



User's Manual

SXII MODELS



SEA XCHANGE

SXII-600

SXII-600-2

SXII-1200

SXII-1800

SXII-2200

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PART 1: INTRODUCTION

ACRONYMS AND DEFINITIONS

ACRONYM/SYMBOLS	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
Φ	PHASE

CONGRATULATIONS

Your Dometic SeaXchange SXII-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 THE 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.



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

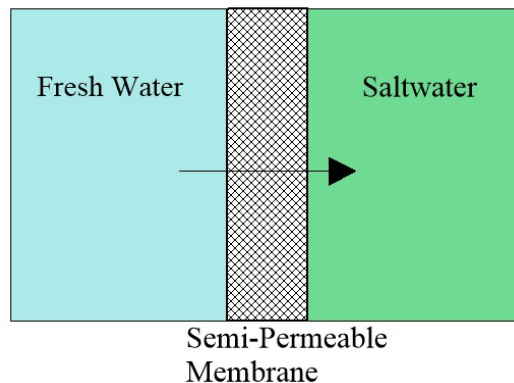
How Fresh Water Is Produced

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 semi-permeable membrane to mix with a highly concentrated solution. For example a freshwater solution will naturally want to mix with a saltwater solution.

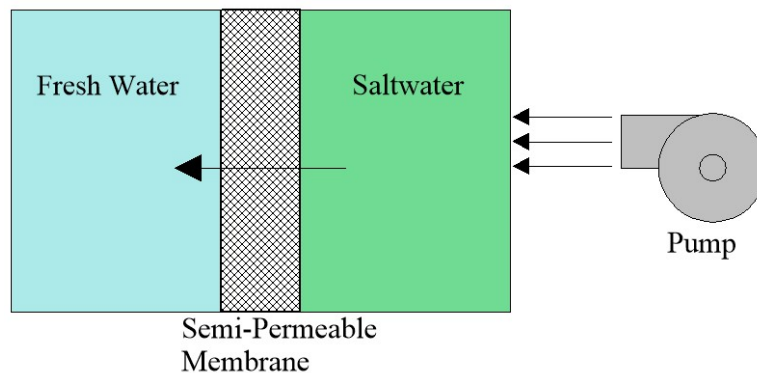
Process of Osmosis



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

SXII MODEL	600	600-2	1200	1800	2200
Configuration	1 Vessel	2 Vessel	2 Vessel	3 Vessel	4 Vessel
Feed Water Source	Sea Water	Sea Water	Sea Water	Sea Water	Sea Water
Rated production gpd (gpm)	600(0.41)	600(0.41)	1200(0.83)	1800(1.25)	2200(1.52)
Rejection and Flow Rates					
Nominal Salt Rejection %	99.4%	99.4%	99.4%	99.4%	99.4%
Minimum Feed Flow gpm (lpm)	4.2 (15.9)	4.2 (15.9)	4.2 (15.9)	4.2 (15.9)	4.2 (15.9)
Minimum Concentrate Flow gpm (lpm)	3.79 (14.3)	3.79 (14.3)	3.3 (12.5)	2.95 (11.2)	2.68 (10.1)
Connections					
Feed inch	¾" Hose	¾" Hose	¾" Hose	¾" Hose	¾" Hose
Product inch	3/8" QC 9.5mm	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 2.7mm	1/2" QC 12.7mm	1/2" QC 12.7mm	1/2" QC 12.7mm	1/2" QC 12.7mm
Membranes					
Membrane Per Vessel	1	1	1	1	1
Membrane Quantity	1	2	2	3	4
Membrane Size	2540	2521	2540	2540	2540
Pumps					
High Pressure Pump Type	Piston	Piston	Piston	Piston	Piston
HP motor amps	10.6	10.6	10.6	10.6	10.6
High Pressure Motor HP (kw)	2.5	2.5	2.5	2.5	2.5
Booster motor amps	4.3	4.3	4.3	4.3	4.3
Booster Pump RPM @ 60 (50Hz)	1750 (1450)	1750 (1450)	1750 (1450)	1750 (1450)	1750 (1450)
Electrical					
Voltage	230V 50/60Hz 1Φ	230V 50/60Hz 1Φ	230V 50/60Hz 1Φ	230V 50/60Hz 1Φ	230V 50/60Hz 1Φ
Amp Draw	14.9	14.9	14.9	14.9	14.9
System Dimensions					
L x W x H inch (cm)	25.75"x16.99"x 14.09" (65.4x43.2x35.8)	25.75"x16.99"x 14.09"(65.4x43. 2x35.8)	44.85"x16.99"x 14.09"(113.9x43.2 x35.8)	44.85"x16.99"x 14.09"(113.9x43 .2x35.8)	44.85"x16.99"x 14.09"(113.9x43 .2x35.8)
Weight lb. (kg)	120 (54.4)	115 (52.2)	125 (56.7)	130 (59)	130 (59)

OPERATION SPECIFICATIONS

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 SXII unit should never be operated over the **rated production** listed in the **UNIT SPECIFICATION** chart (page 8) and also should not be run above **850psi pump pressure**. Water temperature and inlet water ppm are variables that affect product flow rate and pump pressure



CAUTION: THE RATED PRODUCTION WILL HAVE TO BE CORRECTED FOR TEMPERATURE OF 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

SXII-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

SXII-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 104 for the Booster Pump Manual.



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

OPERATION SPECIFICATIONS

HIGH PRESSURE PUMP

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

- Refer to the High Pressure Pump in manufacturer's index for recommended maintenance (page 90).
- 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

SXII-Series reverse osmosis systems come pre-loaded with DOW FILMTEC™ sea water membranes unless otherwise specified. For the best longevity of membranes, use the manufacturer's recommended prefilters, operate it within its limits, and ensure the system is performing its regular FWF. Membrane element guidelines can be found in the Dow FILMTEC™ Membranes Manual on page 120.

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 124.

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 System Controller Manual on page 78.

OPERATION SPECIFICATIONS

PRODUCT WATER

Dometic SeaXchange SXII-Series Reverse Osmosis Systems are designed to produce product water at the capacities indicated. For example, the SXII 600 produces 600 gallons per day or 0.41 gallons per minute (600gpd ÷ 24hrs/day ÷ 60mins/hr=0.41gpm) 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:

$$\% \text{ Rejection} = [(\text{Feed TDS} - \text{Product TDS}) / \text{Feed TDS}] \times 100$$

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:

$$\% \text{ Recovery} = (\text{Product Water Flow Rate} / \text{Feed Water Flow Rate}) \times 100$$

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).

OPERATION SPECIFICATIONS

TEMPERATURE CORRECTION FACTORS FOR MEMBRANE

To find your SXII-series unit's rated flow at a given temperature, refer to the chart to find the Temperature Correction Factor (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.

Temperature °F (°C)	Temperature Correction Factor	Temperature °F (°C)	Temperature Correction Factor	Temperature °F (°C)	Temperature Correction Factor	Temperature °F (°C)	Temperature Correction Factor	Temperature °F (°C)	Temperature Correction 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 (10.2)	1.698	57.6 (14.2)	1.464	64.8 (18.2)	1.267	72.0 (22.2)	1.101	79.2 (26.2)	0.965
50.5 (10.3)	1.692	57.7 (14.3)	1.459	64.9 (18.3)	1.262	72.1 (22.3)	1.097	79.3 (26.3)	0.962
50.7 (10.4)	1.686	57.9 (14.4)	1.453	65.1 (18.4)	1.258	72.3 (22.4)	1.093	79.5 (26.4)	0.959
50.9 (10.5)	1.679	58.1 (14.5)	1.448	65.3 (18.5)	1.254	72.5 (22.5)	1.090	79.7 (26.5)	0.957
51.1 (10.6)	1.673	58.3 (14.6)	1.443	65.5 (18.6)	1.249	72.7 (22.6)	1.086	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

OPERATION SPECIFICATIONS

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: $F = (°C \times 9/5) + 32$

PART 2: INSTALLATION AND COMMISSIONING

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' of ¾" 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 ¼" 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 ½" 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) ½" 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
- ☐ (8) – Stainless steel 5/16" flat washers

CONSUMABLE 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
- ☐ 252404178 – SW30 2521 membrane

OPTIONAL ITEMS

- ☐ 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

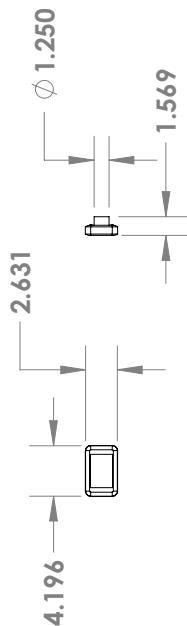
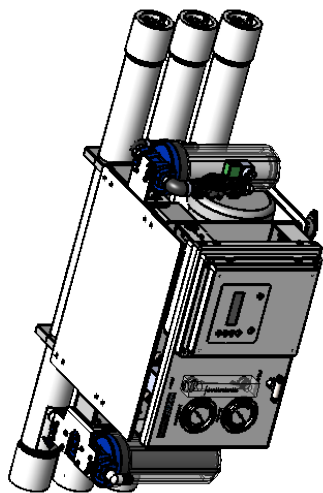
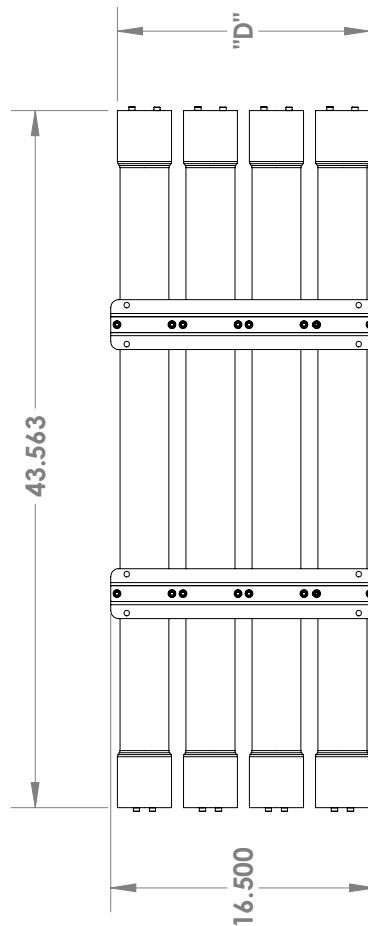
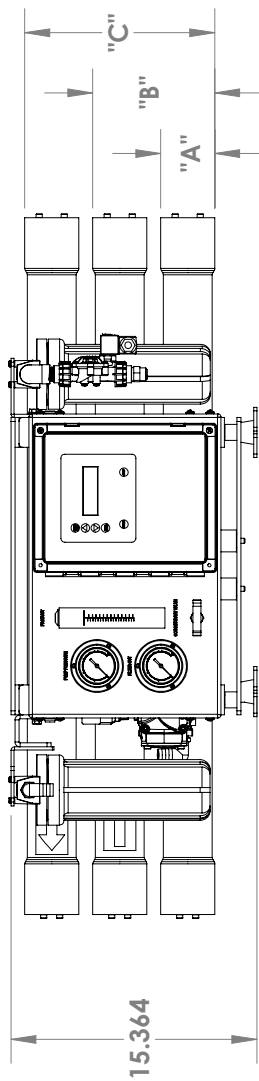
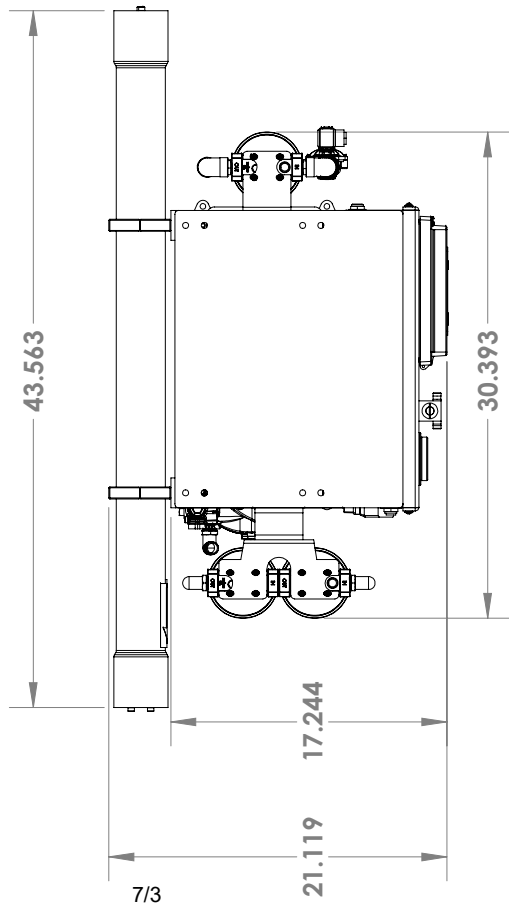
NOTE: Items listed are 1 unit supplied unless noted within parentheses.



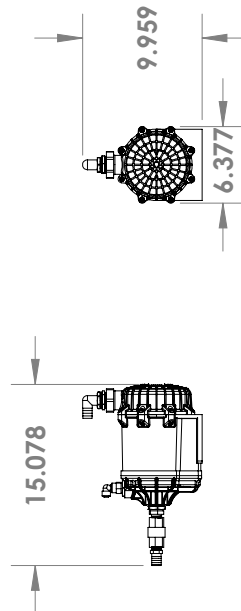
UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES
 TOLERANCES: ±.015
 FRACTIONAL ±.1/32
 ANGULAR: MACH: ±1/2 BEND ±1
 TWO PLACE DECIMAL ±.010
 THREE PLACE DECIMAL ±.005

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.



REMOTE CONTROL (OPTIONAL)



BOOSTER PUMP

2200 GPD

MEMBRANE RACK NOT ON SYSTEM



SXII MODEL

SCALE: 1:16 DWG. #:SX0086 SHEET 1 OF 1

UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES
TOLERANCES: $\pm .015$
FRACTIONAL $\pm 1/32$
ANGULAR: MACH $\pm 1/2$ BEND ± 1
TWO PLACE DECIMAL $\pm .010$
THREE PLACE DECIMAL $\pm .005$

NAME	DATE
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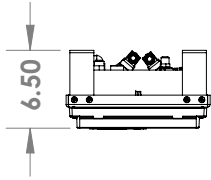
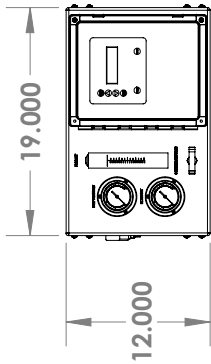
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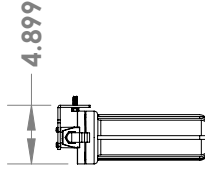
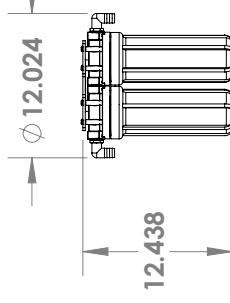
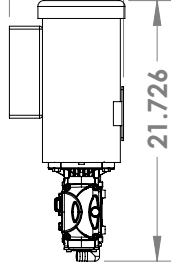
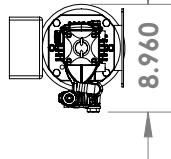
ENG APPR.

Q.A.

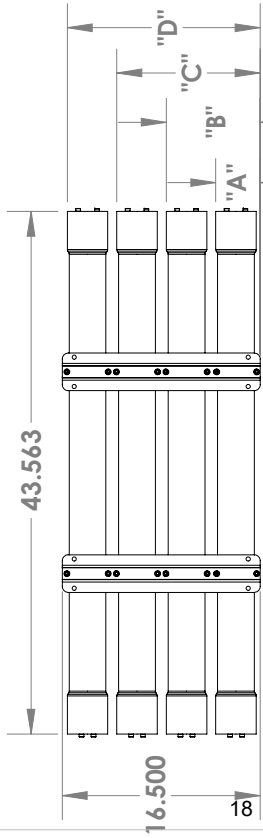
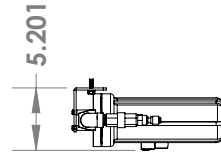
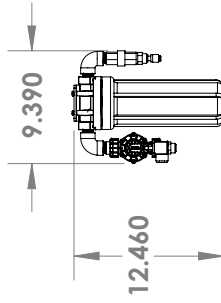
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CONTROL PANEL

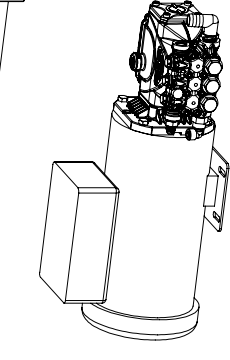
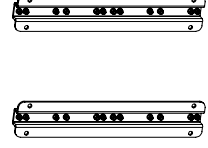
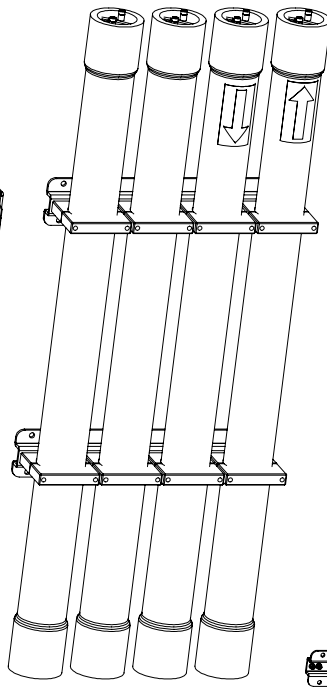
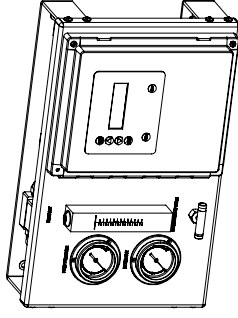
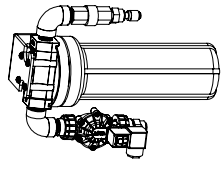


PRE FILTERS

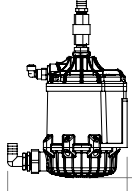
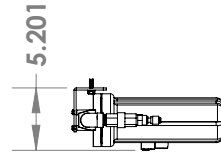
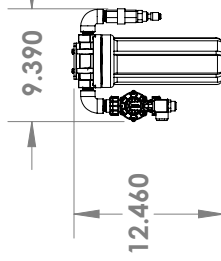


18

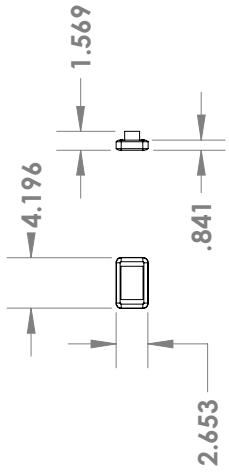
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REMOTE MOUNT MEMBRANE BRACKETS



BOOSTER PUMP



REMOTE CONTROL (OPTIONAL)

MODEL	LETTER	MEMBRANE QTY.
SXII600	A	1
SXII1200	B	2
SXII1800	C	3
SX2200	D	4

UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL: $\pm 1/32$
ANGULAR: MACH: $\pm 1/2$ BEND ± 1
TWO PLACE DECIMAL $\pm .010$
THREE PLACE DECIMAL $\pm .005$



SX II MODULAR SYSTEM

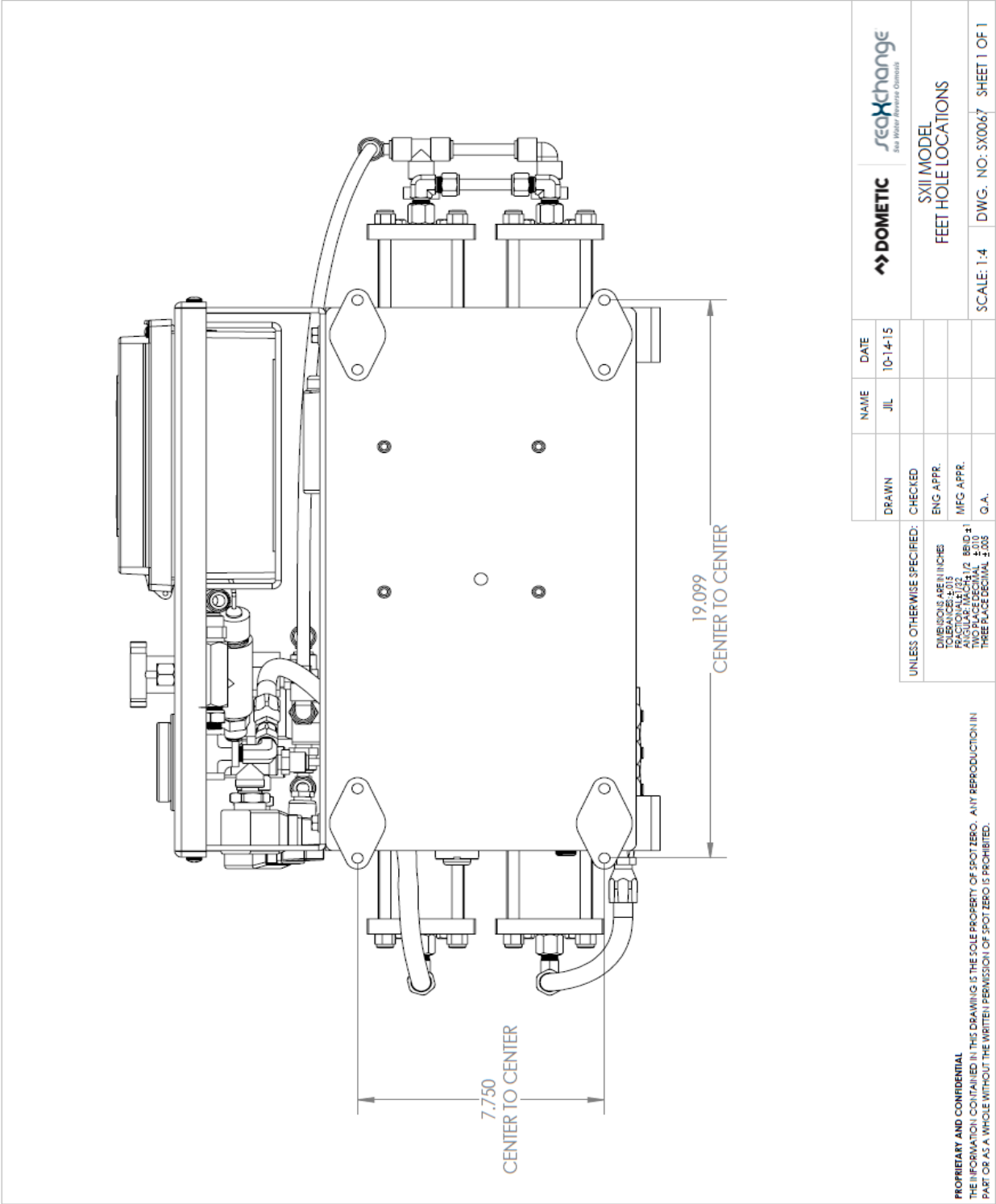
NAME	DATE
JIL	04-24-19
DRAWN	CHECKED
ENG APPR.	MFG APPR.
Q.A.	

SCALE: N/A DWG. #: SX0085 SHEET 1 OF 1

MOUNTING

The freestanding system should be bolted down and securely fastened.

FEET/HOLE LOCATIONS



ELECTRICAL REQUIREMENTS

ELECTRICAL

The SXII-Series systems are available in 1 ϕ (phase).

- 230 volts at 14.9 amps (including booster pump)
- 50/60 Hertz available in the 230 volt unit

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

The membranes and high pressure pumps used on SXII-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.***

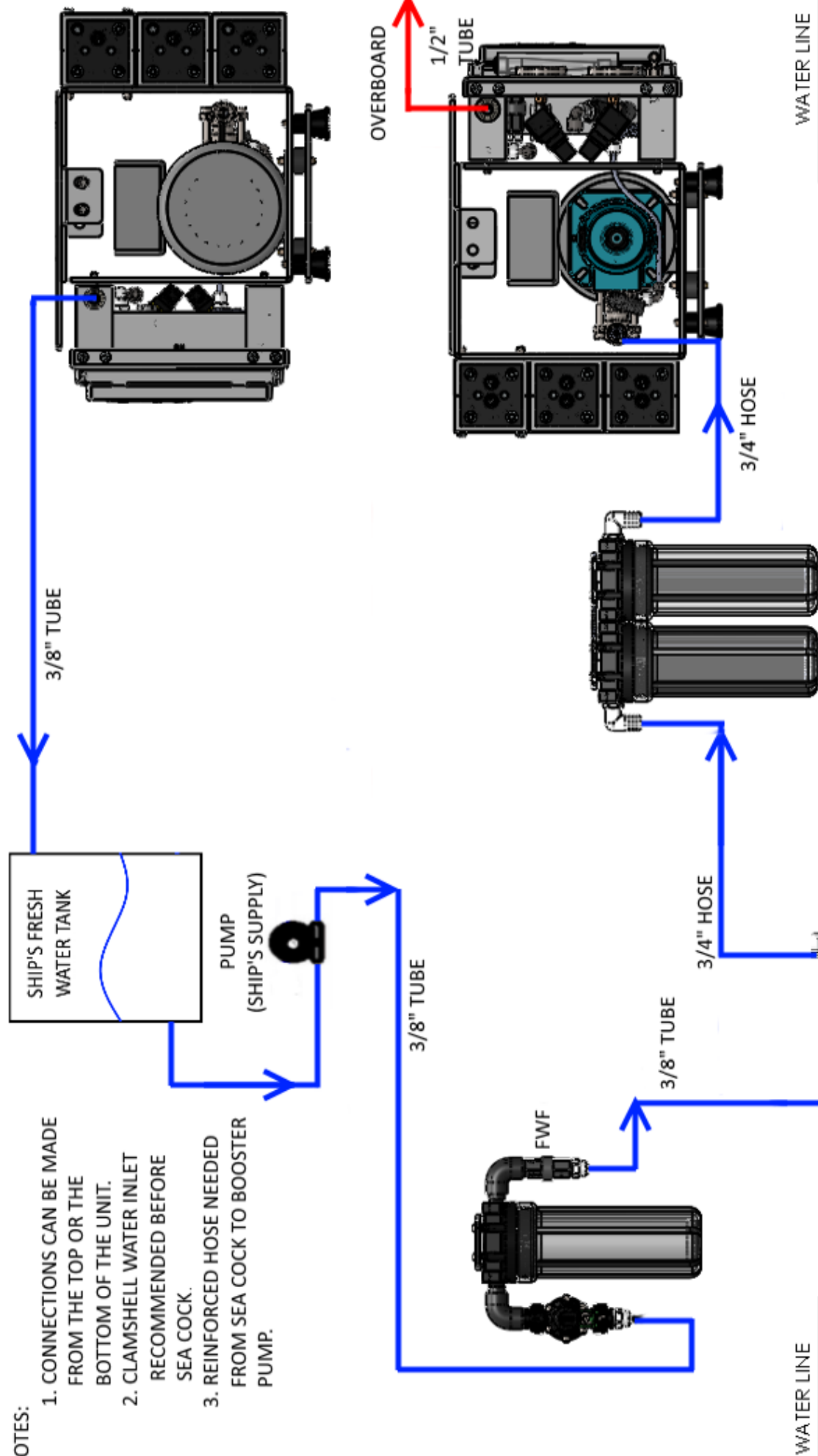


CAUTION: ANY RESTRICTIONS OR BLOCKAGE IN THE CONCENTRATE LINE CAN CAUSE BACKPRESSURE, WHICH WILL INCREASE THE SYSTEM'S OPERATING PRESSURE. THIS CAN RESULT IN DAMAGE TO THE SYSTEM'S MEMBRANES AND COMPONENTS.

NOTES:

1. CONNECTIONS CAN BE MADE FROM THE TOP OR THE BOTTOM OF THE UNIT.
2. CLAMSHELL WATER INLET RECOMMENDED BEFORE SEA COCK.
3. REINFORCED HOSE NEEDED FROM SEA COCK TO BOOSTER PUMP.

7/3



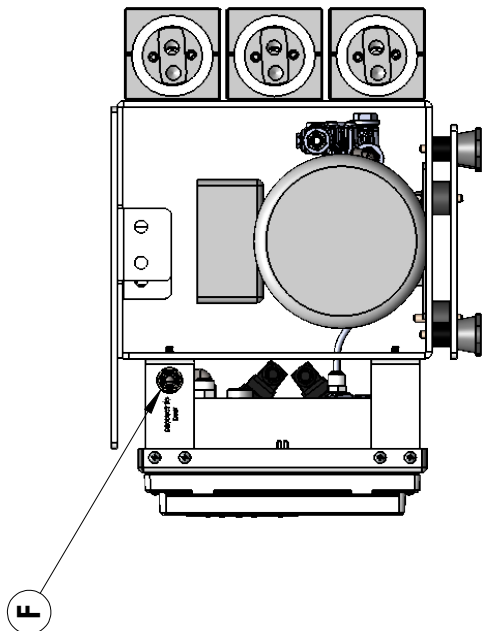
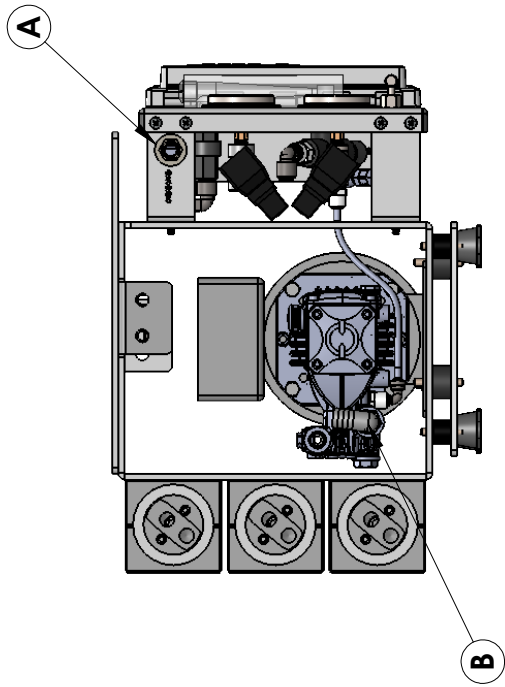
WATER LINE

WATER LINE

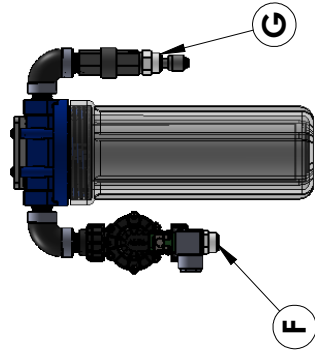
22

Dometic		seaXchange	
NAME	DATE	SXIII	
JIL	12-01-16	CONNECTIONS DIAGRAM	
DRAWN	CHECKED	SCALE: 1:8	DWG. #: SX0099
ENG. APPR.	MFG. APPR.	SHEET 1 OF 1	
UNLESS OTHERWISE SPECIFIED:		DIMENSIONS ARE IN INCHES DIMENSIONS IN PARENTHESES ARE IN MILLIMETERS ANGLES ARE IN DEGREES DIMENSIONS ARE TO FACE UNLESS NOTED OTHERWISE	

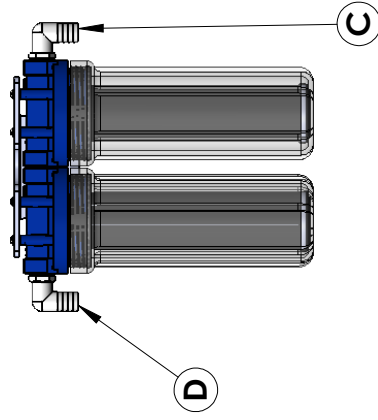
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FWF (OPTIONAL)



PRE-FILTERS

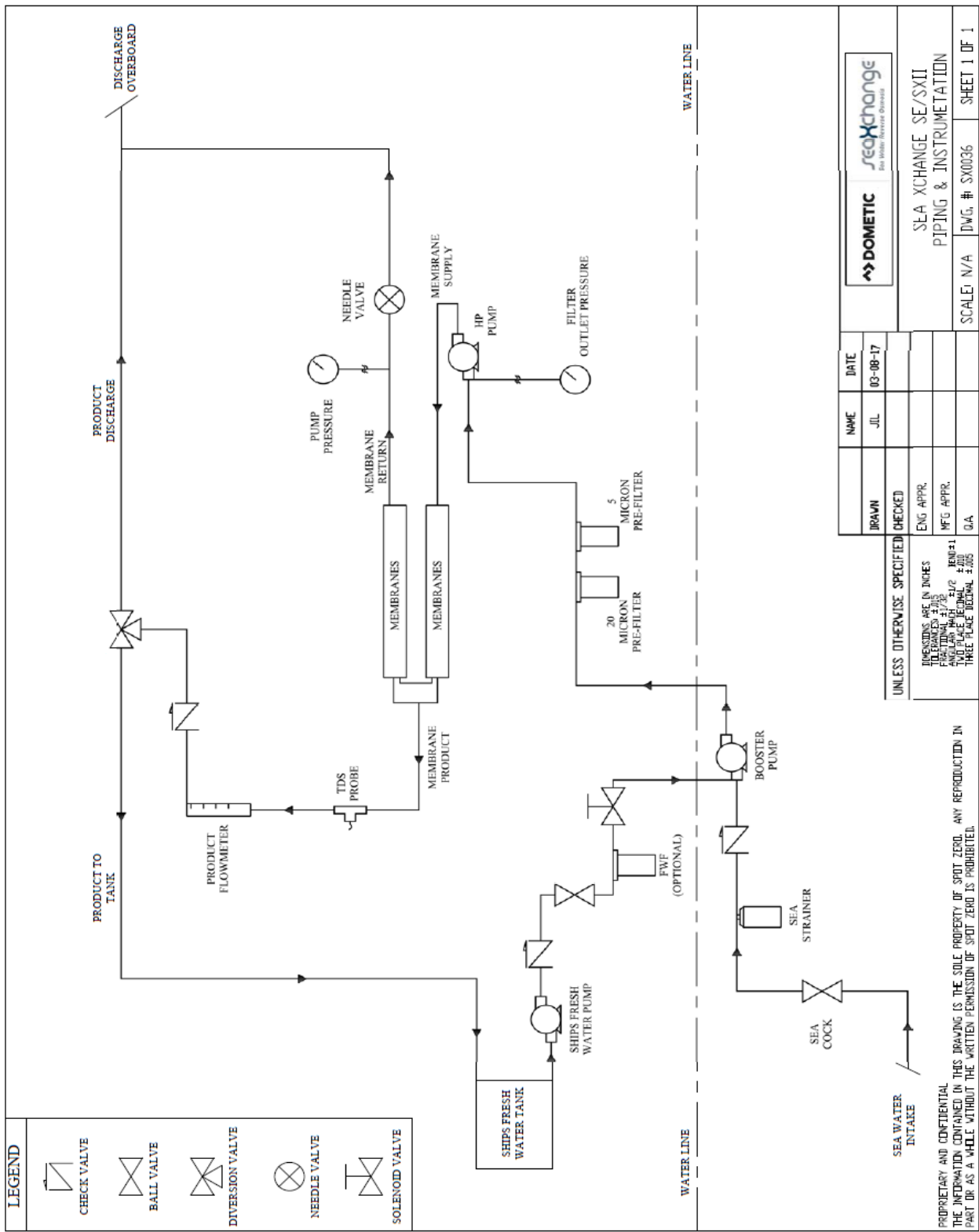


INLETS & OUTLETS		
LOCATION	DESCRIPTION	SIZE
A	OVERBOARD OUTLET	1/2" TUBE
B	FEED FROM PRE-FILTERS	1/2" HOSE
C	SEA WATER INLET	3/4" HOSE
D	TO HP PUMP	3/4" HOSE
F	SHIPS FRESH WATER TANK INLET	3/8" TUBE
G	TO BOOSTER PUMP	3/8" TUBE

			NAME	DATE	  Sea Power (ROKUSE) Oskowsky's
DRAWN		JIL	04-24-19		
CHECKED					
ENG APPR.					
MFG APPR.					
Q.A.					
UNLESS OTHERWISE SPECIFIED:					
DIMENSIONS ARE IN INCHES					
TOLERANCES: ±.015					
FRACTIONAL: ±1/32					
ANGULAR: MACH: ±1/2 BEND ±1					
TWO PLACE DECIMAL ±.010					
THREE PLACE DECIMAL ±.005					
INLET & OULET LOCATIONS					
SXII					
SCALE: N/A		DWG. #: SX0098		SHEET 1 OF 1	

SYSTEM LAYOUT AND SCHEMATICS

SXII SERIES PIPING DIAGRAM



NAME	DATE	SCALE	DWG. #	SHEET 1 OF 1
JIL	03-08-17	N/A	SX0036	
SEA XCHANGE SE/SXII PIPING & INSTRUMENTATION				
DOMETIC				
SEA XCHANGE				

UNLESS OTHERWISE SPECIFIED CHECKED

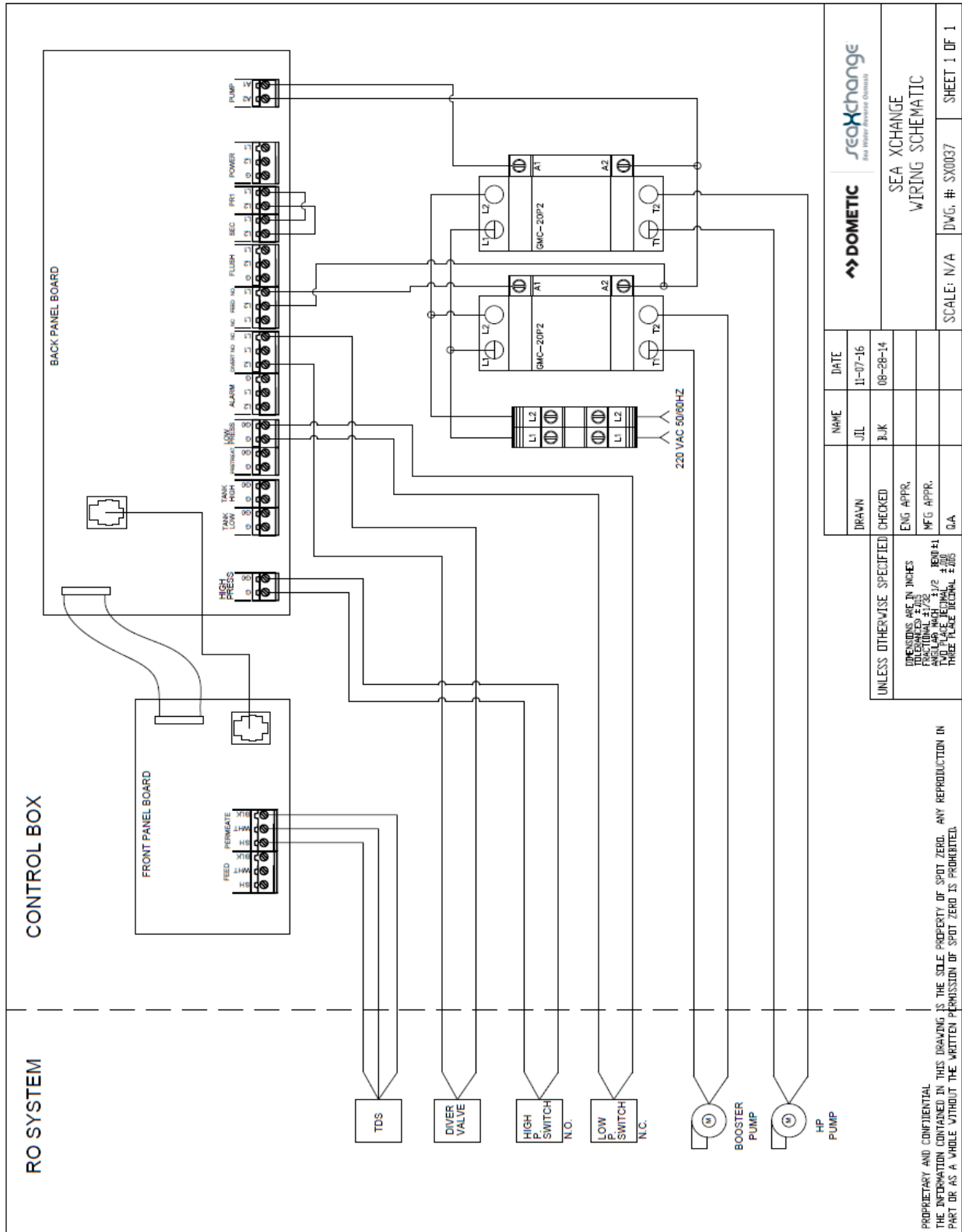
ENGINEERING: JIL
DESIGN: JIL
CHECKED: JIL
DATE: 03-08-17

ENGINEERING: JIL
DESIGN: JIL
CHECKED: JIL
DATE: 03-08-17

ENGINEERING: JIL
DESIGN: JIL
CHECKED: JIL
DATE: 03-08-17

SYSTEM LAYOUT AND SCHEMATICS

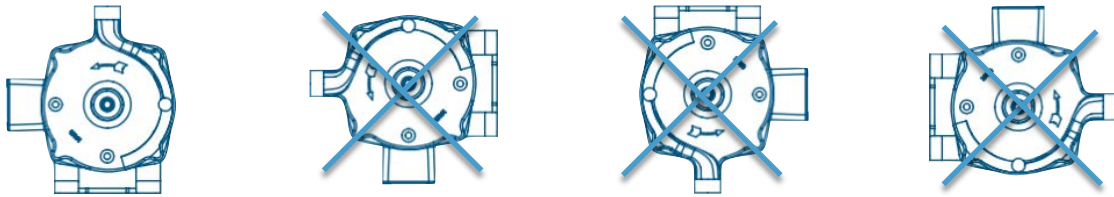
SXII SERIES ELECTRICAL DIAGRAM



COMPLETE INSTALL GUIDE

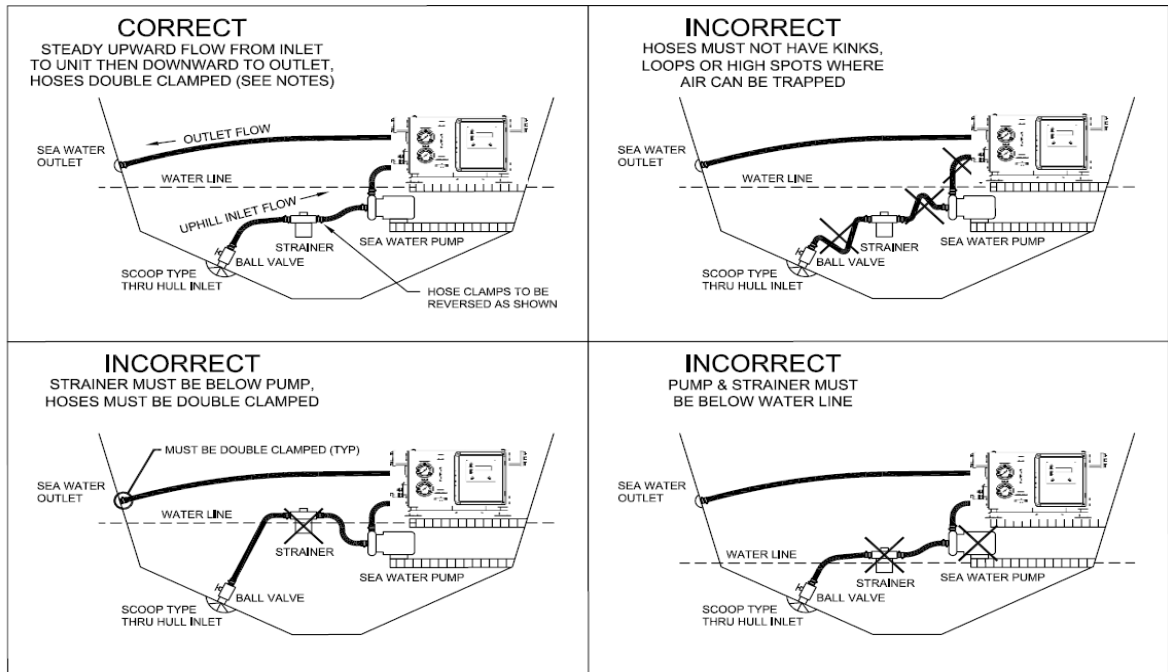
SEA WATER PLUMBING CONNECTIONS

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.



NOTES:

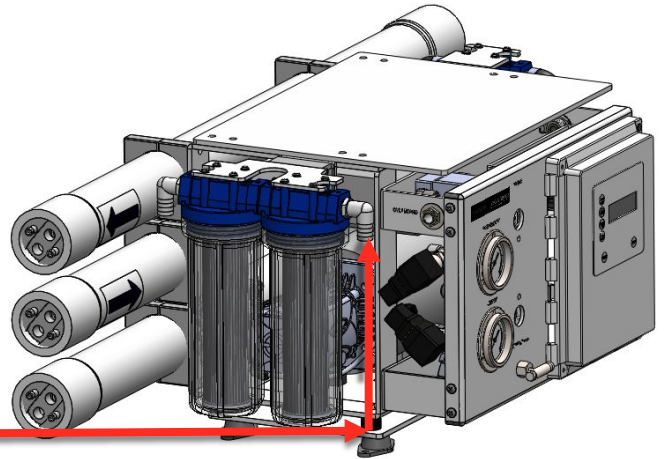
- 1) THRU HULL INLET, BALL VALVE, HOSE AND STRAINER SHOULD BE SIZED NO SMALLER THAN PUMP INLET.
- 2) INSTALL THRU HULL FITTING AS FAR BELOW THE WATER LINE AS POSSIBLE.
- 3) PUMP NEEDS DEDICATED THRU HULL NOT SHARED WITH OTHER PUMPS.
- 4) AVOID OR MINIMIZE 90° ELBOW FITTINGS AS MUCH AS POSSIBLE, ROTATE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

COMPLETE INSTALL GUIDE

SEA WATER PLUMBING CONNECTIONS

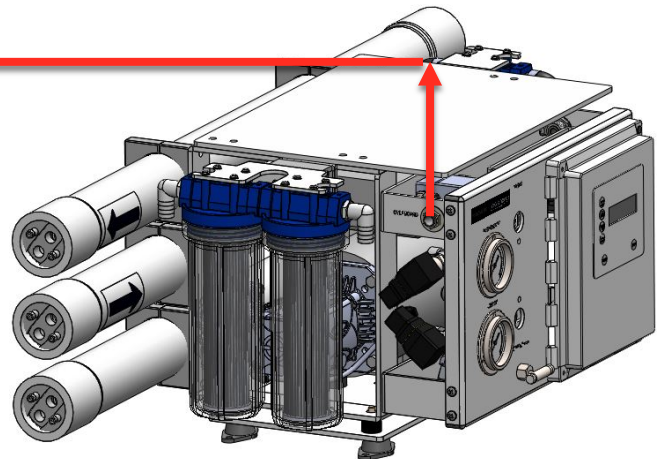
5. Use supplied white 3/4" flexible hose from discharge of booster pump to **Pre-Filter Inlet** connection on **Sea Xchange Sediment** filter assembly located on left side of system. Filter assembly may be remote mounted if desired. Be sure that there are no kinks in hose run and avoid 90's where possible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

3/4" Flexible hose from
Booster Pump



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.

1/2" Tube to dedicated
overboard.

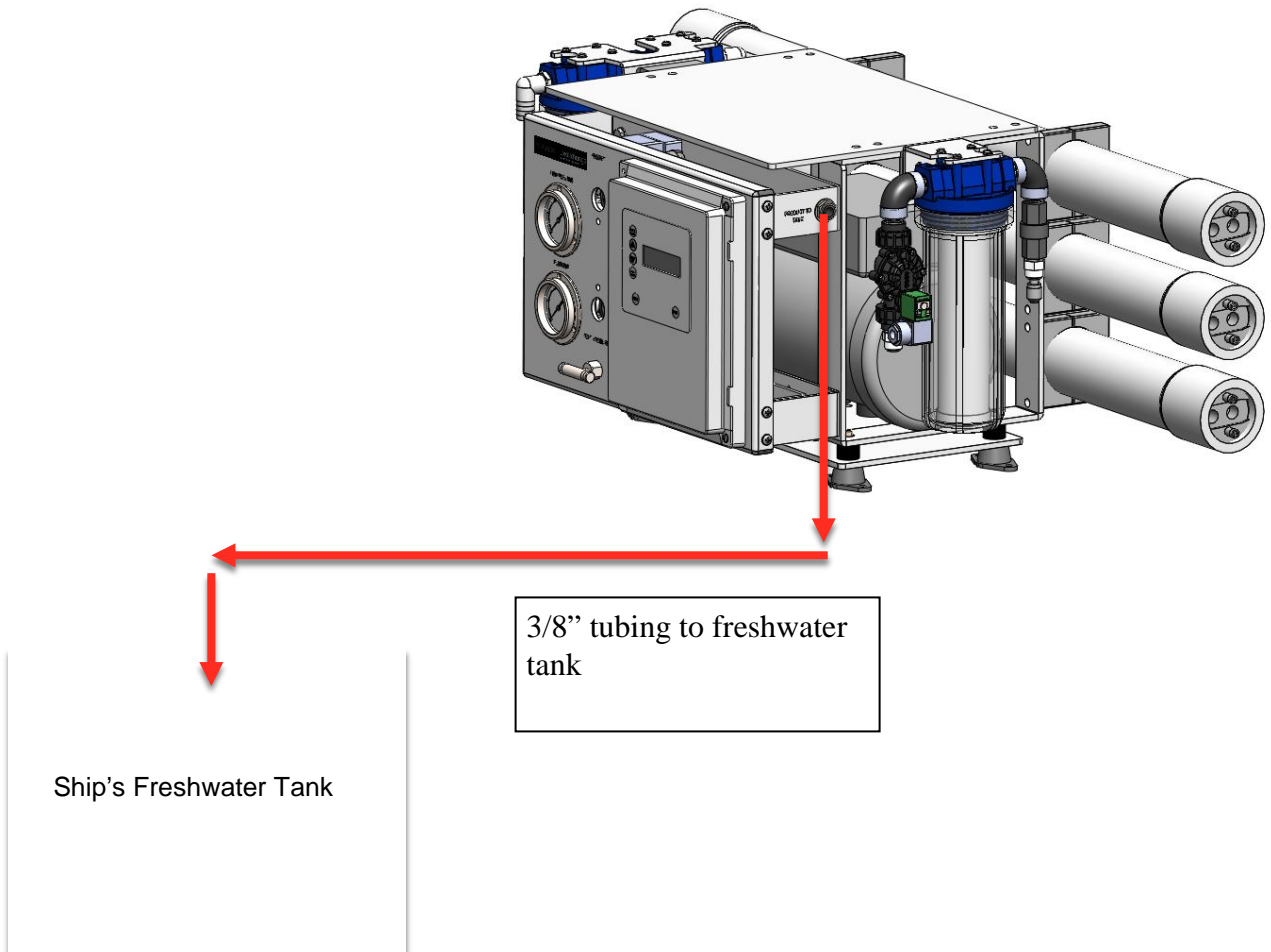


WARNING - SEA WATER OVERBOARD MUST NEVER BE CLOSED OR OBSTRUCTED WHILE SYSTEM IS OPERATIONAL. CLOSING OR OBSTRUCTING THE OVERBOARD FLOW ON SYSTEM MAY CAUSE PERMANENT DAMAGE TO SYSTEM.

COMPLETE INSTALL GUIDE

PRODUCT TO TANK CONNECTION

1. Locate the fitting labeled **PRODUCT TO TANK** on right 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.



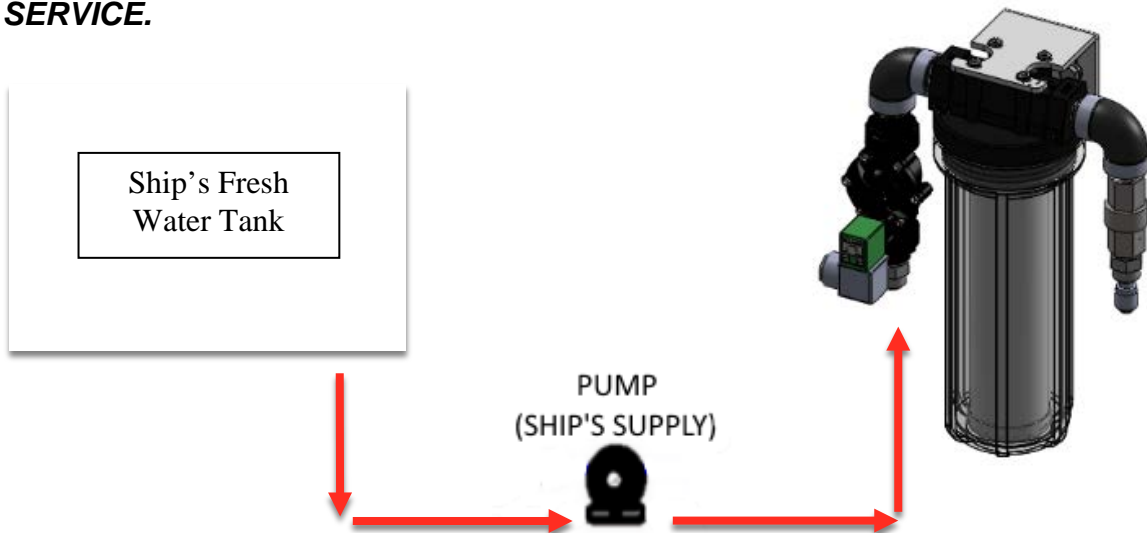
WARNING - PRODUCT TO TANK MUST NEVER BE CLOSED OR OBSTRUCTED WHILE SYSTEM IS OPERATIONAL. CLOSING OR OBSTRUCTING THE PRODUCT FLOW ON SYSTEM MAY CAUSE PERMANENT DAMAGE TO SYSTEM AND/OR TO NOT FUNCTION PROPERLY.

COMPLETE INSTALL GUIDE

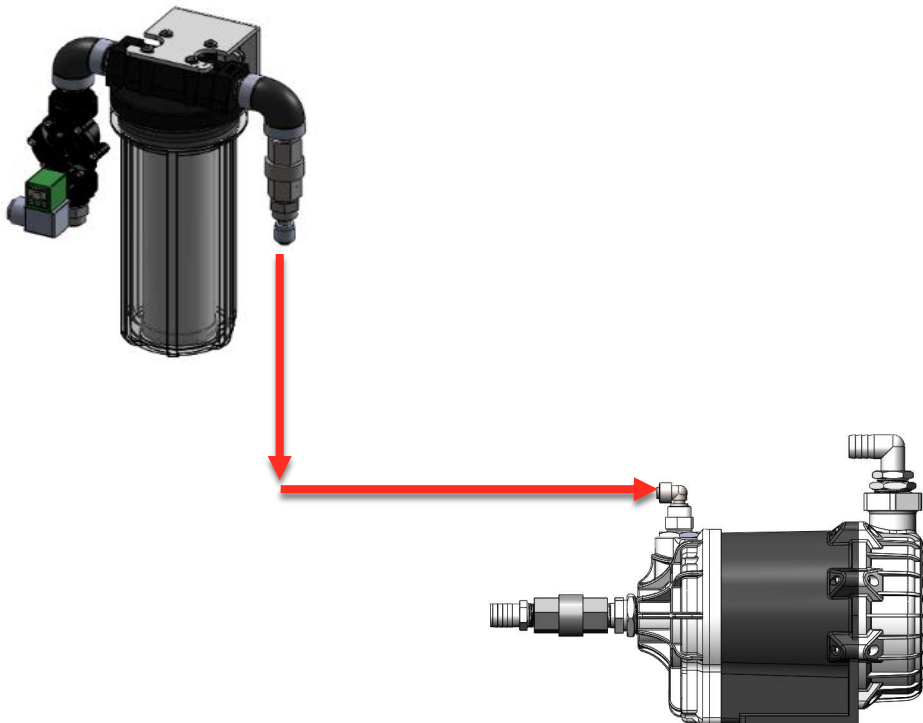
FRESH WATER FLUSH CONNECTION

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

- [illegible]

NEW SYSTEM START-UP

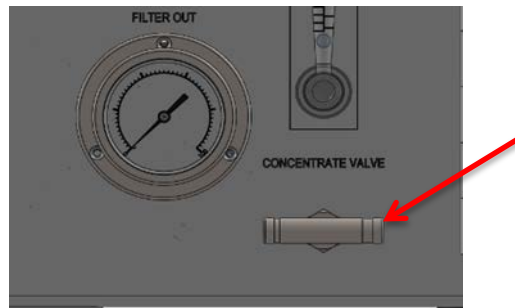
INSPECTION

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 SXII-Series Reverse Osmosis System.

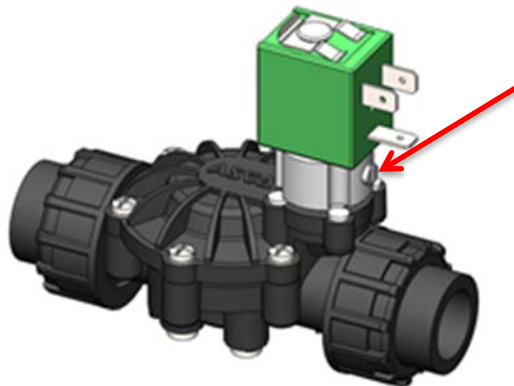
NOTE: LEAVE THE POWER TO THE SYSTEM OFF FOR THE SYSTEM PURGE PROCEDURE.

SYSTEM PURGE

1. Redirect product water to the drain for this procedure.
2. Fully open the concentrate valve (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:

Model number - _____
Date of Commission - _____
Installed by - _____

Serial number - _____
Commissioned 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
psi

Pre-filter outlet _____

Concentrate pressure _____ psi

Concentrate flow _____ gpm

Product flow _____ gpm

Product TDS _____ ppm

Feed water TDS _____ ppm

Feed water temperature _____ F or C

Hours on system _____ hrs

Amp draw _____ Voltage _____

Location system was tested _____

Problems or other notes:

Systems Standard Operating Parameters

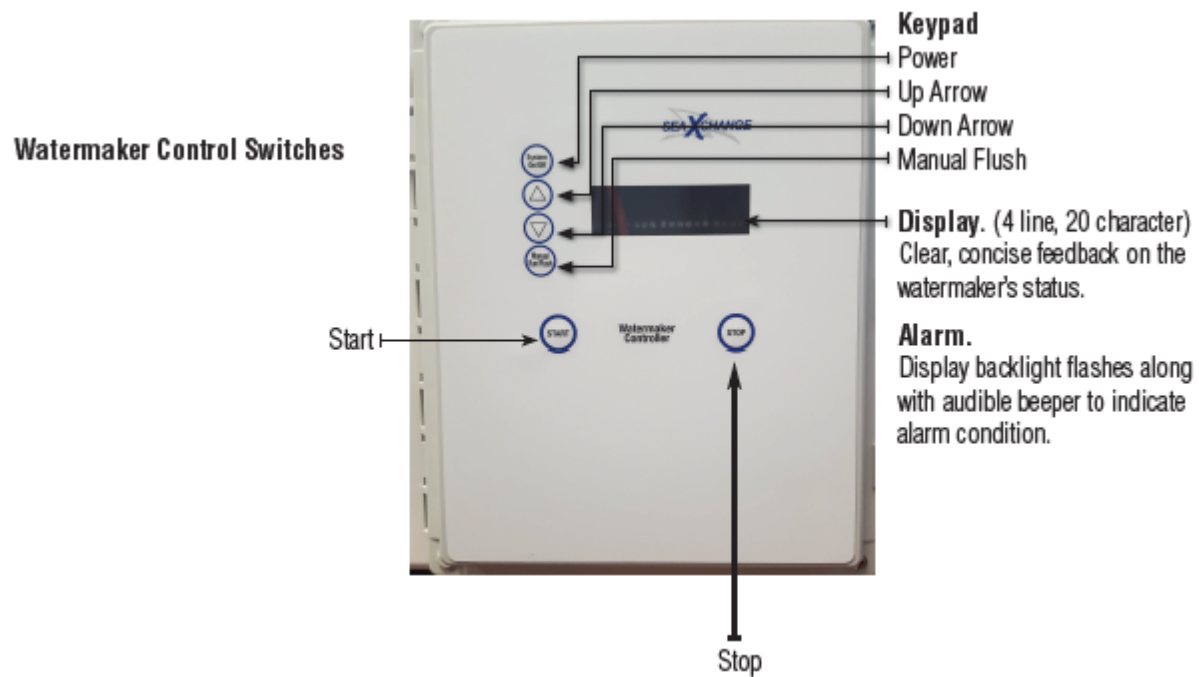
[illegible]

Total Dissolved Solids For Fresh Water Systems (PPM) Product Water Side	90% less than feed water
Total Dissolved Solids For Sea Water Systems (PPM) Product Water Side	Less than 500 PPM
Temperature (F/C)	77/25

PART 3: OPERATION AND MAINTENANCE

CONTROLLER OVERVIEW

The Watermaker System Controller Documentation can be found in the manufacture's index on page 78. The following is a quick overview of the front panel. Refer to this manual before starting to familiarize yourself with Watermaker Control Switches.



NORMAL OPERATION

START-UP

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

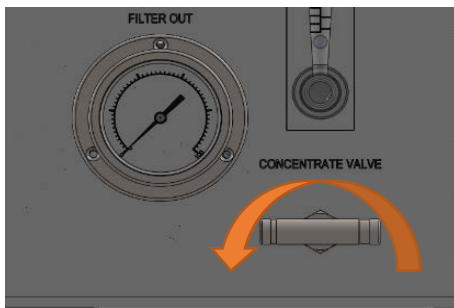


Figure 1

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.

NORMAL OPERATION

START-UP

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

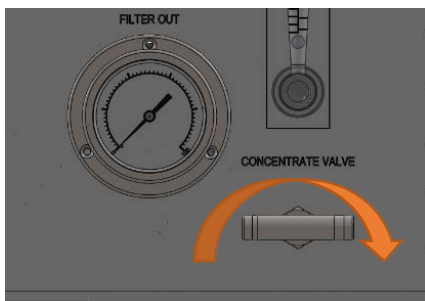


Figure 4

Note:

1. 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)
SXII600 & SXII600-2	600	0.41
SXII 1200	1200	0.83
SXII 1800	1800	1.25
SXII 2200	2200	1.52

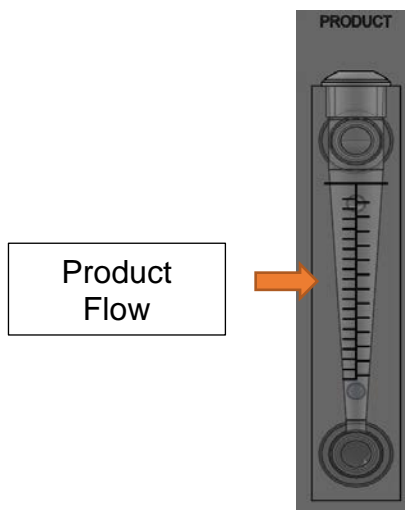


Figure 5

NORMAL OPERATION

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).

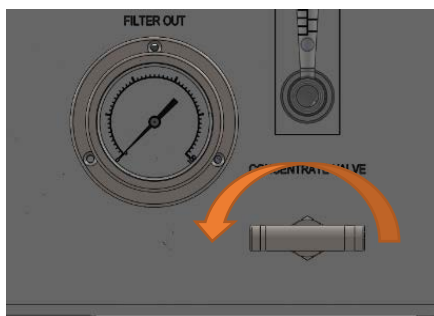


Figure 6

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.
3. 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).

NORMAL OPERATION

OPERATIONAL DO's AND DON'Ts

DO

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 cartridge 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

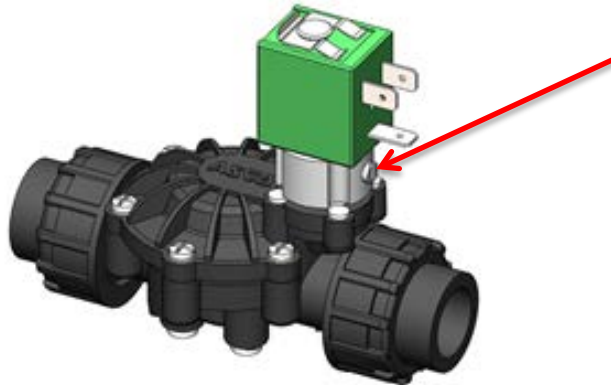
An automatic fresh water flush occurs when:

- 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 drawing 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 is going to be exposed to freezing or near freezing temperature while being stored and the membrane rack can not be removed and stored in a heated climate, the following should be done. A 50% solution of storage chemical and 50% propylene glycol should be ran through the entire system from sea cock to overboard and then valve off both sea cock and overboard. Membrane storage chemical part # is 252404263.

NOTE: PROPYLENE GLYCOL CAN BE PURCHASED AT MOST HARDWARE OR AUTOMOTIVE RETAILERS



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 33.

MEMBRANE REMOVAL AND REPLACEMENT

REMOVAL AND REPLACEMENT

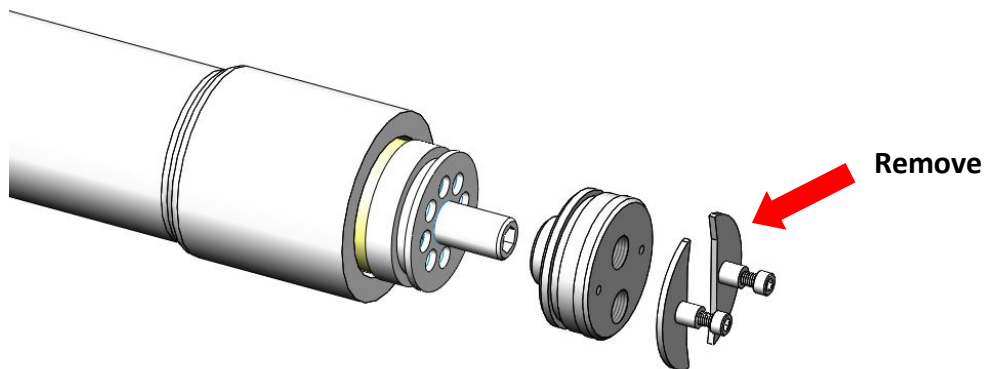
Removing and replacing membranes in the pressure vessels is an easy process if you have the proper information and tools at hand. Please refer to the following instructions when removing and replacing membrane elements.



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.

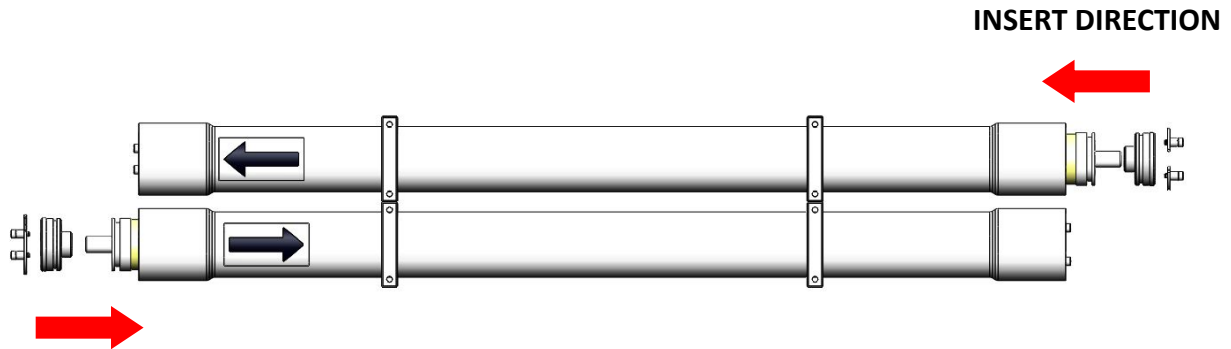


2. Remove the replacement membrane element(s) from the shipping box; the membrane(s) should be contained within a plastic oxygen barrier bag.
3. Cut the bag open as close as possible to the seal at one end of the bag, so the bag may be re-used if necessary.
4. Make sure that all parts are clean and free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

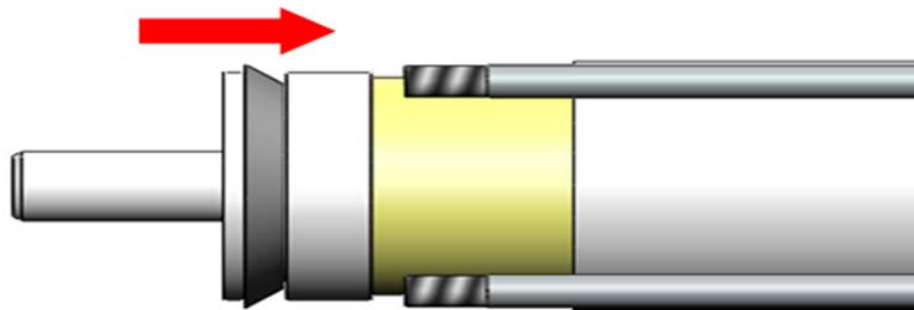
5. Flow directions should be observed for installation of each element into their respective pressure vessels.



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.

SEAL FEED DIRECTION



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

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

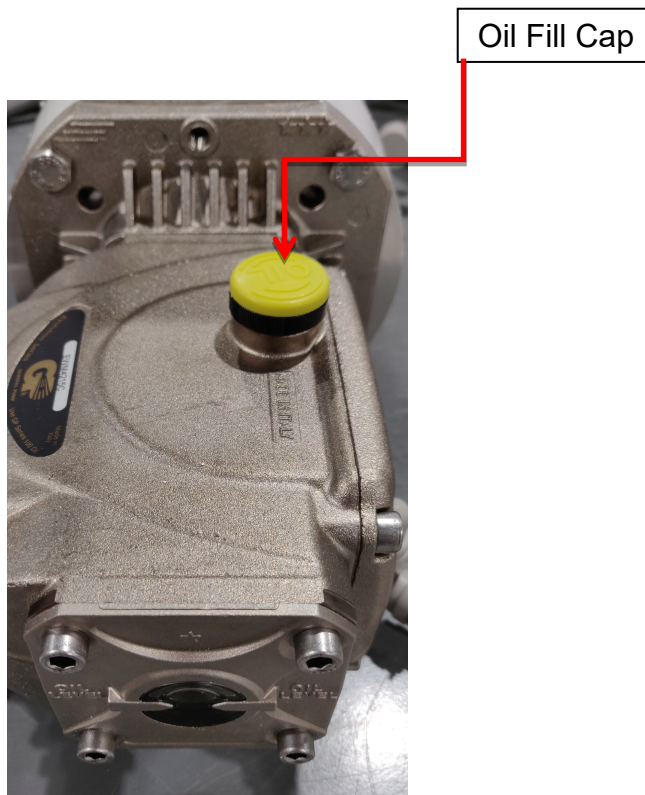
HIGH PRESSURE PUMP OIL CHANGE

OIL CHANGE STEPS

1. Run unit for 30 minutes prior to draining oil
2. Drain the oil out of the pump by opening the oil drain valve. Dispose of oil properly.



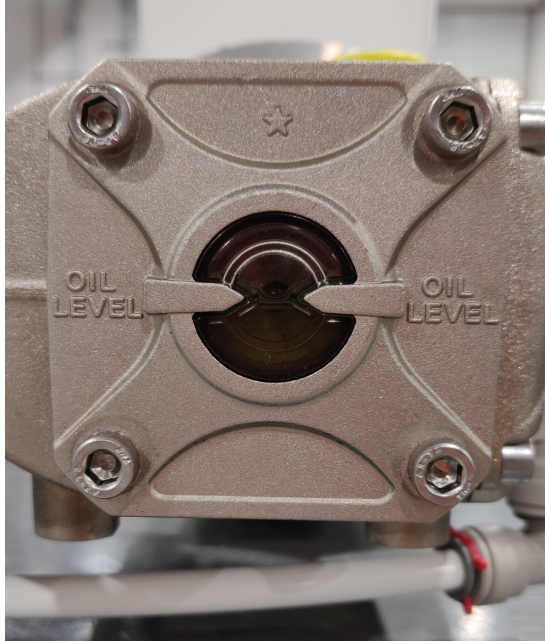
3. Close the drain valve on the high pressure pump drain.
4. Locate and remove oil fill cap.



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 INLET PRESSURE	Low supply pressure	Increase Inlet Pressure
	Cartridge filters plugged	Change Filters
	Leaks	Fix any visible leaks
LOW PRODUCT FLOW	Cold feed water	See temperature correction sheet
	Low operating pressure	Adjust throttle and concentrate valve
	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
HIGH PRODUCT FLOW	Damaged or oxidized membrane	Replace membrane
	Exceeding maximum feed water temperature	See temperature correction sheet
	Low operating pressure	Adjust concentrate valve
POOR PRODUCT QUALITY	Damage product tube O-rings	Inspect and/or replace
	Damaged or oxidized membrane	Replace membrane
MEMBRANE FOULING	Scaling (CaSO ₄ , CaSO ₃ , BaSO ₄ , SiO ₂)	Reduce recovery. Clean with Acid Cleaners
	Biological Fouling	Clean Membranes
	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 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 5/64th Allen wrench, clockwise to increase setting and counterclockwise to lower the setting.



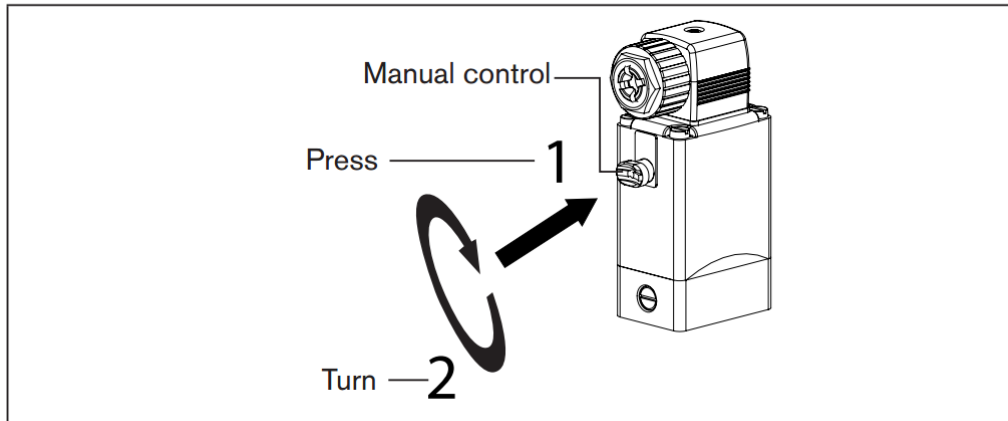
DIVERSION VALVE

BY-PASS

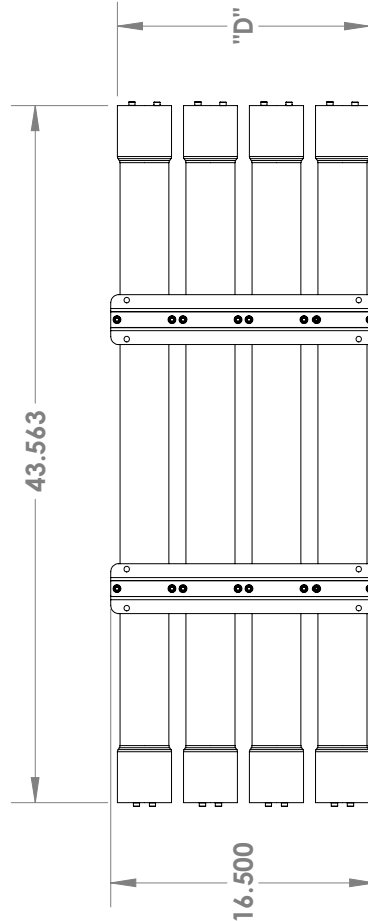
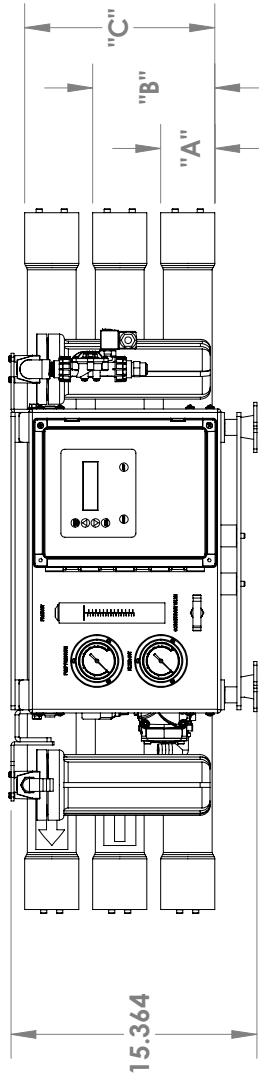
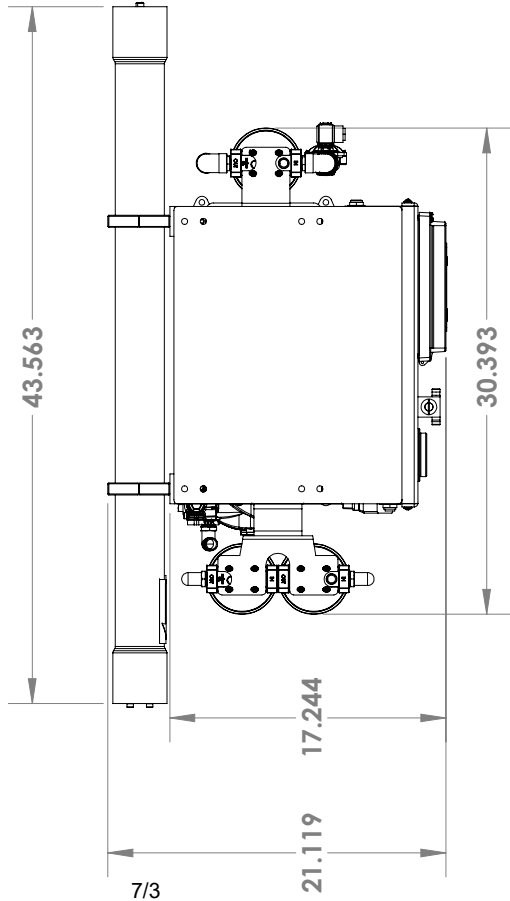
If the electrical portion of the solenoid fails or the controller fails to energize the solenoid, a manual bypass on the diversion valve may be utilized if the product water is found to be acceptable. Refer to picture below and the Diversion Valve Manual on page 124.

NOTE!

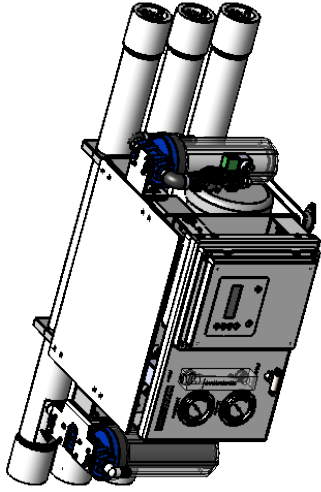
- When the manual control is locked, the valve cannot be actuated electrically.



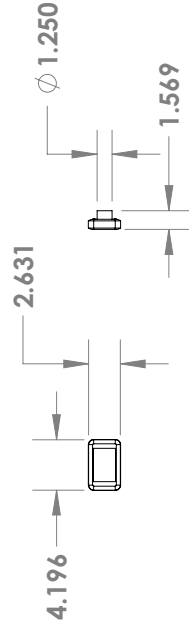
PART 5: PARTS



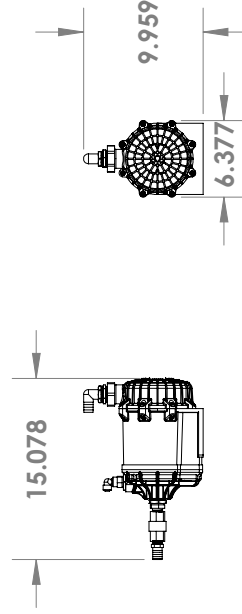
2200 GPD MEMBRANE RACK NOT ON SYSTEM



MODEL	LETTER	MEMBRANE QTY.
SXII600	"A"	1
SXII1200	"B"	2
SXII1800	"C"	3
SXII2200	"D"	4

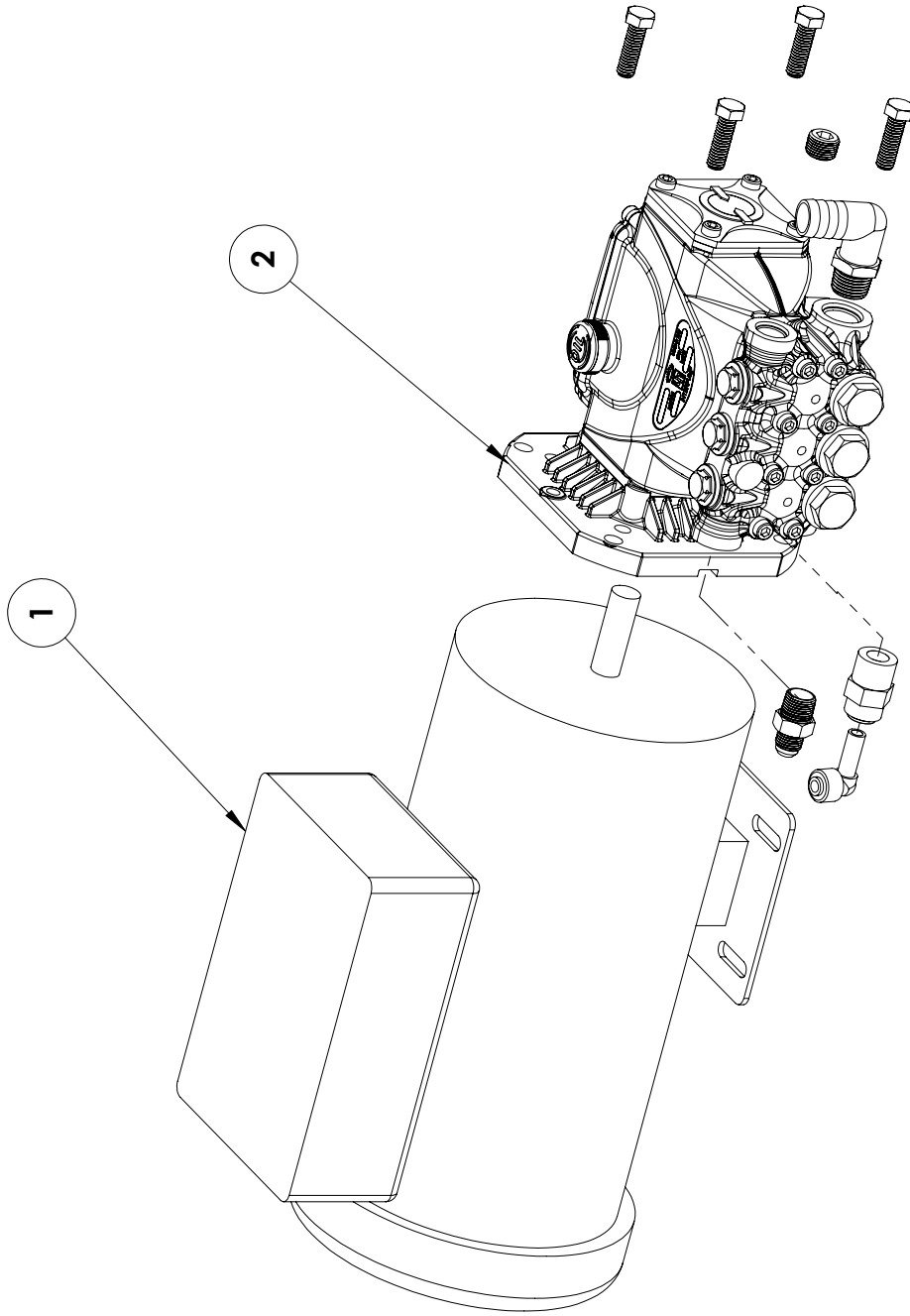


REMOTE CONTROL (OPTIONAL)



BOOSTER PUMP

NAME	DATE
JIL	04-24-19
DRAWN	CHECKED
ENG APPR.	MFG APPR.
Q.A.	
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL: 1/32 ANGULAR: MACH: 1/2 BEND ±1 TWO PLACE DECIMAL ±.010 THREE PLACE DECIMAL ±.005	
  seaXchange Sea Water Filtration Systems	
SXII MODEL	
SCALE: 1:16	DWG. #: SX0086
SHEET 1 OF 1	



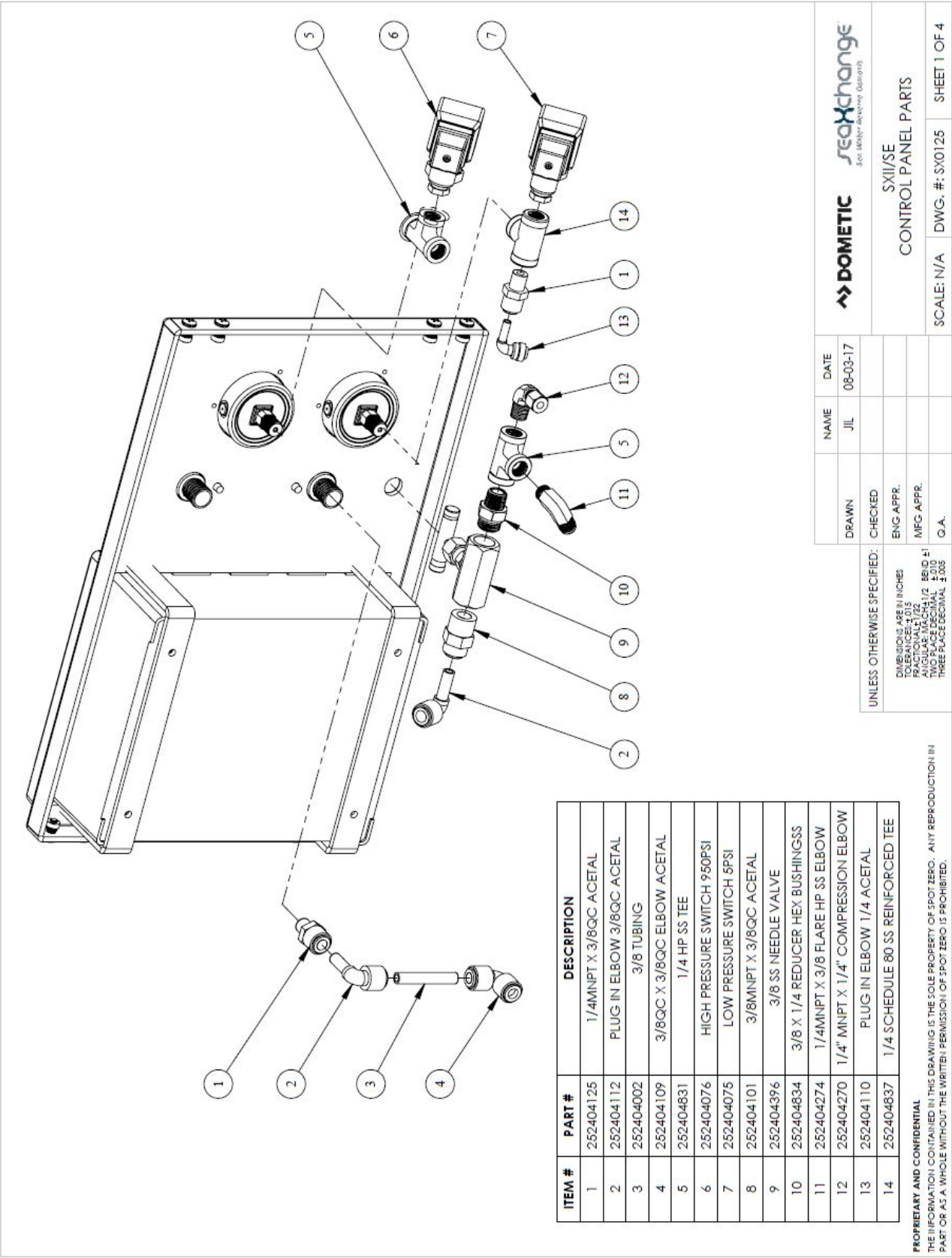
ITEM #	PART #	DESCRIPTION
1	252404155	2.5HP MOTOR
2	252404463	4.2GPM PUMP

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UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL: ±1/32 ANGULAR: MACH: ±1/2 BEND ±1 TWO PLACE DECIMAL ±.010 THREE PLACE DECIMAL ±.005	DRAWN	NAME JIL	DATE 04-18-19
	CHECKED		
	ENG APPR.		
	MFG APPR.		
	Q.A.		
DOMETIC  <small>ALL YOUR MARINE SERVICE NEEDS</small>			
SXII/XTC/XZ PUMP AND MOTOR PARTS			
SCALE: N/A	DWG. #: SX0184	SHEET 1 OF 1	

CONTROL PANEL

SXII DRAWINGS





for water delivery products

NAME

JIL

DATE

08-03-17

DRAWN

CHECKED

ENG APPR.

MFG APPR.

G.A.

UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES

TOLERANCES: ±.015

ANGULAR: ±1.0°

THREE PLACE DECIMAL

BEND ±1°

±.010

±.005

SXII/SE

CONTROL PANEL PARTS

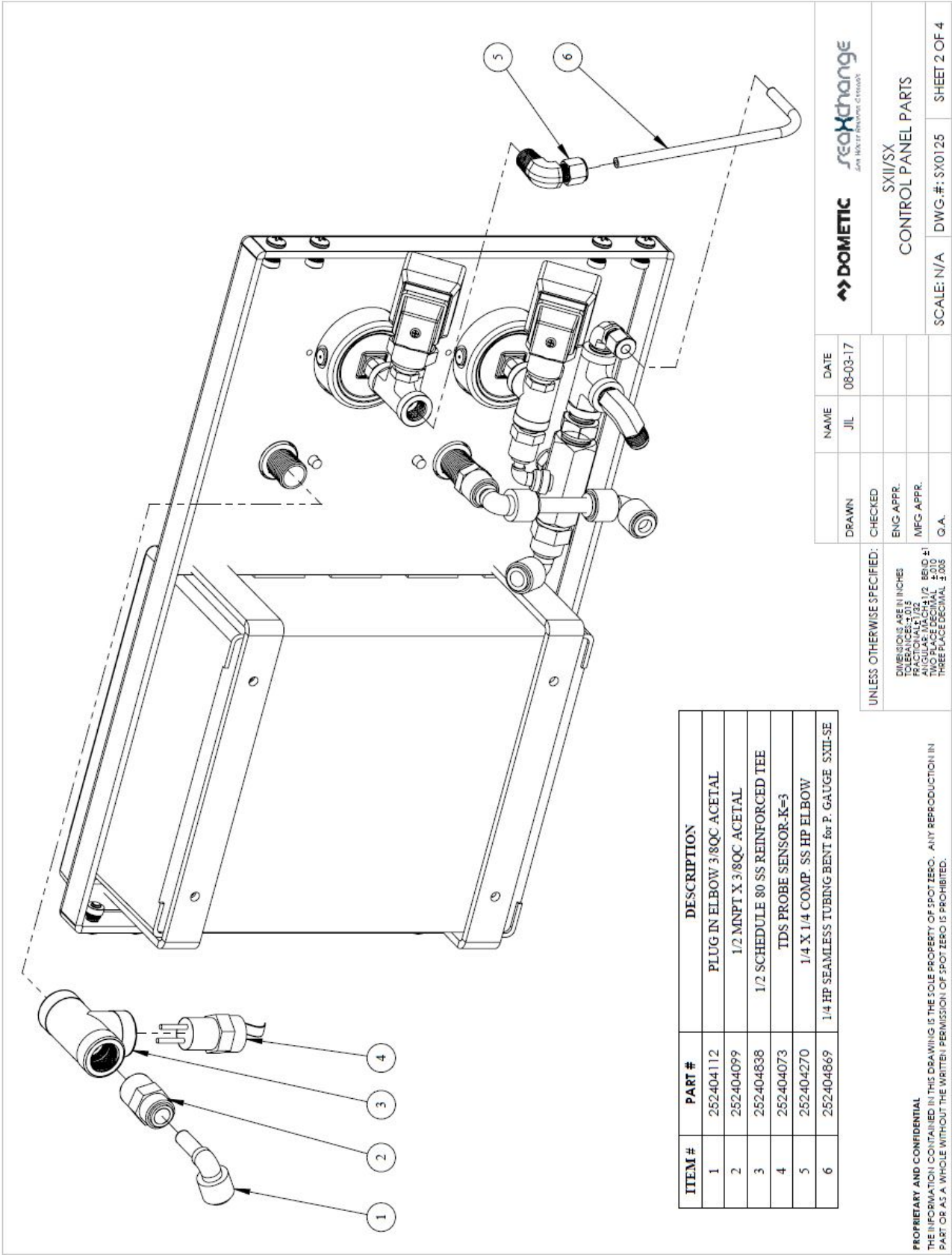
SCALE: N/A

DWG. #: SX0125

SHEET 1 OF 4

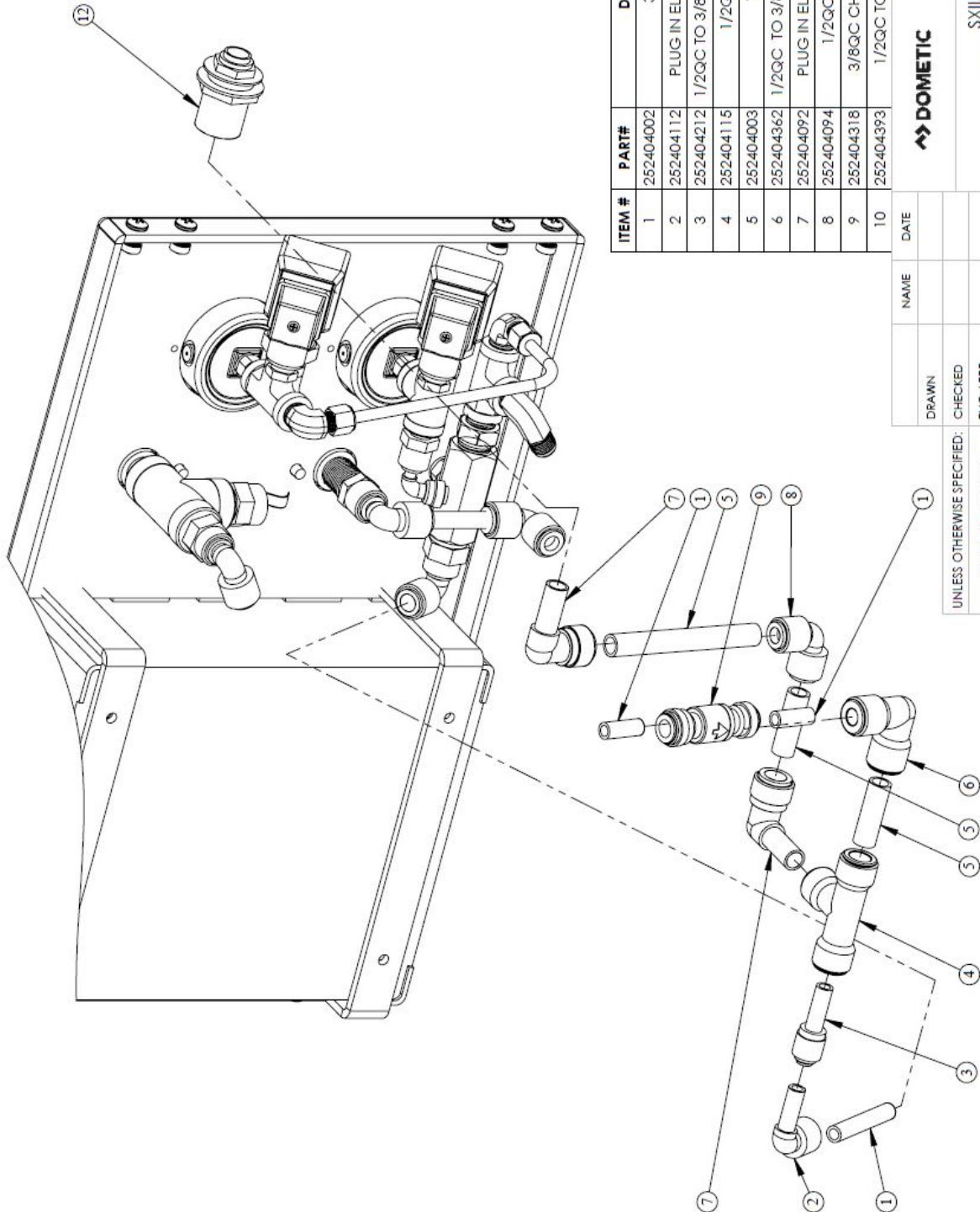
SXII DRAWINGS

CONTROL PANEL



SXII DRAWINGS

CONTROL PANEL



ITEM #	PART#	DESCRIPTION
1	252404002	3/8 TUBING
2	252404112	PLUG IN ELBOW 3/8QC ACETAL
3	252404212	1/2QC TO 3/8QC REDUCER STRAIGHT
4	252404115	1/2QC TEE ACETAL
5	252404003	1/2 TUBING
6	252404362	1/2QC TO 3/8QC REDUCING ELBOW
7	252404092	PLUG IN ELBOW 1/2QC ACETAL
8	252404094	1/2QC ELBOW ACETAL
9	252404318	3/8QC CHECK VALVE ACETAL
10	252404393	1/2QC TO 1/2QC BULKHEAD

DOMETIC	seaXchange <small>Sea Water Reverse Osmosis</small>
SXII/SE	
CONTROL PANEL PARTS	
SCALE: N/A	DWG. #: SX0125
	SHEET 3 OF 4

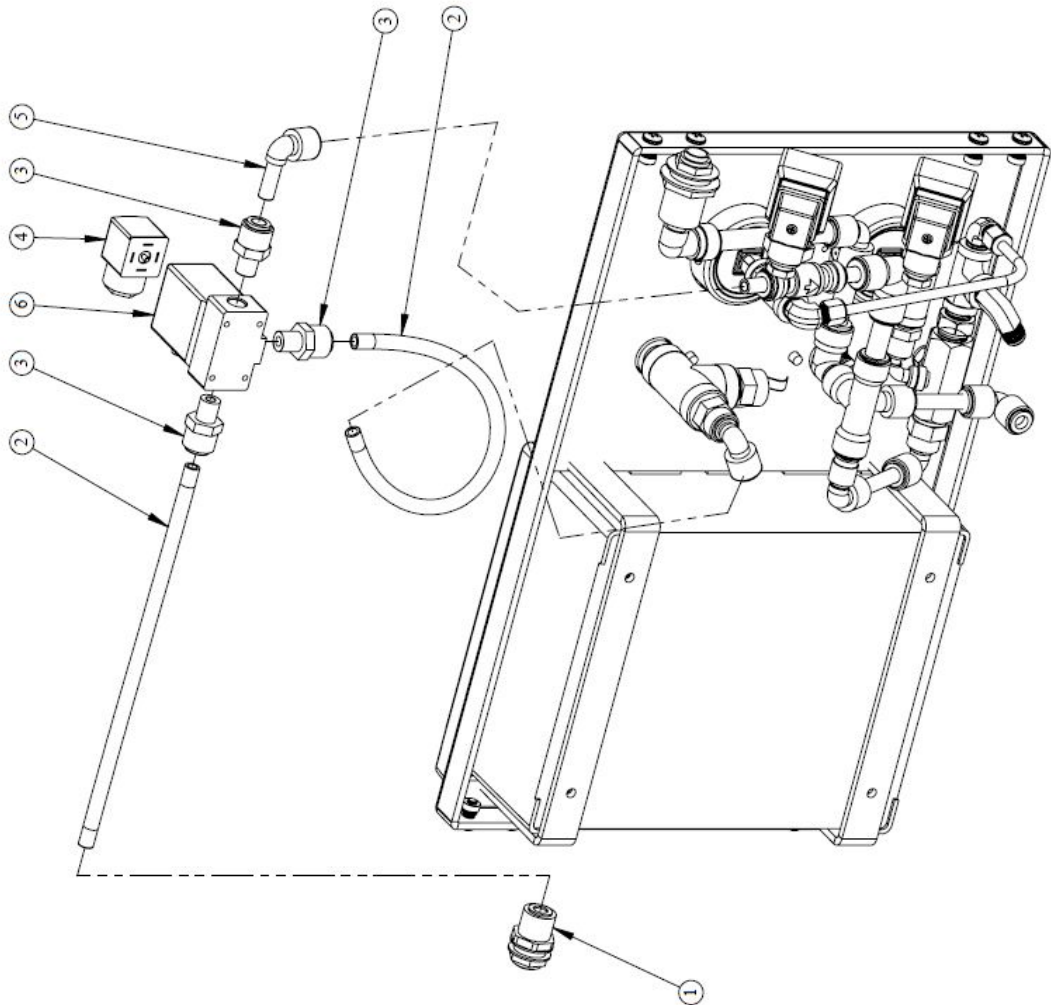
NAME	DATE
DRAWN	
CHECKED	
ENG APPR.	
MFG APPR.	
G.A.	

UNLESS OTHERWISE SPECIFIED:
 DIMENSIONS ARE IN INCHES
 FRACTIONS 1/16, 1/8, 1/4, 3/8, 1/2
 ANGULAR TOLERANCE 1/2 BEND ±1
 TWO PLACE DECIMAL ±.010
 THREE PLACE DECIMAL ±.003

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SXII DRAWINGS

CONTROL PANEL



ITEM #	PART #	DESCRIPTION
1	252404392	3/8QC TO 3/8QC BULKHEAD
2	252404002	3/8 TUBING
3	252404125	1/4MNPT X 3/8QC ACETAL
4	252404083	3/2 BURKERT DIVERSION VALVE-230V
4	252404257	3/2 BURKERT DIVERSION VALVE-115V
5	252404112	PLUG IN ELBOW 3/8QC ACETAL
6	252404067	DIN CONNECTOR PLUG

DRAWN	NAME	DATE	DOMETIC <i>seaXchange</i> <small>LOW NOX & REVIEWS CERTIFIED</small>
CHECKED	JIL	08-03-17	
ENG APPR.			SXII/SE CONTROL PANEL PARTS
MFG APPR.			
Q.A.			SCALE: N/A DWG. #: SX0125 SHEET 4 OF 4

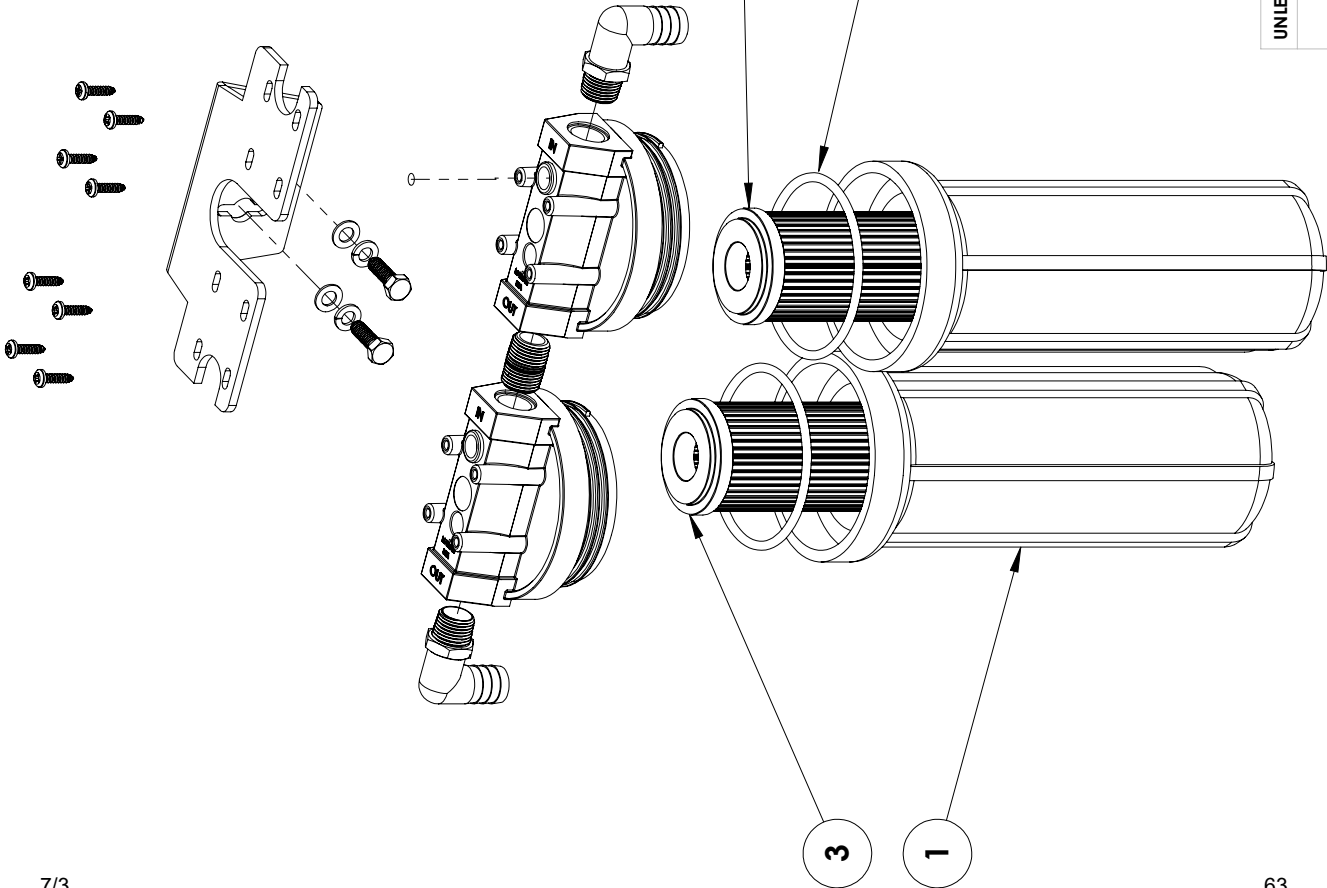
UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES: ±.015
FRACTIONAL: 1/32
DECIMAL: .001
TWO PLACE DECIMAL: ±.01
THREE PLACE DECIMAL: ±.003

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NOTES:

1. (*) FOR XTC MODEL ONLY

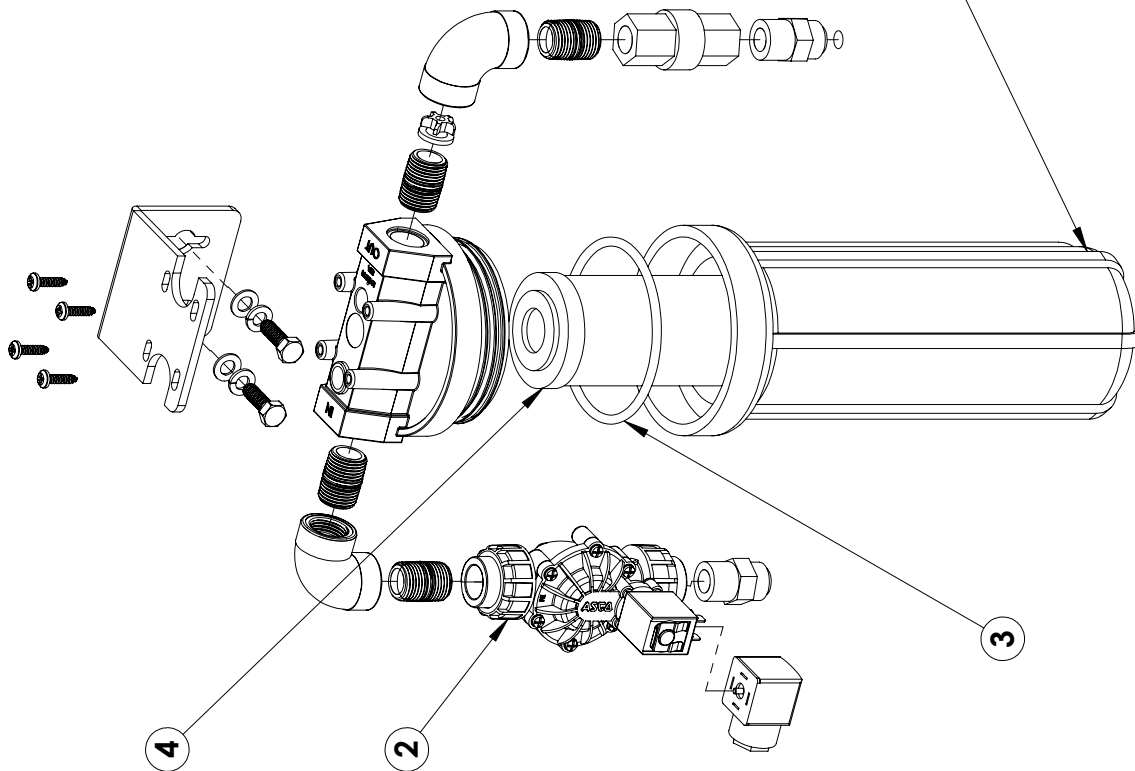
ITEM #	PART #	DESCRIPTION
1	252404325	2.5 X 10 CLEAR HOUSING
2	252404292	25 MICRON FILTER
3	252404291	5 MICRON FILTER
4	252404304	2.5 x 10 CLEAR HOUSING O-RING
5	252404326	WRENCH FOR 2.5 CLEAR HOUSING



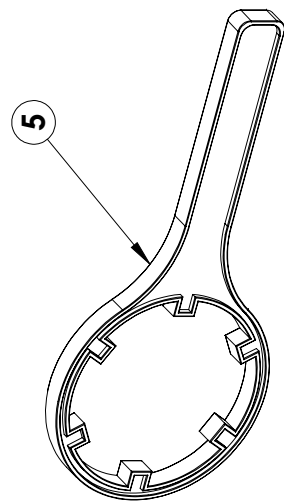
NAME	DATE	DOMETIC	seaXchange
JIL	07-03-19		Sea Water Systems Division
DRAWN	CHECKED		
ENG APPR.	MFG APPR.		
Q.A.			
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES DIMENSIONS IN PARENTHESES ARE IN MILLIMETERS FRACTIONAL: 1/32 ANGULAR: MACH: 1/2 BEND: 1 TWO PLACE DECIMAL: ±.010 THREE PLACE DECIMAL: ±.005			
SX/XTC/SE PRE-FILTER SUB ASSEMBLY			
SCALE: N/A		DWG. #SX0041	SHEET 1 OF 1

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PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF SPOT ZERO IS PROHIBITED.

ITEM #	PART #	DESCRIPTION
1	252404325	2.5 X 10 CLEAR HOUSING
2	SEE CHART	2-WAY SOLENOID
3	252404304	2.5 CLEAR HOUSING O-RING
4	252404295	CARBON BLOCK FILTER
5	252404326	WRENCH FOR 2.5 CELAR HOUSING



2-WAY SOLENOID		
SYSTEM VOLTAGE	SYSTEM MODEL	PART #
115V	SE/SXII	252404879
230V	SE/SXII	252404880
24V	XTC/XZ	252404881



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 PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF SPOT ZERO IS PROHIBITED.

DRAWN	NAME	JIL	DATE	07-03-19
	CHECKED			
ENG APPR.				
MFG APPR.				
Q.A.				

SXII/XTC/SE

FRESH WATER FLUSH SUB ASSY

SCALE: 1:8 DWG. #: SX0042 SHEET 1 OF 1

UNLESS OTHERWISE SPECIFIED:
 DIMENSIONS ARE IN INCHES
 DECIMALS: ±.005
 FRACTIONAL: 1/32
 ANGULAR: MACH: ±1/2 BEND ±1
 TWO PLACE DECIMAL ±.010
 THREE PLACE DECIMAL ±.005

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

Output Relay Ratings (relays are fused with a 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

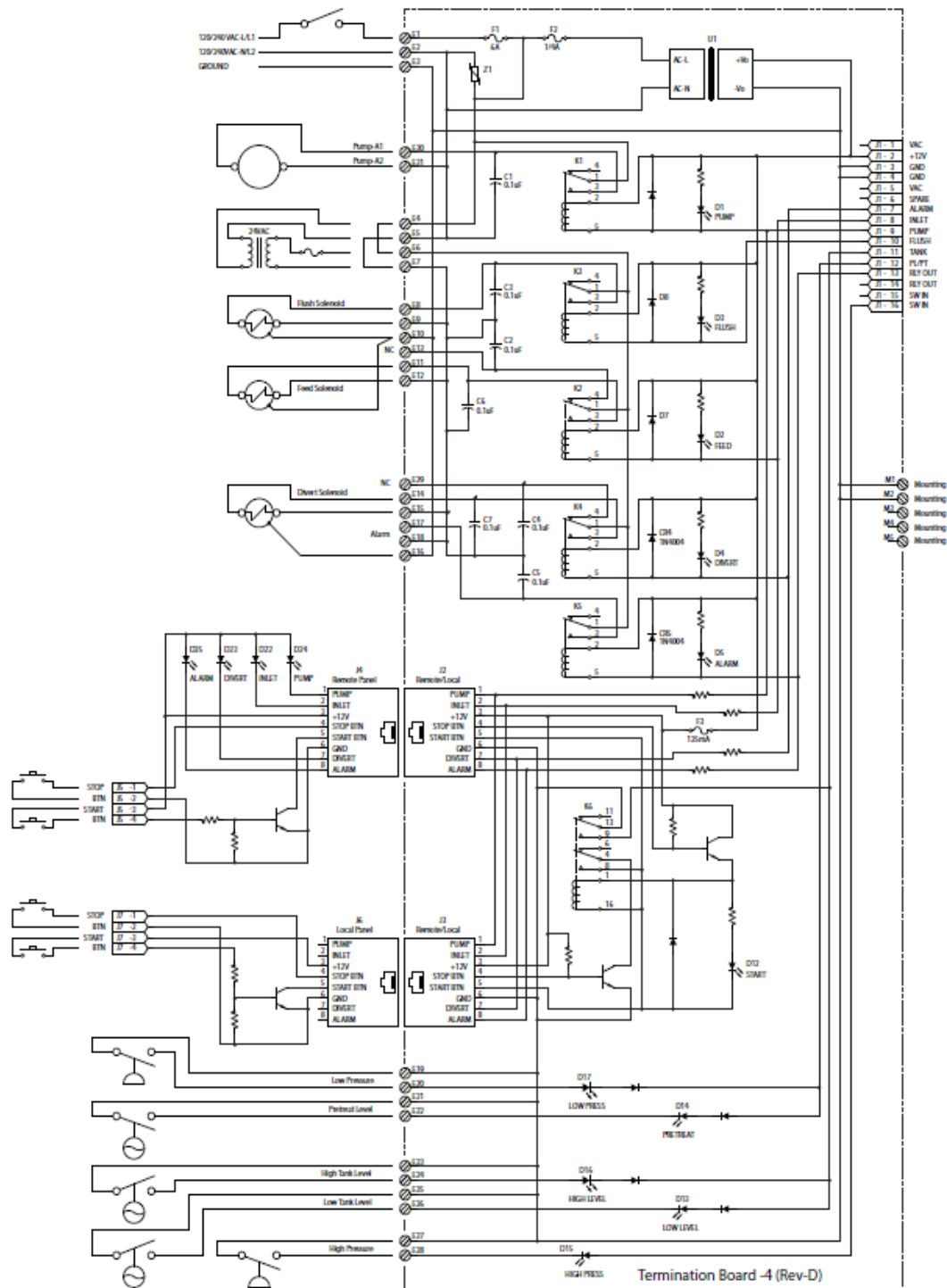
Circuit Protection

Main Power Fuse	F1	6 Amp	5x20mm	Littelfuse O234.006 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) (<i>Enclosure, CPU-4 and TB-4 only.</i>) 6.0 lb. (12.5 x 11.25) (<i>Enclosure, CPU-4 and TB-4 only.</i>) 10.6 lb. (12.5 x 11.25) (<i>Enclosure, CPU-4 and TB-4 only.</i>)
Environment	0-50°C, 10-90%RH (non-condensing)

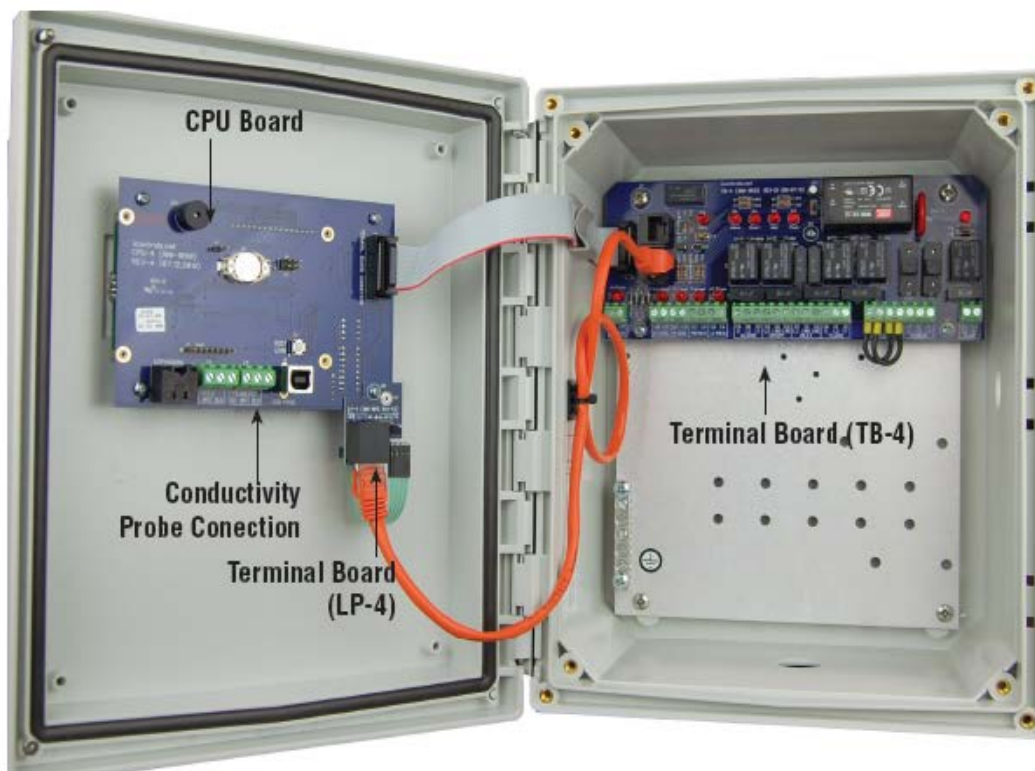
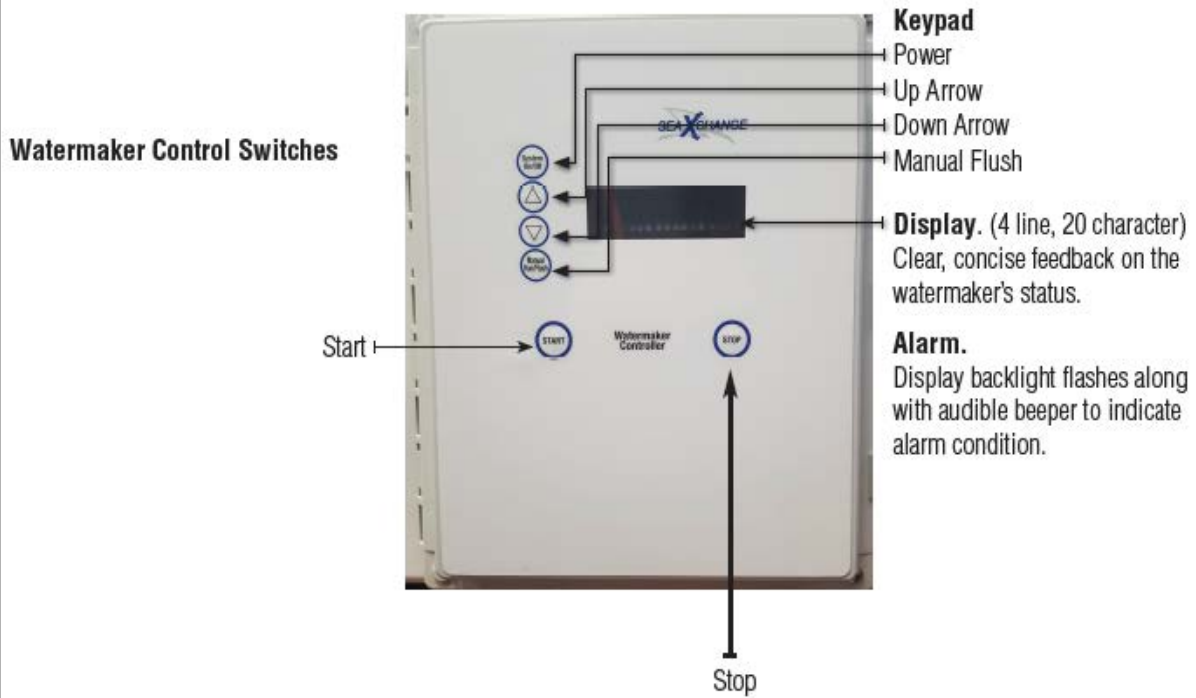
Figure 1. Terminal Board Schematic



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Figure 2. Controller Overview

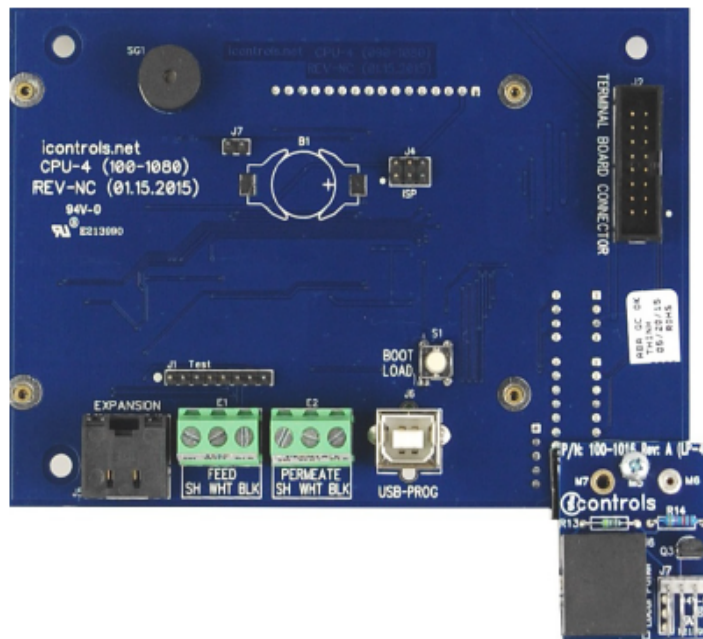


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Figure 3. Controller Detail: CPU-4/LP-4

Typical Configuration



Detailed View

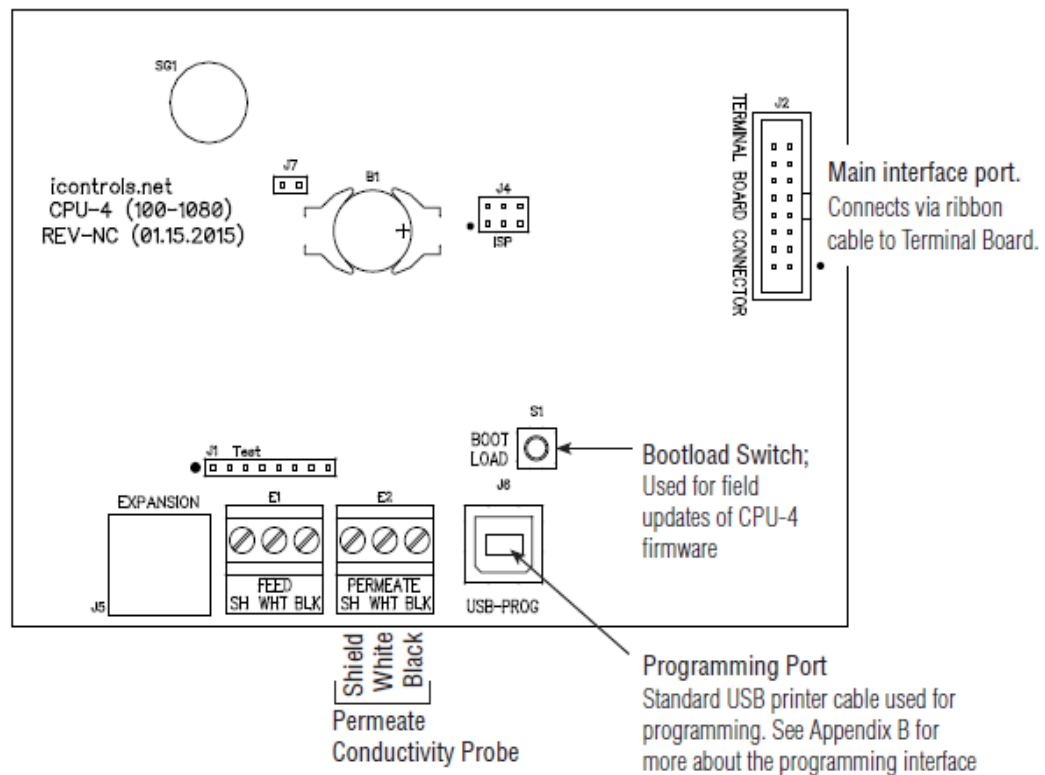
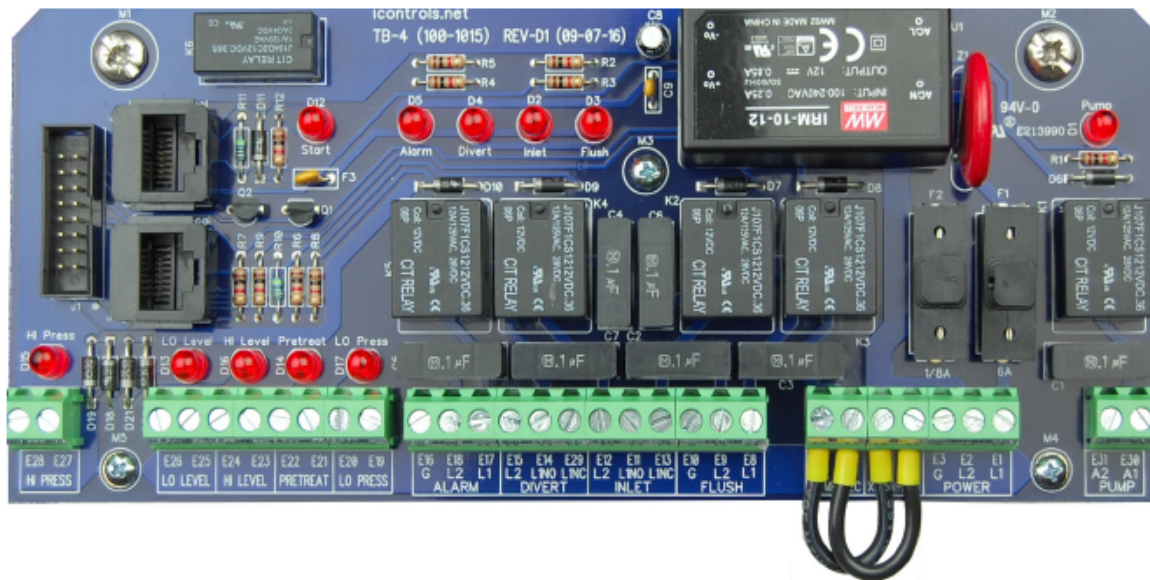


Figure 4. Controller Detail: Terminal Board, TB-4 (See Fig. 1 for schematic)



Switch LEDs
ON when switches close.

Valve LEDs ON when the relay is energized.

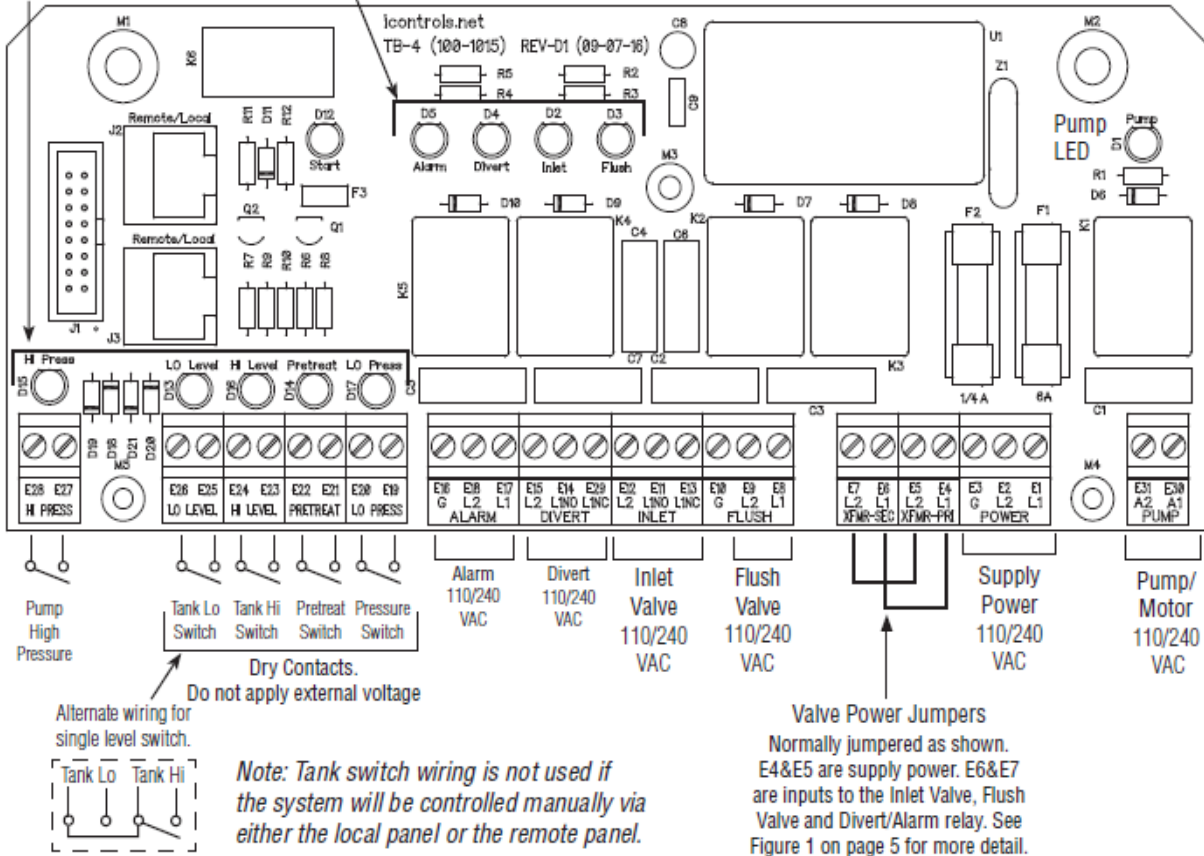


Figure 5. Conductivity Probe Installation



Conductivity Probe Calibration

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

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

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

Figure 6. Controller Programming. Accessing the hidden menus.

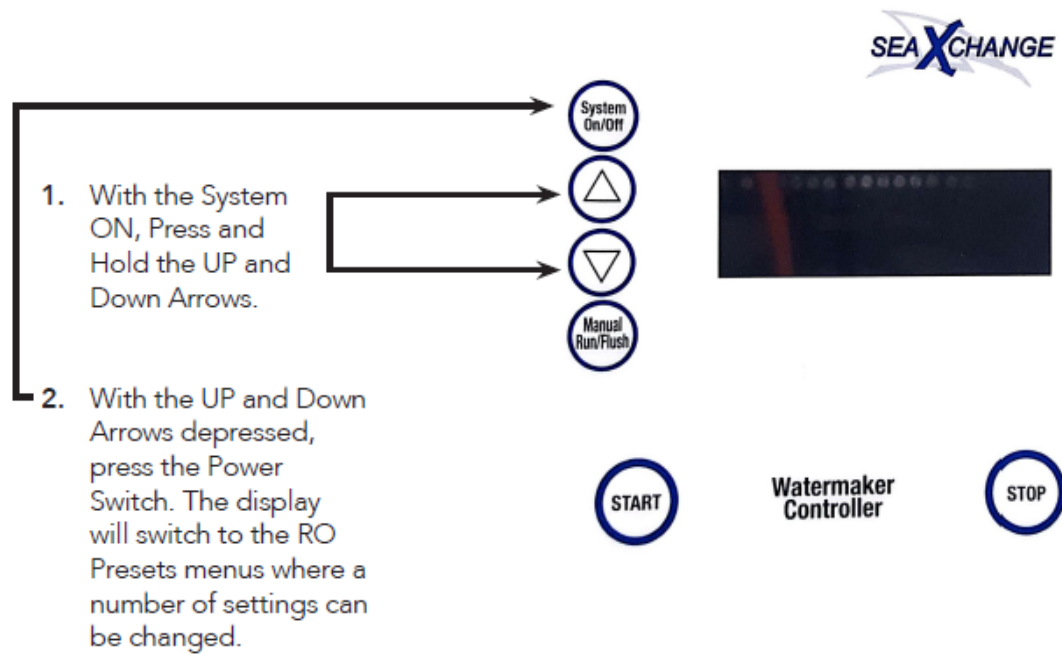
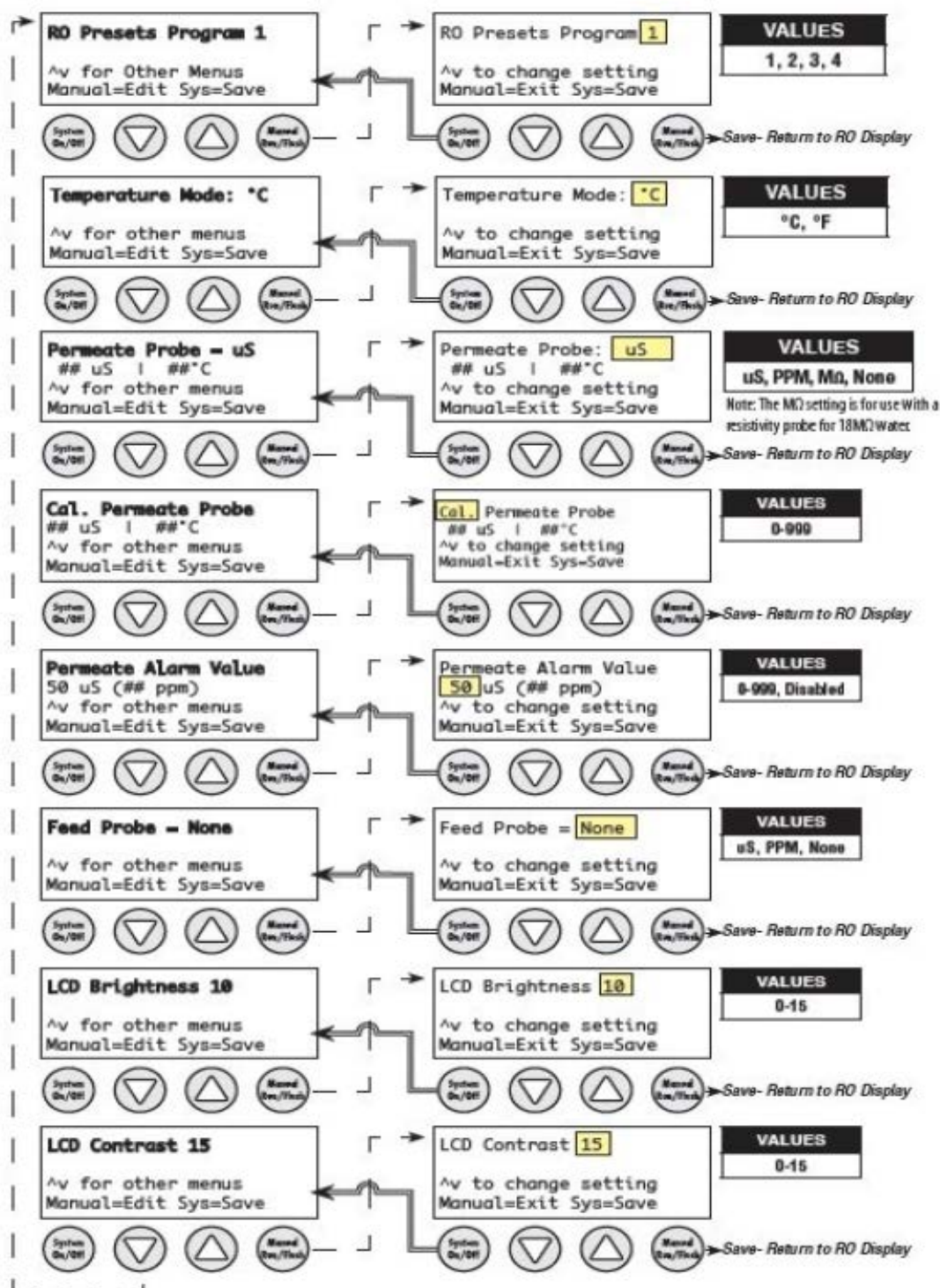


Figure 7. Controller Programming: Menu Navigation



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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:

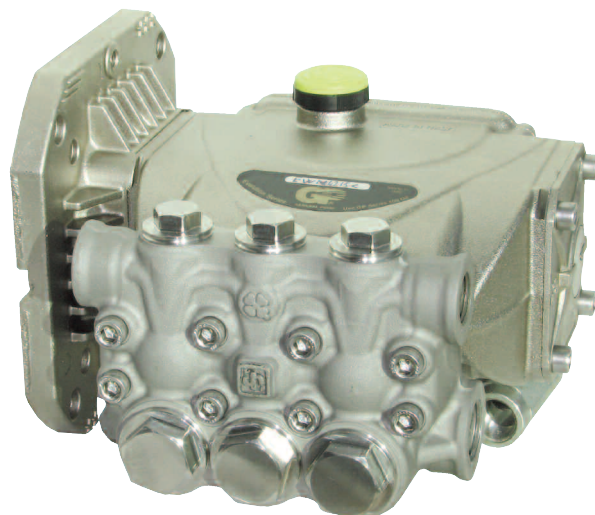
Line 2 "Over-range" - Measurement is out of range for the circuit, probe may also be shorted
Line 2 "Probe shorted" - Short circuit detected on temperature sensor in probe
Line 2 "Probe not detected" - Open circuit detected on temperature sensor in probe
Line 2 "Probe Startup 1" - Internal reference 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

HIGH PRESSURE PUMP

GENERAL PUMP *A member of the Interpump Group*

EWM Series

5/8" Hollow Shaft



FEATURES

- 316 Stainless Steel fluid end for superior corrosion protection
- Designed for use in salt water applications
- Solid ceramic plungers with advanced surface finish assure durability and longevity.
- Compact design offers solutions to space limitations
- Nickel-plated crankcase
- 56C mounting flange
- Use motor #639610, 2.5 HP, 50/60 Hz for 4.2 GPM version

SPECIFICATIONS

Pump Model	EWM0515C	EWM0815C	EWM1015C	EWM1615C	EWM2315C	EWM3015C	EWM3715C	EWM4215C
Maximum Volume	0.5 GPM	0.8 GPM	1.1 GPM	1.6 GPM	2.3 GPM	3.0 GPM	3.7 GPM	4.2 GPM
Maximum Discharge Pressure	1,500 PSI							
Maximum Pump Speed	1750 RPM							
Rated Inlet Pressure	125 PSI							
Plunger Bore (in / mm)	.709/18 mm							
Plunger Stroke (in / mm)	.079 in/2mm	.118 in/3mm	.157 in/4mm	.197/5mm	.283/7.2mm	.370/9.4mm	.452/11.5mm	.512/13mm
Crankcase Oil Capacity	8.5 oz.							
Maximum Fluid Temperature	185° F							
Inlet Port Thread	1/2" NPT-F							
Discharge Port Thread	3/8" NPT-F							
Shaft Diameter	5/8" Hollow							
Weight	11.05 lbs.							
Dimensions	7.5" x 7.5" x 5.5"							

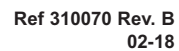


General Pump
is a member of
the Interpump Group



GENERAL PUMP *A member of the Interpump Group*

DIMENSIONAL DRAWING

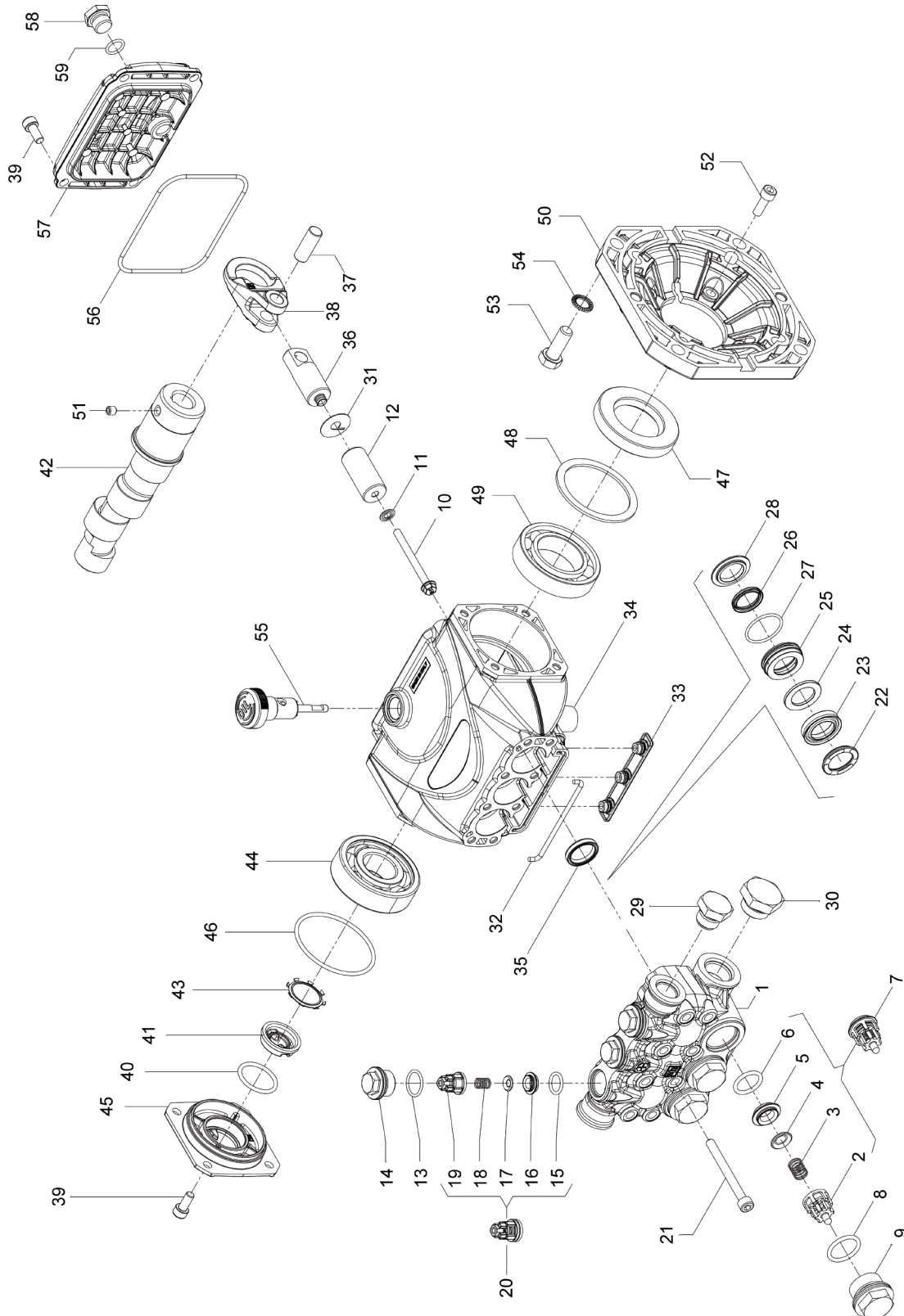


EWM Series

5/8" Hollow Shaft

GENERAL PUMP *A member of the Interpump Group*

EXPLODED VIEW



Ref 310070 Rev. B
02-18



EWM Series

5/8" Hollow Shaft

GENERAL PUMP
A member of the Interpump Group

PARTS LIST

Item	Part #	Description	QTY.
1	53121536	Manifold	1
2	36202551	Valve Cage	3
3	94737300	Spring, 9.4x14.8mm, SS	3
4	36200176	Spherical Valve	3
5	36203666	Valve Seat, SS	3
6	701115	O-ring, Ø17.13x2.62	3
7	36713001	Valve Assembly	3
8	701002	O-ring, Ø 20.24x2.62	3
9	98221420	Plug, M24x1.5x13.2	3
10	99169000	Plunger Bolt, M5x55	3
11	96690500	Washer, Ø 5x11.5x0.4	3
12	63040509	Plunger, Ø 18x38.5	3
13	701016	O-ring, Ø15.60x1.78	3
14	98213720	Plug, M18x1.5x10	3
15	90367400	O-ring, Ø 12x2	3
16	53211166	Valve Seat	3
17	36211276	Poppet Valve, Outlet	3
18	94733300	Spring, Ø6.8x10.8	3
19	36211151	Valve Cage, Outlet	3
20	36724501	Valve Assembly	3
21	99199200	Screw, M6x60	8
22	63101151	Head Ring, HP, 18 mm	3
23	90265350	Packing, Ø18x28x6, HP	3
24	90511150	Anti-extrusion Ring, Ø18x28x2	3
25	53210956	Support Seal	3
26	90220000	Seal, Ø158x22.5, LP	3
27	90360400	O-ring, Ø25.12x1.78	3
28	53211056	Packing Ring, Ø18	3
29	98210066	Plug, G3/8x13	1
30	98218000	Plug, G1/2x10	1
31	96699000	Washer, Ø 7.5x23x.5	3
32	53210382	Gasket, Ø .3x85	1
33	58210451	Cover, Drip	1
34	53010122	Pump Cover, Nickel	1

Item	Part #	Description	QTY.
35	90159300	Oil Seal, Ø18x24x4	3
36	53050166	Plunger Guide	3
37	97733800	Wrist Pin, Ø10x26.5	3
38	53030022	Connecting Rod	3
39	99183800	Screw, M6x14	8
40	90385900	O-ring, Ø25.07x2.62	1
41	53210851	Oil Sight Glass	1
42	60022465	Crankshaft, 5 mm, 5/8, Hollow	1
	60022965	Crankshaft, 7.2 mm, 5/8, Hollow	
	60023465	Crankshaft, 9.4 mm, 5/8, Hollow	
	60022265	Crankshaft, 4 mm, 5/8, Hollow	
	60028065	Crankshaft, 2 mm, 5/8, Hollow	
	53020365	Crankshaft, 3mm, 5/8, Hollow	
	53020465	Crankshaft, 11.5mm, 5/8, Hollow	
	53020565	Crankshaft, 13mm, 5/8, Hollow	
43	90067100	Ring, Stop	1
44	91832800	Crankshaft Bearing	1
45	53150122	Cover, Case	1
46	90389800	O-ring, Ø56.82x2.62	1
47	90167500	Shaft Seal, Ø35x62x10	1
48	60210189	Shaft Spacer	1
49	91846400	Ball Bearing	1
50	10085122	Flange	1
51	99179000	Screw, M6x6	1
52	99186800	Screw, M6x18	4
53	99334500	Screw, 3/8"-16x1	4
54	96710400	Washer, Ø10.5	4
55	98210800	Oil Dipstick	1
56	90391700	O-ring, Ø88.57x2.62	1
57	53160122	Back Cover, Nickel	1
58	98204000	Plug	1
59	90358500	O-ring, Ø10.82x1.78	1

REPAIR KITS

KIT NO.	K341	K334	K311	K335	K336	KEW337	KEW337C
ITEM NO'S INCLUDED IN KIT	2, 3, 4, 5, 6, (7)	15, 16, 17, 18, 19 (20)	35	8, 9	13, 14	22, 23, 24, 24, 26, 27	22, 23, 24, 25, 24, 26, 27, 28
NUMBER OF ASSEMBLIES IN KIT	3	3	3	3	3	3	3

TORQUE SPECS*

ITEM	Ft-lbs	Nm
9	59.0	80
10	4.4	6
14	44.3	60
21	8.9	12
29	29.5	40
30	29.5	40
39	7.4	10
52	7.4	10

 Ref 310070 Rev. B
02-18

*Decrease torque by 20% if threads are lubricated.

GENERAL PUMP 1174 Northland Drive • Mendota Heights, MN 55120

Phone: 651.686.2199 • Fax: 800.535.1745 • e-mail: sales@gpcompanies.com • www.generalpump.com



PREVENTATIVE MAINTENANCE CHECK-LIST						
Check	Daily	Weekly	50 hrs.	500 hrs.*	1500 hrs.**	3000 hrs.**
Clean Filters	x					
Oil Level/Quality	x					
Oil Leaks	x					
Water Leaks	x					
Belts, Pulley		x				
Plumbing		x				
Initial Oil Change			x			
Oil Change				x		
Seal Change					x	
Valve Change						x
Accessories					x	

* If other than CAT PUMPS special multi-viscosity ISO68 oil is used, change cycle should be every 300 hours.

** Each system's maintenance cycle will be exclusive. If system performance decreases, check immediately. If no wear at 1500 hours, check again at 2000 hours and each 500 hours until wear is observed. Valves typically require changing every other seal change.

Duty cycle, temperature, quality of pumped liquid and inlet feed conditions all effect the life of pump wear parts and service cycle.

** Remember to service the regulator/unloader at each seal servicing and check all system accessories and connections before resuming operation. Refer to video for additional assistance.

TORQUE CHART						
Pump Item	Thread	Tool Size [Part No.]	Torque in. lbs. ft. lbs. Nm			
Outer Bearing Case Screw	M6	M10 Hex/Phil. [25082]	50	4.0	6	
Inner Bearing Case Screw	M6	M10 Hex/Phil. [25082]	50	4.0	6	
Manifold Screw	M8	M6 Allen [30941]	115	9.4	13	
Plunger Rod Nut	M6	M10 Hex [25082]	55	4.4	6	
Bubble Oil Gauge	M28	Oil Gauge Tool [44050]	45	3.6	5	
Mounting 2SF						
Adapter Plate to Gas Engine	5/16-24	1/2" Hex	90	7.2	10	
Pump to Adapter Plate	3/8-16	9/16" Hex	110	9.0	12	
Pump to Electric Motor	3/8-16	9/16" Hex	110	9.0	12	
Mounting 4SF						
Adapter Plate to Gas Engine	3/8-16	9/16" Hex	110	9.0	12	
Pump to Adapter Plate	1/2-13	3/4" Hex	150	12.5	17	
Pump to Electric Motor	1/2-13	3/4" Hex	150	12.5	17	

TECHNICAL BULLETIN REFERENCE CHART		
No.	Subject	Models
002	Inlet Pressure VS Liquid Temperature	All Models
024	Lubrication of Lo-Pressure Seals	All Models
043	LPS and HPS Servicing	All Plunger Models
055	Removing Pumps from Gas Engine or Electric Motor	2SF, 2SFX, 2DX, 4SF, 5DX, 6DX
057	Set Screw and Hardened Key	4SF
064	By-Pass Hose Sizing	All Unloaders/Regulators
065	Higher Performance Ratings	2SF and 4SF
070	Maximum Performance	2SF and 4SF
073	Hi-Temp HPS	3PFR, 5PFR, 2SF
074	Torque Chart	Piston and Plunger Pumps
075	Sleeved Plunger Rod	4SF's*
083	Winterizing a Pump	All Models
091	2SF Inlet Valve	2SF Models
092	Crankcase Changes	All 2SF-2SFX

INLET CONDITION CHECK-LIST

Review Before Start-Up

Inadequate inlet conditions can cause serious malfunctions in the best designed pump. Surprisingly, the simplest of things can cause the most severe problems or go unnoticed to the unfamiliar or untrained eye. **REVIEW THIS CHECK-LIST BEFORE OPERATION OF ANY SYSTEM.** Remember, no two systems are alike, so there can be no **ONE** best way to set-up a system. All factors must be carefully considered.

INLET SUPPLY should be adequate to accommodate the maximum flow being delivered by the pump.

- ☐ Open inlet shut-off valve and turn on water supply to avoid cavitating pump. **DO NOT RUN PUMP DRY.**
- ☐ Temperatures above 130°F are permissible. Add 1/2 PSI inlet pressure per each degree F over 130°F. Elastomer or RPM changes may be required. See Tech Bulletin 002 or call CAT PUMPS for recommendations.
- ☐ Avoid closed loop systems without a Thermo Valve high temperature protection.
- ☐ Avoid low vapor pressure and high viscosity liquids.
- ☐ Higher temperature liquids tend to vaporize and require positive heads.
- ☐ When using an inlet supply reservoir, size it to provide adequate liquid to accommodate the maximum output of the pump, generally a minimum of 6-10 times the GPM (however, a combination of system factors can change this requirement); provide adequate baffling in the tank to eliminate air bubbles and turbulence; install diffusers on all return lines to the tank.

INLET LINE SIZE should be adequate to avoid starving the pump.

- ☐ Line size must be a minimum of one size larger than the pump inlet fitting. Avoid thick walled fittings, tees, 90 degree elbows or valves in the inlet line of the pump to reduce the risk of flow restriction and cavitation.
- ☐ The line **MUST** be a **FLEXIBLE** hose, NOT a rigid pipe, and reinforced on SUCTION systems to avoid collapsing.
- ☐ The simpler the inlet plumbing the less the potential for problems. Keep the length to a minimum, the number of elbows and joints to a minimum (ideally no elbows) and the inlet accessories to a minimum.
- ☐ Use pipe sealant to assure air-tight, positive sealing pipe joints.

INLET PRESSURE should fall within the specifications of the pump.

- ☐ Optimum pump performance is obtained with +20 PSI (1.4 BAR) inlet pressure. With adequate inlet plumbing, most pumps will perform with flooded suction. Maximum inlet pressure is 75 PSI (5.25 BAR).
- ☐ After prolonged storage, pump should be purged of air to facilitate priming. Disconnect any discharge port and allow liquid to pass through pump.

INLET ACCESSORIES are designed to protect against over pressurization, control inlet flow, contamination or temperature and provide ease of servicing.

- ☐ A shut-off valve is recommended to facilitate maintenance.
- ☐ A stand pipe can be used in some applications to help maintain a positive head in the inlet line.
- ☐ Inspect and clean inlet filters on a regular schedule.
- ☐ A pressure gauge is recommended to monitor the inlet pressure and should be mounted **AS CLOSE TO THE PUMP INLET** as possible. **Short term, intermittent cavitation will not register on a standard gauge.**
- ☐ All accessories should be sized to avoid restricting the inlet flow.
- ☐ All accessories should be compatible with the solution being pumped to prevent premature failure or malfunction.

BY-PASS TO INLET Care should be exercised when deciding the method of by-pass from control valves.

- ☐ It is recommended the by-pass be directed to a baffled reservoir tank, with at least one baffle between the by-pass line and the inlet line to the pump.
- ☐ The 2SF and 4SF come standard with a Regulating Unloader to handle by-pass liquid directed to the inlet line of the pump. If other than standard valve is used, exercise caution to use proper flexible hose and adequate diameter. A **PRESSURE REDUCING VALVE** may be needed on the inlet line (**BETWEEN THE BY-PASS CONNECTION AND THE INLET TO THE PUMP**) to avoid excessive pressure to the inlet of the pump. It may also be necessary to use a **THERMO VALVE** in the by-pass line to monitor the temperature build-up in the by-pass loop to avoid premature seal failure.
- ☐ A low-pressure, **FLEXIBLE CLOTH BRAID** (not metal braid) hose should be used from the by-pass connection to the inlet of the pump.
- ☐ If standard unloader valve is not used, check the pressure in the by-pass line to avoid over pressurizing the inlet.

HOSE FRICTION LOSS

Water* Flow Gal/Min	PRESSURE DROP IN PSI PER 100 FT OF HOSE WITH TYPICAL WATER FLOW RATES Hose Inside Diameters, inches						
	1/4	5/16	3/8	1/2	5/8	3/4	1"
0.5	16	5	2				
1	54	20	7	2			
2	180	60	25	6	2		
3	380	120	50	13	4	2	
4		220	90	24	7	3	
5		320	130	34	10	4	
6			220	52	16	7	1
8			300	80	25	10	2
10			450	120	38	14	3
15			900	250	80	30	7
20			1600	400	121	50	12
25				650	200	76	19
30					250	96	24
40					410	162	42
50					600	235	62
60						370	93

*At a fixed flow rate with a given size hose, the pressure drop across a given hose length will be directly proportional. A 50 ft. hose will exhibit one-half the pressure drop of a 100 ft. hose. Above values shown are valid at all pressure levels.

WATER LINE PRESSURE LOSS PRESSURE DROP IN PSI PER 100 FEET

Water GPM	Steel Pipe—Nominal Dia.					Brass Pipe—Nominal Dia.					Copper Tubing O.D. Type L				
	1/4	3/8	1/2	3/4	1"	1/4	3/8	1/2	3/4	1"	1/4	3/8	1/2	5/8	3/4
1	8.5	1.9				6.0	1.6				120	13	2.9	1.0	
2	30	7.0	2.1			20	5.8	1.8			400	45	10	3.4	1.3
3	60	14	4.5	1.1		40	11	3.6			94	20	6.7	2.6	
5	150	36	12	2.8		100	28	9.0	2.2		230	50	17	6.1	3.0
8	330	86	28	6.7	1.9	220	62	21	5.2	1.6	500	120	40	15	6.5
10	520	130	43	10	3.0	320	90	30	7.8	2.4	180	56	22	10	
15	270	90	21	6.2	1.8	190	62	16	5.0	1.5	120	44	20		
25	670	240	56	16	4.2	470	150	40	12	3.8	330	110	50		
40		86	17	8.0			39	11	5.0		550	200	88		
60			37	17					23	11					
90			52	29					40	19					
100			210	107	48				61	26					

RESISTANCE OF VALVES AND FITTINGS

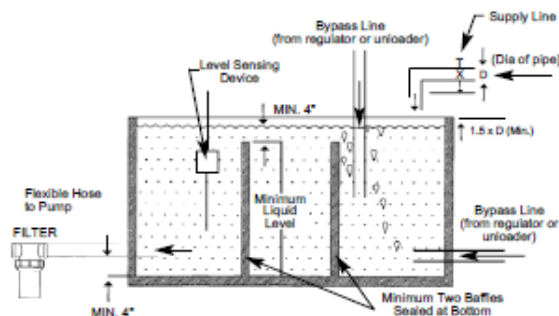
Nominal Pipe Size Inches	Inside Diameter Inches	Equivalent Length of Standard Pipe in Feet							
		Gate Valve	Globe Valve	Angle Valve	45° Elbow	90° Elbow	180° Close Ret.	Tee Thru Run	Tee Thru Branch
1/2	0.622	0.41	18.5	9.3	0.78	1.67	3.71	0.93	3.33
3/4	0.824	0.54	24.5	12.3	1.03	2.21	4.90	1.23	4.41
1	1.049	0.69	31.2	15.6	1.31	2.81	6.25	1.56	5.62
1 1/4	1.380	0.90	41.0	20.5	1.73	3.70	8.22	2.06	7.40
1 1/2	1.610	1.05	48.0	24.0	2.15	4.31	9.59	2.40	8.63
2	2.067	1.35	61.5	30.8	2.59	5.55	12.30	3.08	11.60
2 1/2	2.469	1.62	73.5	36.8	3.09	6.61	14.70	3.68	13.20
3	3.068	2.01	91.5	45.8	3.84	8.23	18.20	4.57	16.40
4	4.026	2.64	120.0	60.0	5.03	10.80	23.90	6.00	21.60

Arriving at a total line pressure loss, consideration should then be given to pressure loss created by valves, fittings and elevation of lines.

If a sufficient number of valves and fittings are incorporated in the system to materially affect the total line loss, add to the total line length, the equivalent length of line of each valve or fitting.

TYPICAL RESERVOIR TANK

RECOMMENDED 6 TO 10 TIMES SYSTEM CAPACITY



Handy Formulas to Help You

Q. How can I find the RPM needed to get specific GPM (Gallons Per Minute) I want?

$$A. \text{Desired RPM} = \text{Desired GPM} \times \frac{\text{Rated RPM}}{\text{Rated GPM}}$$

Q. I have to run my pump at a certain RPM. How do I figure the GPM I'll get?

$$A. \text{Desired GPM} = \text{Desired RPM} \times \frac{\text{Rated GPM}}{\text{Rated RPM}}$$

Q. Is there a simple way to find the approximate horsepower I'll need to run the pump?

$$A. \text{Electric Brake Horsepower Required} = \frac{\text{GPM} \times \text{PSI}}{1460} \quad (\text{Standard 85\% Mech. Efficiency})$$

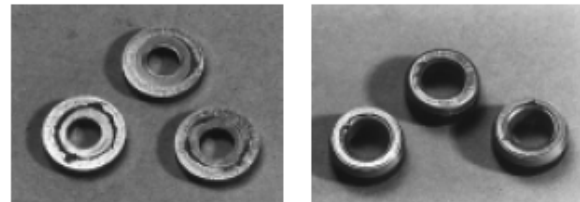
Q. What size motor pulley should I use?

$$A. \text{Pump Pulley (Outer Diameter)} \times \frac{\text{Pump RPM}}{\text{Motor/Engine RPM}} \quad (\text{Consult Engine Mfr.})$$

Q. How do I calculate the torque for my hydraulic drive system?

$$A. \text{Torque (ft. lbs.)} = 3.6 \left(\frac{\text{GPM} \times \text{PSI}}{\text{RPM}} \right)$$

Avoid Cavitation Damage



One or several of the conditions shown in the chart below may contribute to cavitation in a system resulting in premature wear, system downtime and unnecessary operating costs.

CONDITION	SOLUTION
Inadequate inlet line size	• Increase line size to the inlet port or one size larger
Water hammering	• Install C.A.T. Tube
liquid acceleration/deacceleration	• Move pump closer to liquid supply
Rigid Inlet Plumbing	• Use flexible wire reinforced hose to absorb pulsation and pressure spikes
Excessive Elbows in Inlet Plumbing	• Keep elbows to a minimum and less than 90°
Excessive Liquid Temperature	• Use Thermo Valve in bypass line • Do not exceed pump temperature specifications • Substitute closed loop with baffled holding tank • Adequately size tank for frequent or high volume bypass • Pressure feed high temperature liquids • Properly ventilate cabinets and rooms
Air Leaks in Plumbing	• Check all connections • Use PTFE thread tape or pipe thread sealant
Agitation in Supply Tank	• Size tank according to pump output — Minimum 6-10 times system GPM • Baffle tank to purge air from liquid and separate inlet from discharge
High Viscosity Liquids	• Verify viscosity against pump specifications before operation • Elevate liquid temperature enough to reduce viscosity • Lower RPM of pump • Pressure feed pump • Increase inlet line size
Clogged Filters	• Perform regular maintenance or use clean filters to monitor buildup • Use adequate mesh size for liquid and pump specifications

DIAGNOSIS AND MAINTENANCE

One of the most important steps in a high pressure system is to establish a regular maintenance program. This will vary slightly with each system and is determined by various elements such as the duty cycle, the liquid being pumped, the actual specifications vs rated specifications of the pump, the ambient conditions, the inlet conditions and the accessories in the system. A careful review of the necessary inlet conditions and protection devices required before the system is installed will eliminate many potential problems.

CAT PUMPS are very easy pumps to service and require far less frequent service than most pumps. Typically, only common tools are required, making in-field service convenient, however, there are a few custom tools, special to certain models, that do simplify the process. This service manual is designed to assist you with the disassembly and reassembly of your pump. The following guide will assist in determining the cause and remedy to various operating conditions. You can also review our **FAQ** or **SERVICE** sections on our **WEB SITE** for more facts or contact CAT PUMPS directly.

PROBLEM	PROBABLE CAUSE	SOLUTION
Low pressure	<ul style="list-style-type: none"> •Worn nozzle. •Belt slippage. •Air leak in inlet plumbing. •Pressure gauge inoperative or not registering accurately. •Relief valve stuck, partially plugged or improperly adjusted. •Inlet suction strainer (filter) clogged or improperly sized. •Abrasives in pumped liquid. •Leaky discharge hose. •Inadequate liquid supply. •Severe cavitation. •Worn seals. •Worn or dirty inlet/discharge valves. 	<ul style="list-style-type: none"> •Replace with properly sized nozzle. •Tighten belt(s) or install new belt(s). •Tighten fittings and hoses. Use PTFE liquid or tape. •Check with new gauge. Replace worn or damaged gauge. •Clean/adjust relief valve. Replace worn seats/valves and o-rings. •Clean filter. Use adequate size filter. Check more frequently. •Install proper filter. •Replace discharge hose with proper rating for system. •Pressurize inlet and install C.A.T. •Check inlet conditions. •Install new seal kit. Increase frequency of service. •Clean inlet/discharge valves or install new valve kit.
Pulsation	<ul style="list-style-type: none"> •Faulty Pulsation Dampener. •Foreign material trapped in inlet/discharge valves. 	<ul style="list-style-type: none"> •Check precharge. If low, recharge, or install a new dampener. •Clean inlet/discharge valves or install new valve kit.
Water leak		
•Under the manifold	<ul style="list-style-type: none"> •Worn V-Packings, Hi-Pressure or Lo-Pressure Seals. •Worn adapter spacer o-rings. 	<ul style="list-style-type: none"> •Install new seal kit. Increase frequency of service. •Install new o-rings.
•Into the crankcase	<ul style="list-style-type: none"> •Humid air condensing into water inside the crankcase. •Excessive wear to seals and V-Packings. 	<ul style="list-style-type: none"> •Install oil cap protector. Change oil every 3 months or 500 hours. •Install new seal kit. Increase frequency of service.
Knocking noise		
•Inlet supply	<ul style="list-style-type: none"> •Inadequate inlet liquid supply. 	<ul style="list-style-type: none"> •Check liquid supply. Increase line size, pressurize or install C.A.T.
•Bearing	<ul style="list-style-type: none"> •Broken or worn bearing. 	<ul style="list-style-type: none"> •Replace bearing.
•Pulley	<ul style="list-style-type: none"> •Loose pulley on crankshaft 	<ul style="list-style-type: none"> •Check key and tighten set screw.
Oil leak		
•Crankcase oil seals.	<ul style="list-style-type: none"> •Worn crankcase oil seals. 	<ul style="list-style-type: none"> •Replace crankcase oil seals.
•Crankshaft oil seals and o-rings.	<ul style="list-style-type: none"> •Worn crankshaft oil seals or o-rings on bearing cover. 	<ul style="list-style-type: none"> •Remove bearing cover and replace o-rings and/or oil seals.
•Drain plug	<ul style="list-style-type: none"> •Loose drain plug or worn drain plug o-ring. 	<ul style="list-style-type: none"> •Tighten drain plug or replace o-ring.
•Bubble gauge	<ul style="list-style-type: none"> •Loose bubble gauge or worn bubble gauge gasket. 	<ul style="list-style-type: none"> •Tighten bubble gauge or replace gasket.
•Rear cover	<ul style="list-style-type: none"> •Loose rear cover or worn rear cover o-ring. 	<ul style="list-style-type: none"> •Tighten rear cover or replace o-ring.
•Filler cap	<ul style="list-style-type: none"> •Loose filler cap or excessive oil in crankcase. 	<ul style="list-style-type: none"> •Tighten filler cap. Fill crankcase to specified capacity.
Pump runs extremely rough		
•Inlet conditions	<ul style="list-style-type: none"> •Restricted inlet or air entering the inlet plumbing 	<ul style="list-style-type: none"> •Correct inlet size plumbing. Check for air tight seal.
•Pump valves	<ul style="list-style-type: none"> •Stuck inlet/discharge valves. 	<ul style="list-style-type: none"> •Clean out foreign material or install new valve kit.
•Pump seals	<ul style="list-style-type: none"> •Leaking V-Packings, Hi-Pressure or Lo-Pressure seals. 	<ul style="list-style-type: none"> •Install new seal kit. Increase frequency of service.
Premature seal failure	<ul style="list-style-type: none"> •Scored plungers. •Over pressure to inlet manifold. •Abrasive material in the liquid being pumped. •Excessive pressure and/or temperature of pumped liquid. •Running pump dry. •Starving pump of adequate liquid. •Eroded manifold. 	<ul style="list-style-type: none"> •Replace plungers. •Reduce inlet pressure per specifications. •Install proper filtration at pump inlet and clean regularly. •Check pressure and inlet liquid temperature. •DO NOT RUN PUMP WITHOUT LIQUID. •Increase hose one size larger than inlet port size. Pressurize and install C.A.T. •Replace manifold. Check liquid compatibility.

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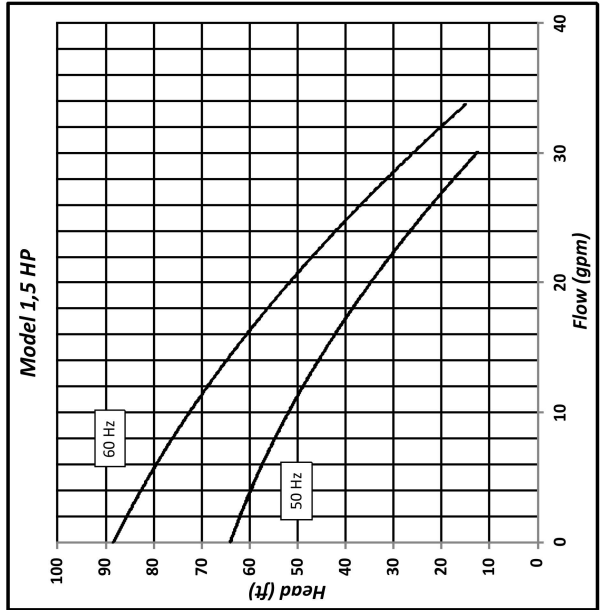
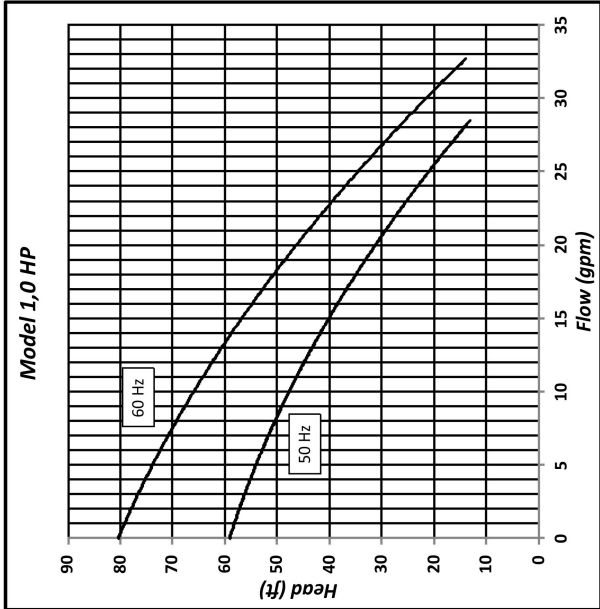
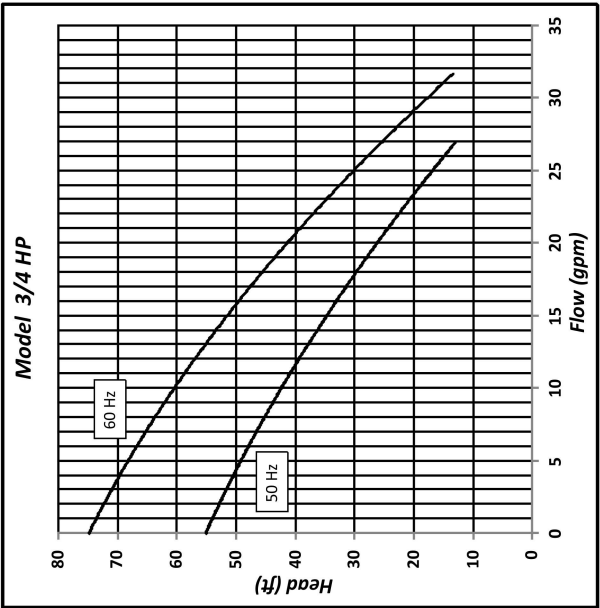
BOOSTER PUMP

SPECIFICATIONS																									
MODEL		60 Hz								50 Hz								Inlet - Outlet	Max. Liquid Temperature	Max. Internal Pressure	Protection				
		Max. Head		Max. Flow		ELECTRICAL				Max. Head		Max. Flow		ELECTRICAL								Pump Weight			
						V	A	P.F.	HP					kW	ft	m	gpm							lpm	V
MS-1024		74,8	22,8	31,7	120	115	8,40	0,99	3/4	0,56	55,1	16,8	26,9	102	115	8,10	0,92	3/4	0,56	15,2	6,9	1" NPT / 1" NPT	45°C / 113°F	150 kPa / 22 psi	IP 68
MS-2024					230	4,10	0,99								230	3,10	0,99								
MS-1025		80,4	24,5	32,8	124	115	9,00	0,98	1,0	0,75	59,1	18,0	28,5	108	115	8,80	0,90	1,0	0,75	16,8	7,6				
MS-2025						230	4,55	0,97							230	3,60	0,99								
MS-1026		88,3	26,9	33,8	128	115	9,60	0,98	1,5	1,12	64,0	19,5	30,1	114	115	8,50	0,92	1,5	1,12	18,5	8,4				
MS-2026						230	5,20	0,98							230	5,20	0,88								

Notes:

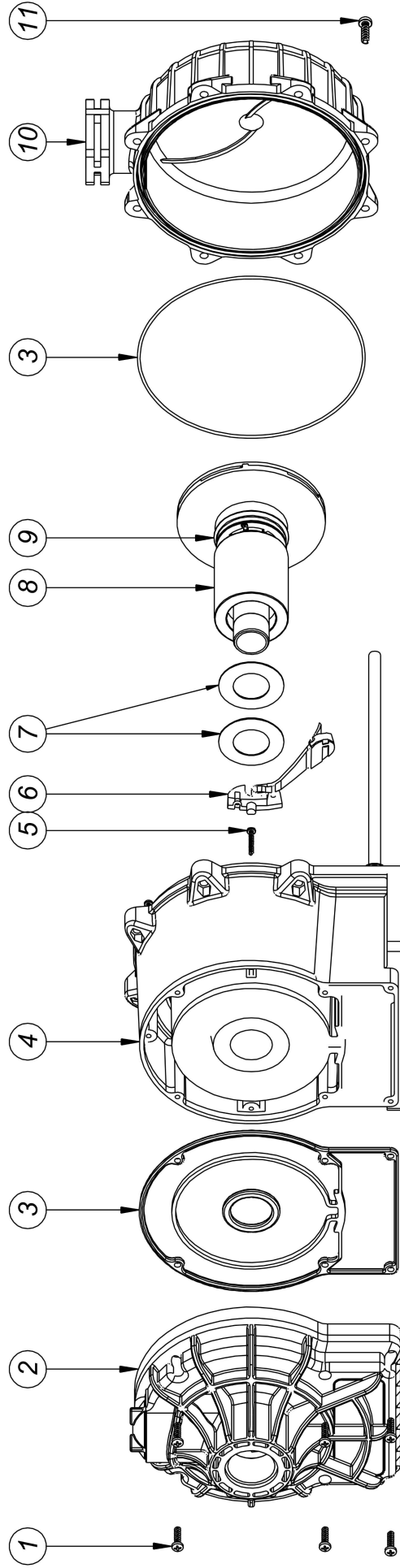
- (1) Motor pump with continuous operation.
- (2) All specifications may vary with different motors, this datas are a guideline only.

FLOW x HEAD CURVE



• This datas can be changed without prior advice.

PARTS LIST



#	DESCRIPTION	MATERIAL	SIZE (inches)	QTY.	PART #
1	Screw	Stainless	#0.157 x 0.630	6	3E4446P1A
2	Pump Inlet Housing Assembly	Polyamide	1 NPT	1	3D9756C4A
3	O'Ring	Nitrile Rubber		1	3D7868A
4	Motor with Encapsulant, Capacitor, Priming Circuit, Housing and Cord Assembly			N/A	Not Available
5	Screw	Stainless	#0.124 x 0.787	4	3E4451P1A
6	Mechanical Priming Sensor	Acetal Polyoxymethylene (POM)		1	3E4472C1A
7	Washer	Stainless		2	3E4353P2A
8	Impeller Assembly		
8-1	3/4 HP Impeller			...	3D9793C1A
8-2	1.0 HP Impeller			1	3D9793C2A
8-3	1.5 HP Impeller			1	3D9793C3A
9	Filter Gasket	Nitrile Rubber		1	3E5147A
10	Pump Outlet Housing	Polyamide	1 NPT	1	3D9794C3A
11	Screw	Stainless	#0.197 x 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



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.

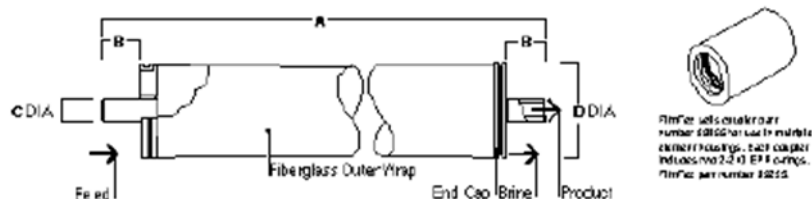
- DOW FILMTEC SW30 membrane elements have the highest flow rates available to meet the water demands of both sea-based and land-based desalinators.
- DOW FILMTEC SW30 elements may also be operated at lower pressure to reduce pump size, cost and operating expenses.
- Improved DOW FILMTEC seawater membrane 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

1. 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%.
2. Permeate flows for individual elements may vary +/-20%.
3. For the purpose of improvement, specifications may be updated periodically.

Figure 1



Product	Maximum Feed Flow Rate gpm (m³/h)	Dimensions – Inches (mm)			
		A	B	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. Refer to DOW FILMTEC Design Guidelines for multiple-element systems.
2. 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.

1 inch = 25.4 mm

Operating Limits

• Membrane Type	Polyamide Thin-Film Composite
• 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 ^a	2 - 11
• pH Range, Short-Term Cleaning ^b	1 - 13
• Maximum Feed Silt Density Index	SDI 5
• Free Chlorine Tolerance ^c	<0.1 ppm
^a Maximum temperature for continuous operation above pH 10 is 95°F (35°C).	
^b Refer to Cleaning Guidelines in specification sheet 609-23010.	
^c 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.

DOW FILMTEC™ Membranes
For more information about DOW FILMTEC membranes, call the Dow Water & Process Solutions business:
North America: 1-800-447-4369
Latin America: (+55) 11-5188-9222
Europe: (+32) 3-450-2240
Pacific: +60 3 7958 3392
Japan: +813 5460 2100
China: +86 21 2301 1000
www.dowwaterandprocess.com

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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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
Electrovanne à 2/2 et 3/2 voies



Operating Instructions
Bedienungsanleitung
Manuel d'utilisation



Bürkert Fluid Control Systems
Sales Center
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D-74653 Ingelfingen
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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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Operating Instructions 1402/04_EU-ML_00803047 / Original DE

www.burkert.com

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3	Basic safety instructions	4
4	System description	5
5	Technical data	6
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1 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.

 **DANGER!**

Immediate danger! Serious or fatal injuries.

 **WARNING!**

Possible danger! Serious or fatal injuries.

 **CAUTION!**

Danger! Moderate or minor injuries.

NOTE!

Warns of damage to property.



Important tips and recommendations.



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

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.

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.

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 work.
- ▶ 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.

4 SYSTEM DESCRIPTION**4.1 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
Type 0331	2/2 or 3/2-way solenoid valve, flange valve body
Type 0332	Bistable 2/2 or 3/2-way solenoid valve 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
Type 0125	2/2 or 3/2-way solenoid valve, flange valve body

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5 TECHNICAL DATA

! The following values are indicated on the type label:

- **Voltage** (tolerance $\pm 10\%$) / **current type**
- **Coil 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. $+50^{\circ}\text{C}$
Other types	max. $+55^{\circ}\text{C}$

Duty cycle

for body material

Brass or stainless steel	long-term operation, duty cycle 100%
Plastic	max. permissible duty cycle 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

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5.4 Mechanical data

Dimensions	see data sheet
Coil material	epoxide
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	
FKM	$0^{\circ}\text{C} - +90^{\circ}\text{C}$
EPDM	$-30^{\circ}\text{C} - +90^{\circ}\text{C}$
NBR	$0^{\circ}\text{C} - +80^{\circ}\text{C}$
FFKM	$+5^{\circ}\text{C} - +90^{\circ}\text{C}$

Circuit functions		
A (NC)		2/2-way valve, closed in rest position
B (NO)		2/2-way valve, open in rest position
C (NC)		3/2-way valve; closed in rest position, output A unloaded
D (NO)		3/2-way valve, in rest position, output B pressurized
E		3/2-way mixing valve; in rest position, pressure connection P2 connected to output A, P1 closed
F		3/2-way distribution valve, in rest position, pressure connection P connected to output B
T		3/2-way all purpose valve

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5.6 Electrical data

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

5.7 Type label

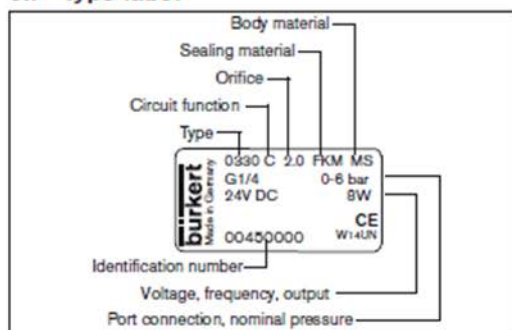


Fig. 1: Description of the type label (example)

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6.1 Before installation

Installation position:

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 ($\leq 500 \mu\text{m}$) 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.

6.3 Manual control

NOTE!

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

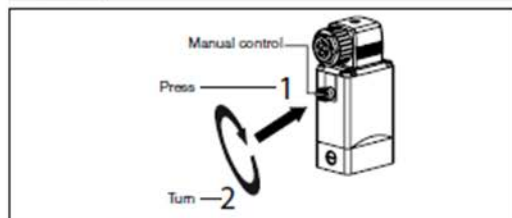


Fig. 2: Manual control

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6 ASSEMBLY

! 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 assembly.

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

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 self-tapping 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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7 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.

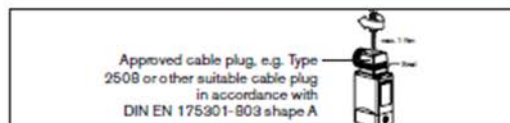


Fig. 3: Connecting the cable plug to the power supply

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

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).

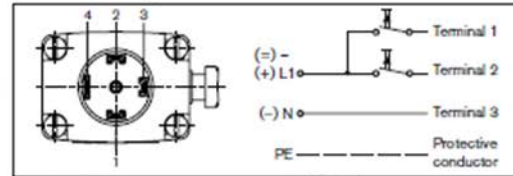


Fig. 4: Electrical connection - pulse model (CF 02)

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 two-pole 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.

9 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
Valve does not switch	Short circuit or coil interrupted
	Medium pressure outside the permitted 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

OWNER'S LIMITED WARRANTY

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.

OWNER'S LIMITED WARRANTY

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.

OWNER'S LIMITED WARRANTY

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.

OWNER'S LIMITED WARRANTY

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.

OWNER'S LIMITED 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.