM	PART	DESCRIPTION
		NUMBER	
	1	252404847	3/8QC TO 3/8QC BULKHEAD
	2	252404002	3/8 TUBING
SXII/SE CONTROL	3	252404125	1/4MNPT X 3/8QC ACETAL
PANEL PARTS <u>PAGE 71</u>	4	252404083	3/2 BURKERT DIVERSION VALVE-230V
	5	252404257	3/2 BURKERT DIVERSION VALVE-115V
	6	252404829	PLUG IN ELBOW 3/8QC ACETAL
	7	252404848	DIN CONNECTOR PLUG
	1	252404854	10-24 X 1/2 PAN SS SCREW
	2	252404806	5/16 SS WASHER
	3	252404807	5/16 SS LOCK WASHER
	4	252404800	5/16 X 1 SS HEX BOLT
	5	252404861	1/2 MNPT X 3/4 BARB ELBOW NYLON
	6	252404862	1/2 NIPPLE 1.5" THREADED
SX/XTC/SE PRE- FILTER SUB	7	252404324	2.5 X 10 CLEAR HOUSING
ASSEMBLY <u>PAGE 72</u>	8	252404863	DOUBLE PRE-FILTER BRACKET
	9	252404836	1/4 PLUG IN ELBOW ACETAL
	10	252404864	1/4 MNPT TO 1/4QC CONNECTOR ACETAL
	11	252404292	25 MICRON FILTER
	12	252404291	5 MICRON FILTER
	13	252404856	2.5 x 10 CLEAR HOUSING O-RING
	14	252404326	WRENCH FOR 2.5 CELAR HOUSING

DRAWING	ITEM	PART NUMBER	DESCRIPTION
	1	252404324	2.5 X 10 CLEAR HOUSING
	2	252404849	3/8 TO 1/4QC STEM REDUCER
	3	252404850	1/2 MNPT X 3/8QC CONNECTOR ACETAL
	4	252404851	1/2 THREADED NIPPLE
	5	252404852	1/2 FNPT REINFORCED ELBOW
	6	252404853	SINGLE PRE-FILTER BRACKET
	7	252404354	10-24 X 1/2 PAN SS SCREW
SXII/XTC/SE FRESH	8	SEE DWG	2-WAY SOLENOID
WATER FLUSH SUB ASSY	9	252404855	DIN CONNECTOR
<u>PAGE 73</u>	10	252404856	2.5 CLEAR HOUSING O-RING
	11	252404014	CARBON BLOCK FILTER
	12	252404800	5/16 X 1 SS HEX BOLT
	13	252404807	5/16 SS LOCK WASHER
	14	252404806	5/16 SS WASHER
	15	252404217	1/2 SPRING CHECK VALVE
	16	252404326	WRENCH FOR 2.5 CELAR HOUSING
	17	202404858	WATER RESTRICTOR 1.0

### **SE MODEL**





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SHEET 1 OF 1

SCALE: N/A DWG. SX0106

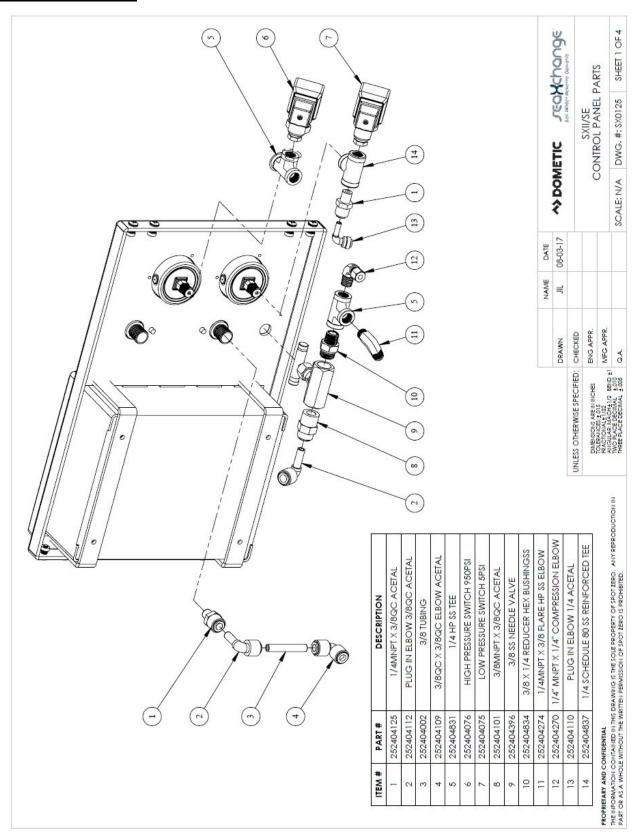
DIMENSIONS AREIN INCHES
TOLLERANCES: 2015
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ANGLIJAR: MACH: 1/2 BEID ±1
TWO PLACE DECIMAL ± 2016
THERE PLACED DECIMAL ± 3016
Q.A.

ENG APPR.

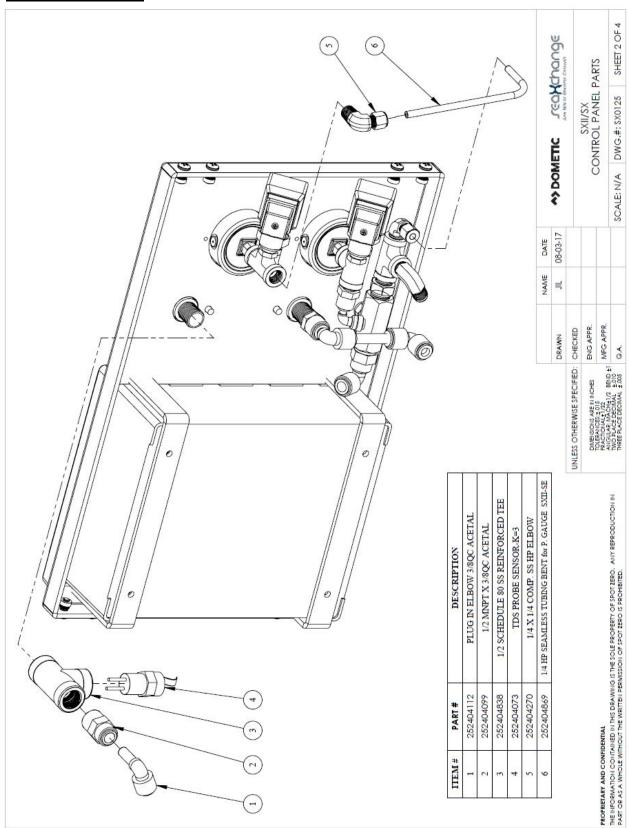
SE MOTOR AND PUMP PARTS

63

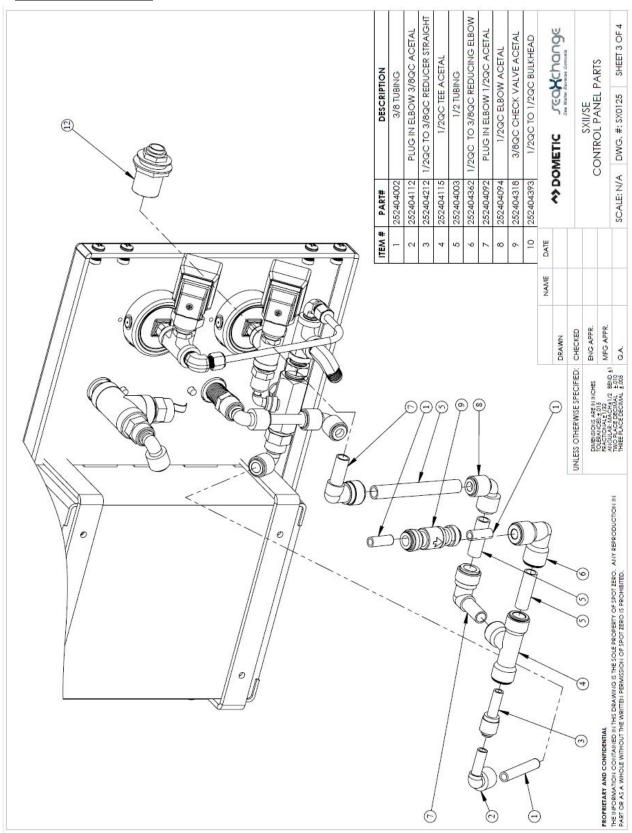
## **CONTROL PANEL**



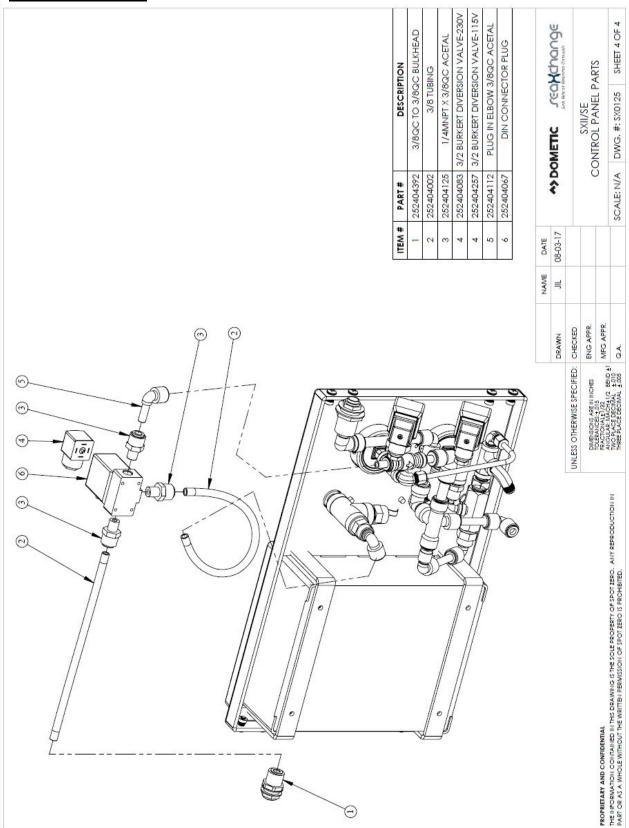
## **CONTROL PANEL**

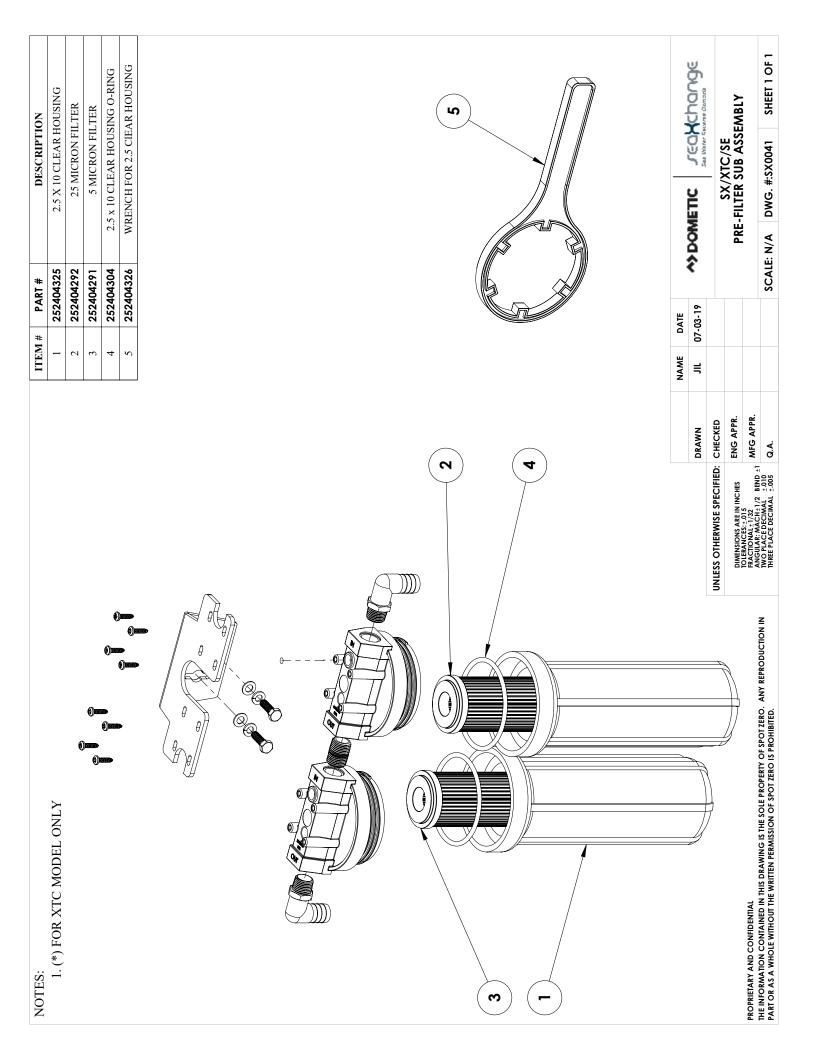


## **CONTROL PANEL**



## **CONTROL PANEL**





	2.5	14RT 2-WAY SOLENOID	4304 2.5 CLEAR HOUSING O-RING	4295 CARBON BLOCK FILTER	4326 WRENCH FOR 2.5 CELAR HOUSING
#		2 SEE CHART	3 252404304	4 252404295	5 252404326
ITE					•
					•)

# PART 6: MANUFACTURERS INDEX

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# **WATERMAKER SYSTEM CONTROLLER**





# Watermaker System **Controller Documentation**

# **Table of Contents**

Description	Page
Specifications: Table 1	3
Terminal Board Schematic: Figure 1	4
Controller Overview: Figure 2	5
Controller Detail, CPU-4 & LP-4: Figure 3	6
Controller Detail, TB-4: Figure 4	7
Conductivity Probe Installation: Figure 5	8
Controller Programming, Internal Menus: Figure 6	9
Controller Factory Default Settings	10
Controller Fault Conditions	11

#### Table 1. Specifications

#### Inputs

Tank level switches (2) Normally-Closed. Can be used with a single level switch.

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 µs (standard sensor, CP-1, K=.75)

Feed Conductivity not applicable on Seawater

#### Output Relay Ratings (relays are fused with a 6A fuse)

Feed Valve (Boost Pump Coil) 1A @ 250VAC (with NO and NC contacts for motorized valves)

Flush Valve 1A @ 250VAC.

Divert Valve 1A @ 250VAC (with NO and NC contacts)

 Alarm
 1A @ 250VAC

 HP Pump Motor Coil
 1A @ 250VAC

#### Circuit Protection

Main Power Fuse F1 6 Amp 5x20mm LittelFuse 0234.006 or Buss GMC-6R

Power Supply Fuse F2 1/4 Amp 5x20mm LittelFuse O218.250

#### 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)

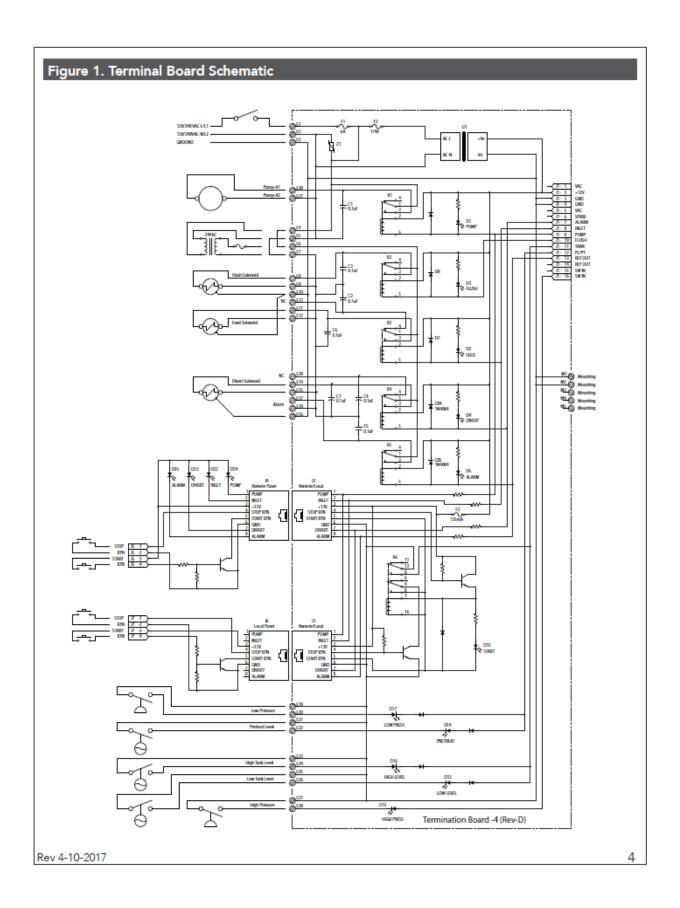
Weight 4.2 lb. (10.5x9.5) (Enclosure, CPU-4 and TB-4 only.)

6.0 lb. (12.5 x 11.25) (Enclosure, CPU-4 and TB-4 only.)

10.6 lb. (12.5 x 11.25) (Enclosure, CPU-4 and TB-4 only.)

Environment O-50°C, 10-90%RH (non-condensing)

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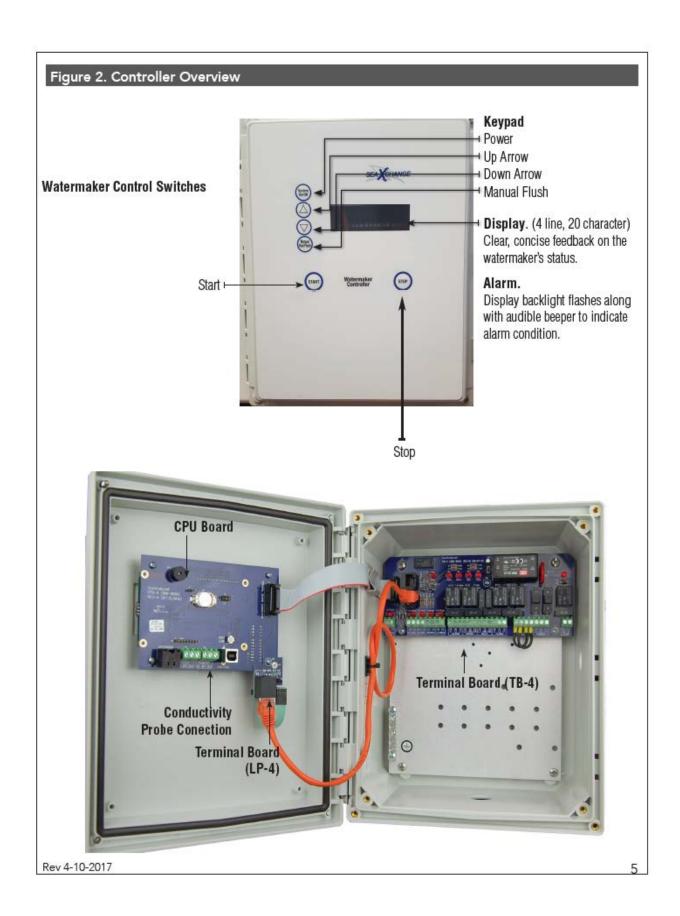
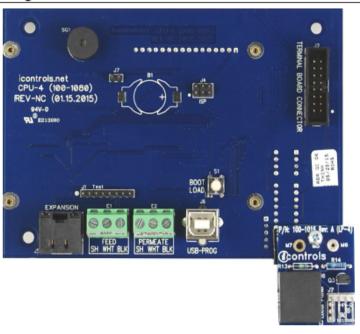
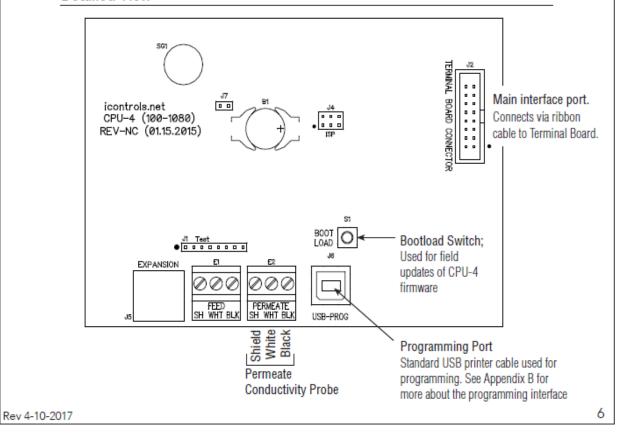


Figure 3. Controller Detail: CPU-4/LP-4

#### Typical Configuration



#### **Detailed View**



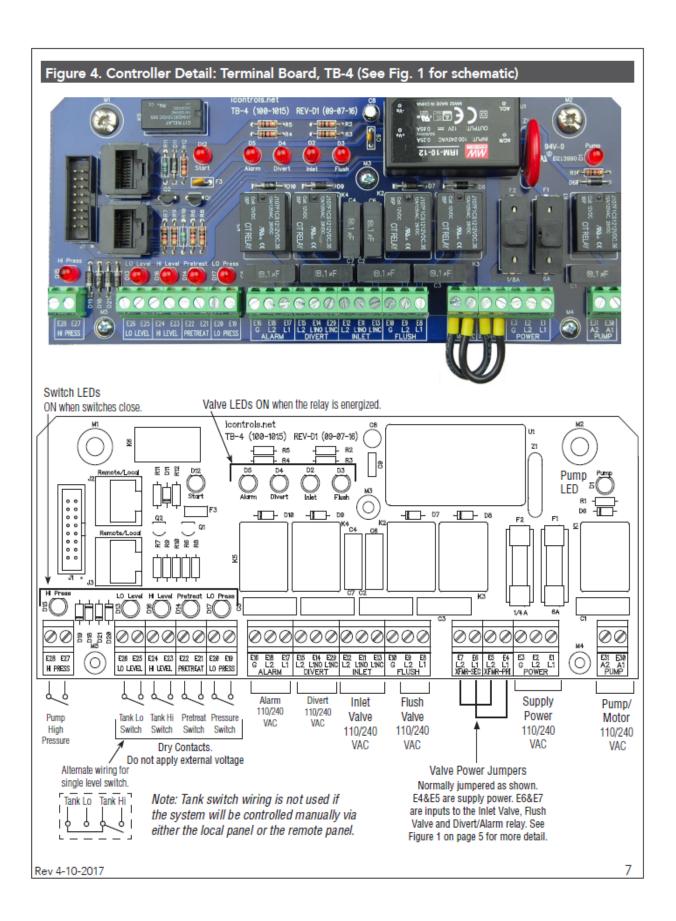


Figure 5. Conductivity Probe Installation



#### **Conductivity Probe Calibration**

Because the conductivity measurement is affected by the physical envioronment 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.

- 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.
- 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.

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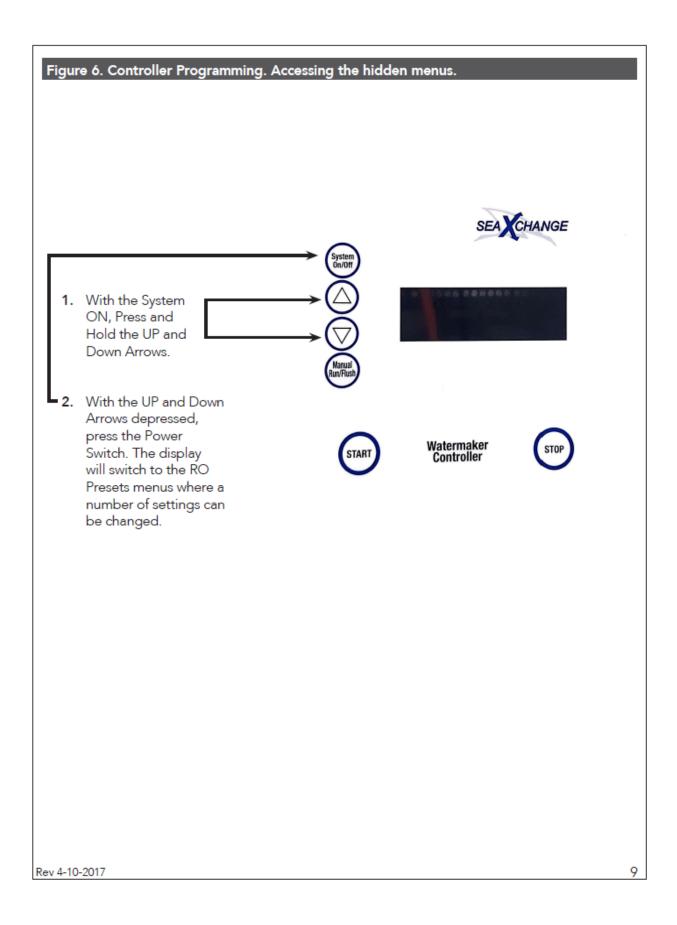
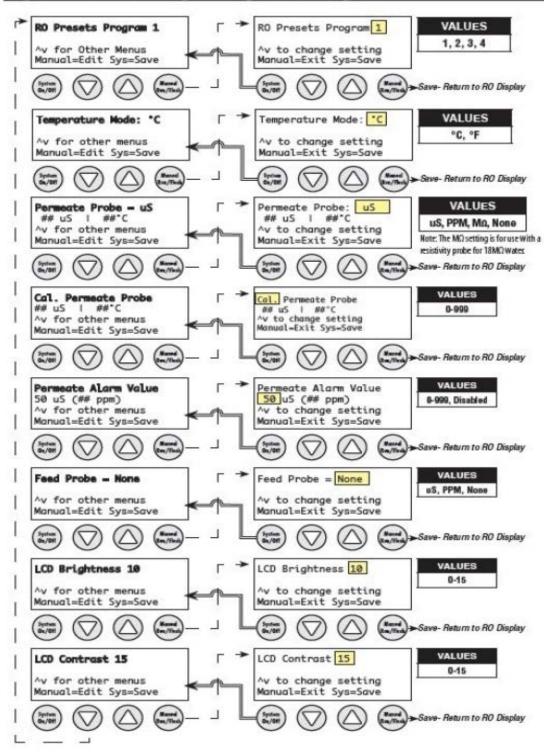


Figure 7. Controller Programming: Menu Navigation



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#### **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
Rev 4-10-2017
                                                                                                      11
```

# **GENERAL HIGH PRESSURE PUMP**

Stainless Steel Triplex Plunger Pump

# SERVICING INSTRUCTIONS





#### SERVICING PUMP PROCEDURES

Valve Replacement: All inlet and discharge valves can be serviced without disrupting the inlet or discharge plumbing.







#### To service any valve:

- Using a 3/8" allen wrench, remove valve cap. Examine threads and o-ring. Replace o-ring if there is any evidence of cuts, abrasions, distortion or wear.
- 2) Remove valve assembly (retainer, spring, valve, valve seat) from valve cavity.
- 3) Remove valve seat o-ring from valve cavity.
- 4) Inspect manifold for wear or damage.
- 5) Install new o-ring in valve cavity.
- 6) Insert valve assembly into valve cavity.
- Coat the threads of the valve cap with Loctite anti-seize 77164 and reinstall valve cap. Torque to 10.8 Nm (8.0 Ft-Lbs).

NOTE: Only one valve kit is necessary to repair all the valves in the pump. The kit includes new o-rings, valve seat, poppet, spring and retainer. All are pre-assembled.

Ref 300789 Rev.C 04-16



# WM Series Servicing Instructions

#### GENERAL PUMP A member of the Interpump Group







#### Replacing packings using kit WM02:

 Remove head bolts using 5mm hex wrench and slide manifold away from crankcase. (It is normal for some packing assemblies to remain on the plungers).

Note: it may be necessary to rotate crankshaft and/or use pry bars to separate manifold from crankcase.

2) Inspect plungers for cracks, scoring or build up and replace/clean as needed.







Insert 18 mm extractor collet through seal retainer. Tighten collet and extract packing assembly from manifold. Clean and inspect cavity for unusual wear, cracks, etc.







4) Note: do not grease any portion of the packing assembly during this process. Set high pressure seal insertion collar in manifold cylinder. Assemble Glyd rings (positions 5 & 6) and gently place inside cylinder tool so they are resting evenly. Insert pusher tool and firmly press down to set packing in manifold.

> Ref 300789 Rev.C 04-16

# WM Series Servicing Instructions

# GENERAL PUMP A member of the Interpump Group







- 5) Set insertion collar over seal casing (position 4) and ensure recess for seal is facing upwards. Gently place low pressure sea (position 2) into collar ensuring the spring side of the seal is facing downward and resting evenly. Insert pusher tool into collar and firmly press down to set seal in casing.
- 6) Install o-ring (position 3) so it's properly seated in the middle groove on the casing groove that doesn't have through holes. Installation in the wrong groove will impede the flow of cooling water resulting in premature seal failure.







- Place seal case into manifold cylinder with low pressure seal facing upwards. Firmly press into cylinder until properly seated and repeat for each cylinder.
- 8) Rotate crankshaft so center plunger is furthest forward.
- Slide seal retainer ring over the plunger until seated in crankcase. Ensure o-ring (position 3) is positioned so crankcase opening will receive aligned portion.

Note: a small amount of silicone grease on the back side of the retainer ring will help secure it in place.

- 10) Slide manifold assembly on to center plunger first, then align to outer plungers while pushing towards crankcase. Note: a pair of make shift 6mm alignment pins will minimize chance of seal damage at this point, see illustration for details.
- Once manifold is properly seated, install head bolts and begin torque sequence as illustrated. Tighten to 10.8Nm or 8.0 Ft-lbs.



#### Recommended Tools/Supplies:

100783 Complete Extraction Kit

includes the following tools:

2530016 handle 2530020 15mm sleeve 2530017 bolt 2530021 18mm sleeve

2530018 pin

100295 General Pump Series 100 Oil (1-16 oz. bottle)

100214 General Pump Series 100 Oil (6-16oz. bottles) 100216 General Pump Series 100 Oil (24-16 oz. bottles)

100278 General Pump general packing lubricant

Loctite 77164

Loctite 243

Ref 300789 Rev. C 04-16



# TROUBLESHOOTING



PROBLEM	CAUSE	REMEDY
Pulsation	Valve stuck open.	Check all valves, remove foreign matter.
Pulsation	Faulty pulsation damper.	Check precharge; if low, recharge it or install a new one.
	Wom nozzle.	Replace nozzle, of proper size.
	Belt slippage.	Tighten or replace; use correct belt.
	Air leak in inlet plumbing.	Disassemble, reseal and reassemble.
	Relief valve stuck; partially plugged or improperly adjusted valve seat worn.	Clean, adjust relief valve; check for worn and dirty valve seats. Kit available.
Low pressure	Inlet suction strainer dogged or improperly sized.	Clean. Use adequate size. Check more frequently.
	Worn packing. Abrasives in pumped fluid or severe cavitation. Inadequate water.	Install proper filter. Suction at inlet manifold must be limited to lifting less than 20 feet of water or -8.5 PSI vacuum.
	Fouled or dirty inlet or discharge valves.	Clean inlet and discharge valve assemblies.
	Worn inlet, discharge valve blocked or dirty.	
	Leaky discharge hose.	Replace worn valve seats and/or discharge hose
97 : 15 V3	Restricted inlet or air entering the inlet plumbing.	Proper size inlet plumbing; check for air tight seal
Pump runs extremely rough, pressure very low.	Inlet restrictions and/or air leaks. Stuck inlet or discharge valve.	Replace worn cup or cups, clean out foreign material replace worn valves.
Water leakage from under	Worn packing.	Install new packing.
manifold. Slight leakage.	Cracked plunger.	Replace plunger(s).
Oil leak between crankcase and pumping section.	Worn crankcase piston rod seals. O-rings on plunger retainer worn.	Replace crankcase piston rod seals. Replace o-rings.
Oil leaking in the area of	Worn crankshaft seal or inproperly installed oil seal o-ring.	Remove oil seal retainer and replace damaged o-ring and/or seals.
crankshaft.	Bad bearing.	Replace bearing and any spacer or cover damaged by heat.
Excessive play in the end of the crankshaft pulley.	Worn main bearing from excessive tension on drive belt.	Replace crankcase bearing and/ or tension drive belt.
	May be caused by humid air condensing into water inside the crankcase	Change oil intervals. Use General Pump SAE 30 non-detergent oil.
Water in crankcase.	Worn packing and/or piston rod sleeve, o-rings on plunger retainer worn.	Replace packing. Replace o-rings.
	Cracked plunger	Replace plunger(s).
Oil leaking from underside	Worn crankcase piston rod seals.	Replace seals.
of crankcase.	Scored piston rod.	Replace piston rod.
Oil leaking at the rear portion of the crankcase.	Damaged crankcase, rear cover o-ring, drain plug o-ring, or sight glass o-ring.	Replace cover o-ring, drain plug o-ring, or sight glass o-ring.
	Pulley loose on crankshaft.	Check key and tighten screw.
Loud knocking noise in pump.	Broken or worn bearing on rod(s).	Replace bearing or rod(s).
	Valve stuck open or shut, or not opening enough.	Replace bad valve.
	Scored, damaged or worn plunger.	Replace plungers.
	Overpressure to inlet manifold.	Reduce inlet pressure.
	Abrasive material in the fluid being pumped.	Install proper filtration on pump inlet plumbing.
Frequent or premature failure of the packing.	Excessive pressure and/or temperature of fluid being pumped.	Check pressures and fluid inlet temperature; be sure they are within specified range.
	Overpressure of pump.	Reduce pressure.
	Running pump dry.	Do not run pump without water.
	Upstream chemical injection.	Use downstream chemical injection.

# **WM SERIES**

#### MAINTENANCE LOG

#### **HOURS & DATE**

1				
OIL CHANGE Change oil after first 50 hours of pump operation, then every 300 hours, or every 3 months, thereafter. (Depending on conditions.)				
GREASE				
PACKING REPLACEMENT				
PLUNGER REPLACEMENT				
VALVE REPLACEMENT				



GP Companies, Inc. 1174 Northland Drive Mendota Heights, MN 55120 Phone: 651.686.2199 Fax: 800.535.1745

www.generalpump.com email: sales@gpcompanies.com

Ref 300789 Rev.B

# **BOOSTER PUMP**

# Installation and Operation Manual

# Syllent Marine



# Description:

The single stage centrifugal Syllent Marine motor pump has conjugated hydromagnetic rotor / turbine / bearings, resin encapsulated coiled stator, free from roller bearings and dynamics seals (mechanic seal type).

It doesn't need external ventilation, heat exchange is done with water and doesn't have any water contact with electricity and metal components, that makes the motor pump resistant to water submersion.

#### Operation:

The Syllent Marine motor pump is not self-priming, and thus require a flooded suction. **If the pump is not fully filled with water, it could damage the unit.** 

Make use of a seawater strainer to avoid any sort of dirt inside the pump. Install the seawater strainer below the level of the pump with easy access to filter to do a periodical cleaning.

If a noise of water mixed with air remains in the pump, it could mean that there is false air entry through the suction piping, which should be perfectly sealed; or else, it could mean that the motor pump is cavitating, that is, the motor pump needs more water at the suction. In this case, it is necessary to reduce the discharge outflow, gradually closing the shutoff valve and increasing the column (water or pressure height) at the discharge, until the noise is reduced.

#### Electric Installation:

Check if the electricity voltage is the same of the motor pump.

Connect the motor pump's wiring to a circuit breaker and do not forget to connect the ground wire. Use cable gauges compatible with the electrical current.

#### Protection:

Priming sensor: it turns off the pump automatically after 4 seconds, it turns off the motor pump automatically in case of lack of water, rotor blocking or overheat. In this case, in order to restart the operation, it is necessary to disconnect the motor pump from the power supply (manual reset).

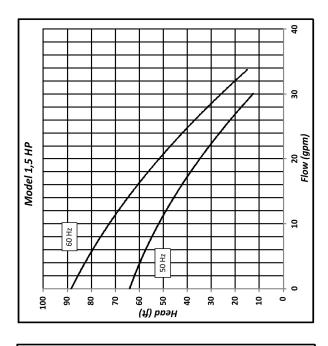
The motor pump has been equipped with bimetallic thermostats in the casing and in the coiling. The motor pump will shut off automatically if overheated (water temperature over 50°C). Troubleshooting procedures should be carried out to find out what might have caused overheating. The motor pump will turn on automatically when the temperature inside the pump gets lower than 35°C.

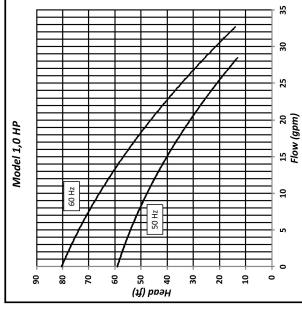
# Warranty:

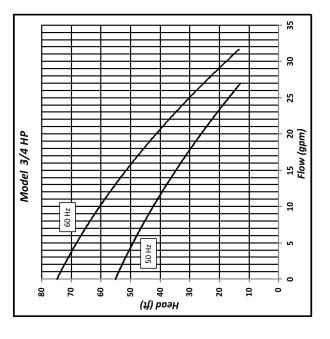
The Syllent Marine motor pump has a one year warranty against material and manufacture defects, as from the date of purchase, supported by the purchase invoice and as long as it has been used under normal conditions.

												SPE	<b>SPECIFICATIONS</b>	;ATIC	SNC								
				9	ZH 09								51	20 Hz				4	dun			Max	Protection
MODEL	Мах.	Мах. Неад	Max. Flow	Flow		ELE	ELECTRICAL	47		Мах. Н	ead	Head Max. Flow	WO!		ELECI	ELECTRICAL		3	Weight	Inlet - Outlet	Max. Liquid Temperature	Internal	Sealed
	ų,	ш	udb	lpm	/	A	P.F.	НР	kW	tt .	m m	mdb	lpm	^	A P.	P.F. HP	P kW	sqI /	kg			Pressure	Pump
MS-1024	74.0	000	24.7	120	115	8,40	66,0	7/0	990	7	16.0		400	115 8	8,10 0,	0,92	7/0	0 56 15 2	0 9				
MS-2024	0,4	0,47	,''0	0.7	230	4,10	66'0	) 1		_	 o, 			230	3,10 0,	66'0	, 	<u></u>					
MS-1025	7.00	7 70	0 00	707	115	9,00	96'0	-	37.0	1	10.0		00	115	8,80 0,	06,0	6	10 075 168 76	7 6		To C + 1 + 20 E	150 kPa/	09 01
MS-2025	t, 00,	C, † 4	0,50	+71	230	4,55	76,0	0,'0	2,,0		0,0			230	3,60 0,	66,0	oʻ	5	0,	1" NPT	- - - - -	22 psi	9 -
MS-1026	000	0 30	0 00	100	115	09'6	86'0	<u>ч</u>	100	_	10 6 20 1	100	7	115 8	8,50 0,	0,92	-	0 +	0				
MS-2026	0,00	60,3	0,00	0 7 -	230	5,20	96'0	<u>.</u>	0,+0			- , -		230	5,20 0,88		<u>-</u>	2,0					

**Notes:**(1) Motor pump with continuous operation.
(2) All specifications may vary with different motors, this datas are a guideline only.

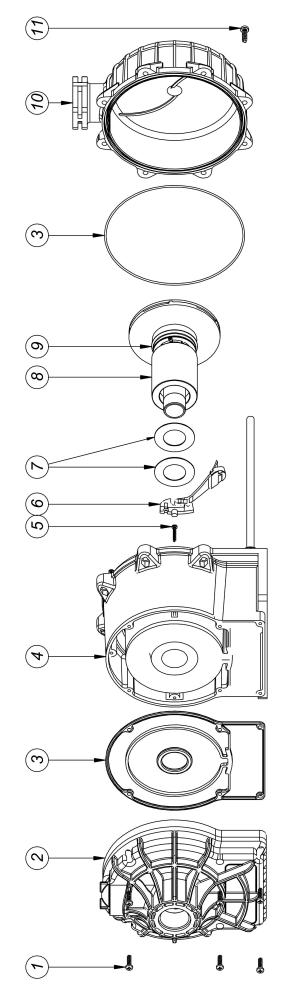






This datas can be changed without prior advice.

# PARTS LIST



	DESCRIPTION	MATERIAL	SIZE (inches)	QTY.	PART #
S	Screw	Stainless	#0.157 x 0.630	9	3E4446P1A
ᅀ	Pump Inlet Housing Assembly	Polyamide	1 NPT	1	3D9756C4A
$^{1}$	O'Ring	Nitrile Rubber		1	3D7868A
╚	Motor with Encapsulant, Capacitor, Priming Circuit, Housing and Cord Assembly			N/A	Not Avaliable
S	Screw	Stainless	#0.124 x 0.787	4	3E4451P1A
╚	Mechanical Priming Sensor	Acetal Polyoxymethylene (POM)		1	3E4472C1A
_	Washer	Stainless		2	3E4353P2A
ᆖ	Impeller Assembly				
3	3/4 HP Impeller				3D9793C1A
1	1.0 HP Impeller			1	3D9793C2A
8-3 1	1.5 HP Impeller				3D9793C3A
ㅗ	Filter Gasket	Nitrile Rubber		1	3E5147A
ام	Pump Outlet Housing	Polyamide	1 NPT	1	3D9794C3A
2	Screw	Stainless	#0.197 × 0.708	8	3E5134P3A

# Manufactured by Eberle Equipamentos e Processos S.A. 1101 Ana Catharina Canalli Caxias do Sul, RS, - Brazil Phone: 55 (54) 3218-5555 www.syllent.com.br

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12401 Orange Drive, Suite 136 Davie, FL, 33330 - USA Phone: 954 - 668 - 2787 www.syllent.com Distributed by Mundial Inc.

Sold by Southern Marine Supply, Inc. 1957 S. Andrews Ave. Fort Lauderdale, FL, 33316 - USA Phone: 954 - 533 - 8060 www.smsupplyinc.com







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# **DOW FILMTEC™ MEMBRANES**



#### DOW FILMTEC™ Membranes

DOW FILMTEC Seawater RO Elements for Marine Systems

#### **Features**

Improved DOW FILMTEC™ seawater reverse osmosis elements offer the highest productivity while maintaining excellent salt rejection.

- . DOW FILMTEC SW30 membrane elements have the highest flow rates available to meet the water demands of both sea-based and land-based desalinators.
- DOW FILMTEC SW30 elements may also be operated at lower pressure to reduce pump size, cost and operating expenses.
- Improved DOW FILMTEC seawater membrane combined with automated, precision element fabrication result in the most consistent product performance available.

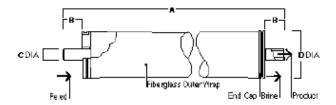
#### **Product Specifications**

Product	Part Number	Applied Pressure psig (bar)	Permeate Flow Rate gpd (m³/d)	Stabilized Salt Rejection (%)
SW30-2514	80733	800 (55)	150 (0.6)	99.4
SW30-2521	80734	800 (55)	300 (1.1)	99.4
SW30-2540	80737	800 (55)	700 (2.6)	99.4
SW30-4021	80740	800 (55)	800 (3.0)	99.4
SW30-4040	80741	800 (55)	1,950 (7.4)	99.4

<sup>1.</sup> Permeate flow and salt rejection based on the following test conditions: 32,000 ppm NaCl, pressure specified above, 77°F (25°C) and the following recovery rates; SW30-2514 - 2%, SW30-2521 & SW30-4021 - 5%, SW30-2540 & SW30-4040 - 8%.

<sup>3.</sup> For the purpose of improvement, specifications may be updated periodically.







	Maximum Feed Flow Rate	Dimensions – I	nches (mm)			
Product	gpm (m³/h)	A	В	C	D	
SW30-2514	6 (1.4)	14.0 (356)	1.19 (30.2)	0.75 (19)	2.4 (61)	_
SW30-2521	6 (1.4)	21.0 (533)	1.19 (30.2)	0.75 (19)	2.4 (61)	
SW30-2540	6 (1.4)	40.0 (1,016)	1.19 (30.2)	0.75 (19)	2.4 (61)	
SW30-4021	16 (3.6)	21.0 (533)	1.05 (26.7)	0.75 (19)	3.9 (99)	
SW30-4040	16 (3.6)	40.0 (1,016)	1.05 (26.7)	0.75 (19)	3.9 (99)	

1 inch = 25.4 mm

Form No. 609-00377-0811

Permeate flows for individual elements may vary +/-20%.

Refer to DOW FILMTEC Design Guidelines for multiple-element systems.
 SW30-2514, SW30-2521 and SW30-2540 elements fit nominal 2.5-inch I.D. pressure vessels. SW30-4021 and SW30-4040 elements fit nominal 4-inch I.D. pressure vessel.

Page 1 of 2

<sup>™#</sup> Trademark of The Dow Chemical Company ("Dow") or an affiliated company of Dow

#### Operating Limits

Polyamide Thin-Film Composite Membrane Type

Maximum Operating Temperature 113°F (45°C) Maximum Operating Pressure 1,000 psi (69 bar) Maximum Pressure Drop 15 psig (1.0 bar)

pH Range, Continuous Operation® 2 - 11 pH Range, Short-Term Cleaning<sup>b</sup> 1 - 13 Maximum Feed Silt Density Index SDL5 Free Chlorine Tolerance<sup>c</sup> <0.1 ppm

Maximum temperature for continuous operation above pH 10 is 95°F (35°C).

Refer to Cleaning Guidelines in specification sheet 609-23010.

Under certain conditions, the presence of free chlorine and other oxidizing agents will cause premature membrane failure. Since oxidation damage is not covered under warranty, DOW FILMTEC recommends removing residual free chlorine by pretreatment prior to membrane exposure. Please refer to technical bulletin 609-22010 for more information.

#### Important Information

Proper start-up of reverse osmosis water treatment systems is essential to prepare the membranes for operating service and to prevent membrane damage due to overfeeding or hydraulic shock. Following the proper start-up sequence also helps ensure that system operating parameters conform to design specifications so that system water quality and productivity goals can be achieved.

Before initiating system start-up procedures, membrane pretreatment, loading of the membrane elements, instrument calibration and other system checks should be completed.

Please refer to the application information literature entitled "Start-Up Sequence" (Form No. 609-02077) for more information.

#### Operation Guidelines

Avoid any abrupt pressure or cross-flow variations on the spiral elements during start-up, shutdown, cleaning or other sequences to prevent possible membrane damage. During start-up, a gradual change from a standstill to operating state is recommended as follows:

- · Feed pressure should be increased gradually over a 30-60 second time frame.
- Cross-flow velocity at set operating point should be achieved gradually over 15-20 seconds.
- · Permeate obtained from first hour of operation should be discarded.

#### General Information

- · Keep elements moist at all times after initial wetting.
- . If operating limits and guidelines given in this bulletin are not strictly followed, the limited warranty will be null and void.
- To prevent biological growth during prolonged system shutdowns, it is recommended that membrane elements be immersed in a preservative solution.
- The customer is fully responsible for the effects of incompatible chemicals and lubricants on elements.
- Maximum pressure drop across an entire pressure vessel (housing) is 50 psi (3.4 bar).
- Avoid static permeate-side backpressure at all times.

For more information about DOW FILMTEC membranes, call the Dow Water & Process Solutions business: 1-800-447-4369 Latin America: (+55) 11-5188-9222 (+32) 3-450-2240 Europe: Pacific: +60 3 7958 3392 +813 5460 2100 Japan:

www.dowwaterandprocess.com

+86 21 2301 1000

DOW FILMTEC™ Membranes

Notice: The use of this product in and of itself does not necessarily guarantee the removal of cysts and pathogens from water. Effective cyst and pathogen reduction is dependent on the complete system design and on the operation and maintenance of the system.

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Form No. 609-00377-0811

Page 2 of 2

China:

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# **BURKERT DIVERSION VALVE**

#### Type 0121, 0330, 0331 (0124, 0125, 0332, 0333)

2/2- and 3/2-Way Solenoid Valve 2/2- und 3/2-Wege-Magnetventil Électrovanne à 2/2 et 3/2 voies



Operating Instructions Bedienungsanleitung Manuel d'utilisation

Bürkert Fluid Control Systems Sales Center Christian-Bürkert-Str. 13-17 Christian-Burkert-Str. 13-17 D-74653 Ingelfingen Tel. + 49 (0) 7940 - 10 91 111 Fax + 49 (0) 7940 - 10 91 448 E-mail: info@de.buerkert.com

# International address www.burkert.com

Manuals and data sheets on the Internet: www.burkert.com Bedienungsanleitungen und Datenblätter im Internet: www.buerkert.de Instructions de service et fiches techniques sur Internet: www.buerkert.fr

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www.burkert.com

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burkert

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4	System description
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8	Disassembly12
9	Maintenance, troubleshooting12
10	Transportation, storage, disposal13

#### THE OPERATING INSTRUCTIONS

The operating instructions contain important information.

- · Read the instructions carefully and follow the safety instructions.
- Keep the instructions in a location where they are available to every user.

The liability and warranty for the device are void if the operating instructions are not followed.

#### 1.1 Symbols

- ► Designates instructions for risk prevention.
- → Designates a procedure which you must carry out.



Immediate danger! Serious or fatal injuries.



Possible danger! Serious or fatal injuries.



Danger! Moderate or minor injuries.

#### NOTE!

2

Warns of damage to property.



Important tips and recommendations.



Refers to information in these operating instructions or in other documentation.

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#### 1.2 Definitions of terms

In these instructions, the term "device" always refers to the Type 0121, 0330, 0331, (0124, 0125, 0332, 0333).

#### 2 AUTHORIZED USE

The device is designed to control, shut off and meter neutral and aggressive media up to a viscosity of 37 mm²/s.

- Use according to the authorized data, operating conditions and conditions of use specified in the contract documents and operating instructions.
- Provided the cable plug is connected and installed correctly, e.g. Bürkert Type 2508, the device satisfies degree of protection IP65 in accordance with DIN EN 60529 / IEC 60529.

#### Only operate the device

- when in perfect condition and always ensure proper storage, transportation, installation and operation.
- ▶ Use the device only as intended.

#### 2.1 Restrictions

If exporting the device, observe any existing restrictions.

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#### 3 BASIC SAFETY INSTRUCTIONS

These safety instructions do not make allowance for any contingencies and events which may arise during assembly, operation and maintenance.



Risk of injury from high pressure in the system/device.

 Before working on the system or device, switch off the pressure and vent/drain lines.

#### Risk of injury due to electrical shock.

- Before working on the system or device, switch off the power supply and secure to prevent reactivation.
- Observe applicable accident prevention and safety regulations for electrical equipment.

Risk of burns/risk of fire if used for a prolonged switch-on time through hot device surface.

 Keep device away from highly flammable substances and media and do not touch with bare hands. Risk of injury due to malfunction of valves with alternating voltage (AC).

Sticking core causes coil to overheat, resulting in a malfunction.

Monitor process to ensure function is in perfect working order.
 Risk of short-circuit/escape of media through leaking screw joints.

- Ensure seals are seated correctly.
- ► Carefully screw valve and pipelines together.

4 english

#### General hazardous situations.

To prevent injuries:

- ► In a potentially explosive area, the device may be used only in accordance with the specification on the type label. For the use, observe the supplementary instructions manual enclosed with the device with safety instructions for the explosion-risk area.
- ► The enclosed UL instructions must be followed in the UL area.
- ► Do not carry out any external or internal modifications and do not subject the device to mechanical loads (e.g. by placing objects on it or standing on it).
- Secure the device against unintentional activation.
- · Only trained technicians may perform installation and maintenance
- ► The valves must be installed in accordance with the regulations applicable in the country.
- ► After an interruption in the power supply, ensure that the process is restarted in a controlled manner.
- Observe the general rules of technology.

#### SYSTEM DESCRIPTION

#### General description

The pivoted armature valves are direct acting 2/2 or 3/2-way solenoid valves in a wide variety of circuit functions and models. Solenoid system and media chamber are separated from one another by a separating diaphragm system. The valves are fast acting and have a long service life.

Type 0121 2/2 or 3/2-way solenoid valve, socket valve body Type 0330 2/2 or 3/2-way solenoid valve, socket valve body 2/2 or 3/2-way solenoid valve, flange valve body Type 0331 Bistable 2/2 or 3/2-way solenoid valve Type 0332 with 2 coil windings, socket valve body Type 0333 Bistable 2/2 or 3/2-way solenoid valve with 2 coil windings, flange valve body

Type 0124 2/2 or 3/2-way solenoid valve, socket valve body 2/2 or 3/2-way solenoid valve, flange valve body Type 0125

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#### **TECHNICAL DATA**



The following values are indicated on the type label:

Voltage (tolerance ±10 %) / current type

- · Coll power consumption (active power in W at operating temperature)
- Pressure range
- Body material (MS=brass, VA=stainless steel, PV=PVC. TE=PTFE, PP=polypropylene, PD=PVDF)
- Sealing material (F=FKM, A=EPDM, B=NBR, C=FFKM)

#### 5.1 Conformity

The Types 0121, 0330, 0331, (0124, 0125, 0332, 0333) are compliant with the EC Directives according to the EC Declaration of Conformity.

#### 5.2 Standards

The applied standards, which are used to demonstrate compliance with the EC Directives, are listed in the EC type test certificate and/or the EC Declaration of Conformity.

#### 5.3 Operating conditions

Ambient temperature

Type 0121 max. +50°C Other types max. +55°C

Duty cycle

for body material

Brass or stainless steel long-term operation, duty cycle 100%

max, permissible duty cycle Plastic

see data sheet

# Important information for functional reliability.

If switched off for a long period, 1-2 switching actions are recommended prior to restart.

Service life

High switching frequency and high pressures reduce the service life.

Degree of protection IP65 in accordance with DIN EN 60529

/ IEC 60529 with correctly connected and installed cable plug, e.g. Bürkert

Type 2508

6 english

#### 5.4 Mechanical data

Dimensions see data sheet Coil material emoxide Connections G 1/4

(NPT 1/4, G 1/8, G 3/8, Rc 1/4 on request)

#### 5.5 Fluidic data

Media aggressive, neutral, gaseous and liquid media, which do not attack body and sealing materials.

(see resistance table at www.buerkert.de).

Medium temperature for sealing material

0 °C - +90 °C FKM **EPDM** -30 °C - + 90 °C 0 °C - + 80 °C NBR +5 °C - +90 °C FFKM

Circuit fu	nctions	
A (NC)		2/2-way valve, closed in rest position
B (NO)		2/2-way valve, open in rest position
C (NC)	200 a(R)	3/2-way valve; closed in rest position, output A unloaded
D (NO)	Z - 1 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2	3/2-way valve, in rest position, output B pressurized
Е	29A) 1(7) 2(R)	3/2-way mixing valve; in rest position, pressure connection P2 connected to output A, P1 closed
F	200 + FR	3/2-way distribution valve, in rest position, pressure connection P connected to output B
Т		3/2-way all purpose valve

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#### 5.6 Electrical data

DIN EN 175301-803 (DIN 43 650), shape A for cable plug Type 2508 or 2509

#### 5.7 Type label

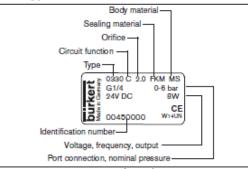


Fig. 1: Description of the type label (example)

WARNING!

electrical equipment.

#### Risk of Injury from Improper assembly.

Risk of injury due to electrical shock.

ply and secure to prevent reactivation.

ASSEMBLY

DANGER!

► The assembly may be carried out only by trained technicians and with the appropriate tools.

Risk of injury from high pressure in the system/device.

Before working on the system or device, switch off the pressure and vent/drain lines.

► Before working on the system or device, switch off the power sup-

Observe applicable accident prevention and safety regulations for

- Secure system against unintentional activation.
- ► Following assembly, ensure a controlled restart.

#### 6.1 Before Installation

#### Installation position:

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The installation position is optional. Preferably: Actuator at the top.

-> Prior to installation check pipelines for dirt and clean if necessary.

Dirt filter: To ensure that the solenoid valve functions reliably, a dirt filter (≤ 500 µm) must be installed in front of the valve input.



#### 6.2 Installation

→ Observe flow direction:

Functioning of the device is only ensured if the circuit function is maintained.

#### Devices in socket model

- → Use PTFE tape as sealing material.
- → Determine the maximum screw-in depth of the connecting threads as this does not comply with any standard.

#### NOTE!

#### Caution risk of breakage.

- ► Do not use the coil as a lifting arm.
- → Hold the device with a suitable tool (open-end wrench) on the body; screw into the pipeline.

#### Attaching the device:

→ Via bore holes M4x8 (made from brass or stainless steel) or selftapping screws 3.9 DIN 7970 (made from plastic, max. screw-in depth 10 mm) on the bottom side of the body at drill pattern 38x24

#### Devices in flange model

Attaching the device:

- → Via supplied screws on basic devices or manifold.
- → Tighten fastening screws on the coil to a maximum torque of 2 Nm.

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#### 6.3 Manual control

#### NOTE!

► When the manual control is locked, the valve cannot be actuated electrically.

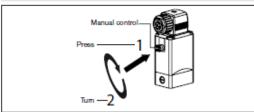


Fig. 2: Manual control

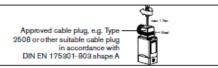
#### ELECTRICAL CONNECTION DANGER!

Risk of Injury due to electrical shock.

- ► Before working on the system or device, switch off the power supply and secure to prevent reactivation.
- ► Observe applicable accident prevention and safety regulations for electrical equipment.

If the protective conductor is not connected, there is a risk of electric shock.

Always connect protective conductor and check electrical continuity between coil and housing.



Connecting the cable plug to the power supply



Note the voltage and current type as specified on the type label.

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#### 7.1 Standard model

- → Connect L1/+ and N/- to terminals 1 and 2, independent of the polarity.
- Connect protective conductor.
- → Attach seal and check for correct fit.
- → Tighten cable plug (Type 2508 or 2509 in accordance with DIN EN 175301-803 (DIN 43 650), shape A, for order numbers see data sheet); while doing so, observe the maximum torque of 1 Nm.
- Check electrical continuity between coil and body (protective conductor function).

#### 7.2 Pulse model (CF 02)



In accordance with the terminals on the valves, the connection terminals in the cable plug are marked with the numbers 1 to 3.

- Connect as shown in "Fig. 4". Pulse on terminal 1 closes the valve; pulse on terminal 2 opens the valve.
- → Attach seal and check for correct fit.
- → Tighten cable plug (Type 2508 or 2509 in accordance with DIN EN 175301-803 (DIN 43 650), shape A, for order numbers see data sheet); while doing so, observe the maximum torque of 1 Nm.

→ Check electrical continuity between coil and body (protective conductor function).

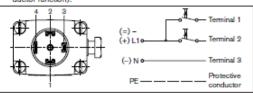


Fig. 4: Electrical connection - pulse model (CF 02)

#### NOTE!

- Prevent simultaneous pulsing on both coil windings.
- Parallel to the terminals, no other consumers (relay, etc.) may be connected
- The respective coil connection that does not carry current must be galvanically isolated (open).
- In case two or more valves are connected in parallel, the use of twopole or multi-pole switches must ensure that this requirement is met.

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#### 8 DISASSEMBLY



#### DANGER!

Risk of injury from high pressure in the system/device.

 Before working on the system or device, switch off the pressure and vent/drain lines.

#### Risk of injury due to electrical shock.

- Before working on the system or device, switch off the power supply and secure to prevent reactivation.
- Observe applicable accident prevention and safety regulations for electrical equipment.



#### WARNING!

#### Risk of injury from improper disassembly.

 Disassembly may be carried out only by trained technicians and with the appropriate tools.

#### Risk of injury from hazardous media.

 Before loosening lines or valves, flush out hazardous media, depressurize and drain the lines.

#### MAINTENANCE, TROUBLESHOOTING

#### 9.1 Safety Instructions



#### DANGER!

#### Risk of injury from high pressure in the system.

 Turn off the pressure and vent the lines before loosening lines or valves.

#### Risk of injury due to electrical shock.

- Before working on the system or device, switch off the power supply and secure to prevent reactivation.
- Observe applicable accident prevention and safety regulations for electrical equipment.



#### WARNING!

#### Risk of injury from improper maintenance work.

- Maintenance may be carried out only by trained technicians and with the appropriate tools.
- ► Secure system against unintentional activation.
- ► Following maintenance, ensure a controlled restart.

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#### 9.2 Malfunctions

If malfunctions occur, check whether:

- -> the device has been installed according to the instructions,
- -> the electrical and fluid connections are correct.
- -> the device is not damaged,
- → all screws have been tightened.
- → the voltage and pressure have been switched on,
- -> the pipelines are clean.

Malfunction	Possible cause
	Short circuit or coil interrupted
switch	Medium pressure outside the permitted
l .	pressure range
	Manual control locked
Valve does not close	Inner compartment of the valve is dirty
	Manual control locked

#### 9.2.1 Repairs

Repairs may only be carried out by the manufacturer. Operating data may change if spare parts are replaced by the user.

#### 10 TRANSPORTATION, STORAGE, DISPOSAL

#### NOTE

#### Transport damage.

Inadequately protected devices may be damaged during transportation.

- Protect the device against moisture and dirt in shock-resistant packaging during transportation.
- Prevent the temperature from exceeding or dropping below the permitted storage temperature.

#### Incorrect storage may damage the device.

- ► Store the device in a dry and dust-free location.
- ► Storage temperature -40 +80°C

# Damage to the environment caused by parts contaminated with media.

- Dispose of the device and packaging in an environmentally friendly manner
- Observe applicable disposal and environmental regulations.

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# **PART 7: WARRANTY INFORMATION**

Dometic Corporation (Dometic) warrants to the original purchaser/owner, and to subsequent owners during the applicable Limited Warranty Period, Dometic's Water Purification Products, Pumps, Related Accessories and Replacement Parts against failure from defects in material or workmanship arising in the periods specified in the Table of Limited Warranty Periods below. If a covered product or part fails during the applicable warranty period, Dometic will remedy same by repairing or replacing the defective warranted product or part as outlined below in the Table of Limited Warranty Periods. Defective parts shall be replaced free of charge and labor shall be paid for by Dometic only as set forth in the Table. Dometic reserves the right to refund the purchase price of the subject product or part as an alternative remedy to repair or replacement. The remedy allowed hereunder (repair, replacement or refund) shall be at Dometic's sole option.

#### **SECTION I**

#### WHAT'S COVERED

#### What does the Limited Warranty cover?

Water Purification Products, Pumps, Related Accessories and Replacement Parts manufactured and/or marketed by Dometic for the durations set forth in the Table of Limited Warranty Periods.

What is disclaimed, and are the warranties and remedies exclusive of all others?

Dometic does not disclaim the implied warranty of merchantability, but limits the duration of that implied warranty to the duration of the Limited Warranty offered herein.

This Limited Warranty, as well as the implied warranty of merchantability and the remedies offered by Dometic herein, are EXCLUSIVE and are made or provided in lieu of all other express or implied warranties, obligations, or liabilities. In no event shall Dometic be responsible or liable for any incidental or consequential damages alleged to have resulted from any defect in or failure of any warranted product or part. In those instances in which a cash refund is made, such refund shall effect the cancellation of the contract of sale and such refund shall constitute full and final satisfaction of all claims which the purchaser has or may have against Dometic due to any actual or alleged breach of warranty, either express or implied, including, without limitation, the implied warranty or merchantability or fitness for a particular purpose. Some states do not allow the exclusion or limitation of incidental or consequential damages so the above limitation may not apply to you. Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you.

The Dealer is not an agent for Dometic, except for the purpose of administering the above warranty to the extent herein provided. Dometic does not authorize the dealer or any other person to assume for Dometic any liability in connection with such warranty, or any liability or expense incurred in the replacement or repair of its products other than those expressly authorized herein. Dometic shall not be responsible for any liability or expense except as is specifically authorized and provided herein.

Dometic reserves the right to improve its products, through changes in design or material without being obligated to incorporate such changes in products of prior manufacture. Dometic can make changes at any time in design, materials, or part of units of any one, model year, without obligation or liability to owners of units of the same year's model of prior manufacture.

This warranty gives you, the purchaser/owner, specific legal rights, and you may also have other rights which vary from state to state.

#### **SECTION II**

#### WHAT'S NOT COVERED

#### What does this Limited Warranty not cover?

#### This Warranty Shall Not Apply to:

- 1. Failures resulting from improper installation or use contrary to instructions.
- 2. Failures resulting from abuse, misuse, accident, fire, or submergence.
- 3. Any part manufactured by Dometic, which shall have been altered so as to impair its original characteristics.
- 4. Any parts which fail as a result of misuse, improper application or improper installation.
- 5. Items not manufactured by Dometic, i.e., items, which are purchased from another manufacturer and supplied as received by Dometic without alteration or modification except as any part of a Dometic manufactured unit or component.
- 6. Components or parts used by or applied by the purchaser, as an integral part of products not manufactured by Dometic.
- 7. Labor resulting from difficult access to a Dometic product. The original installer or OEM is responsible for accessibility of unit.
- 8. Leaks due to improper installation of system, for example: hose clamps, fittings, flare nuts, quick disconnects.
- 9. Freight Damage.
- 10. Pumps that have been run dry, are water damaged or have blown freeze plugs.
- 11. Pumps with cracked heads.
- 12. Pump seals are not covered.
- 13. UV light bulbs are not covered.
- 14. Sea strainer elements are not covered.
- 15. Cartridge filter elements are not covered.
- 16. Sand & gravel in a multi-media filter are not covered.
- 17. Pump packing assemblies are not covered.
- 18. Pump valve assemblies are not covered.
- 19. Pump crankcase oil is not covered.
- 20. Gauge instrument calibration is not covered.
- 21. Fuses are not covered.
- 22. Valve seals and packings are not covered.
- 23. Exterior corrosion is not covered.
- 24. Membrane elements are not covered.
- 25 Logic boards with water damage.
- 26. Logic boards with blown MOV's (Power Surge)
- 27. Mis-programmed displays.
- 28. Displays or remotes with water damage.
- 29. Failures due to improper winterization.
- 30. Unit damage as a result of improper return packaging.
- 31. Travel costs are included in the hourly labor allowances and should not be billed as a separate item without preapproval from the factory.

Installation and application of Dometic components are not warranted by Dometic, because Dometic has no control or authority over the selection, location, application, or installation of these components.

#### **SECTION III**

#### **COVERAGE PERIOD**

#### What is the period of coverage?

SEE TABLE OF LIMITED WARRANTY PERIODS BELOW.

How does one determine when the Limited Warranty Period begins? All Dometic products bear a data plate on which there are model and serial numbers. The date of manufacture of the product can be determined by Dometic based on the serial number on the product. To determine whether or not any Dometic component is in warranty, proceed as follows:

- 1. Determine the model and serial number on the data plate located on the product. Write or call the Dometic Customer Service Department to obtain the manufacture date of the product. The hours of the Customer Service Department are 8:00 a.m. 5:00 p.m. (USA, Eastern Standard Time Zone) Monday through Friday excluding holidays.
- 2. It is possible that a considerable time lag exists between the date a product or component is manufactured and the date it is put in service. In such instances, the date of manufacture could indicate that the item is out of warranty. However, based on the date the equipment is first put in service, the item may still be covered by the Dometic Limited Warranty. For proof of date put in service, Dometic will require a copy of the bill of sale of the Dometic equipment from the installer or new boat dealer to the original owner.

#### **SECTION IV**

#### **GETTING COVERED WARRANTY SERVICE**

How does the purchaser/owner get warranty service?

**Please read the following Warranty Procedure:** If the failure of a Dometic component is determined to be covered under the Dometic warranty and the time in service is determined to be within the warranty time limit, the owner has the following three options:

- 1. Preferred option: Have a Dometic authorized Servicing Dealer, perform the work needed. The customer needs to call Dometic Customer Service Department for a recommendation as to the closest dealer. If the customer already knows an authorized servicing dealer, the dealer should be contacted directly.
- 2. Second option: If the customer contacts Dometic Service Department for a Servicing Dealer and Dometic has no one in that particular area, Dometic will authorize the use of a local service company and Dometic will work with the local company to assist in any way possible.

The customer may contact the Dometic Service Department at 1(800) 542-2477, Monday through Friday, 8:00am - 5:00pm.

#### **TABLE OF LIMITED WARRANTY PERIODS**

#### Important Notes Regarding Product Start-up/ Commissioning:

- 1. Warranty periods begin from the date of possession of the boat/vessel by the first owner if OEM installed or date of installation if dealer installed, but not to exceed three (3) years from date of production of the product. However, if the product is started for any reason by the OEM or dealer, notwithstanding any provision to the contrary, the warranty period will be for a period of one (1) year commencing from the date that the product was started by the OEM or dealer. The warranty is transferable and will carry the remainder of the original owner's warranty based on the original date of purchase or date of installation.
- 2. Proof of purchase or installation may be required to verify warranty coverage.
- 3. Any unit or replacement part installed due to a warranty failure carries the remainder of the original warranty. Warranty coverage does not start over from the repair/replacement date.
- 4. Warranty coverage shall not exceed three (3) years from the date of production of the product.
- 5. These warranty periods are effective February 1, 2014.

#### **WATER PURIFICATION PRODUCTS:**

#### PRODUCT SALE TYPE WARRANTY COVERAGE

**Spot Zero** OEM 1-year warranty, parts and labor, from date of delivery of vessel. Not to exceed 3 years from date of production of product, and subject to **Important Notes above**. Pump warranty, see Pump section.

Dealer Installed 1-year warranty, parts and labor, from date of installation. Not to exceed 3 years from date of production of product, and subject to **Important Notes above**. Pump warranty, see Pump section.

**Sea Xchange** OEM 1-year warranty, parts and labor, Not to exceed 3 years from date of production of product, and subject to **Important Notes above**. Pump warranty, see Pump section.

Dealer Installed 1-year warranty, parts and labor, from date of installation. Not to exceed 3 years from date of production of product, and subject to **Important Notes above**. Pump warranty, see Pump section.

(SE SERIES, SX SERIES FROM DATE OF DELIVERY OF VESSEL. XTC SERIES, CX SERIES)

# PUMPS, ACCESSORIES, REPLACEMENT PARTS: PRODUCT SALE TYPE WARRANTY COVERAGE

Pumps OEM or Dealer Installed 1 year warranty, parts and labor. Wearable parts such as pump seals, brushes and plastic valves are not covered under warranty.

# **SECTION IV (CONTINUED)**

Dealer Installed and 1 year warranty, parts only. Wearable parts such as pump seals, brushes and plastic valves are not covered under warranty.

Accessories OEM, Dealer Installed, 1 year warranty, parts only.

Replacement Parts Aftermarket sales. 90-Day warranty, parts only.

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