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Sea Recovery's Reverse Osmosis Desalination Systems
are Type Accepted by the American Bureau of Shipping, ABS.



ABS

American Bureau of Shipping.

Safety, Service, Solutions

These three goals define the activities of ABS. They are the bedrock upon which the American Bureau of Shipping's commitment to set standards of excellence as one of the world's leading ship classification societies is founded.

From its inception in 1862, setting safety standards for the marine industry has been the core commitment of ABS. This is achieved through the establishment and application of technical standards, known as Rules, for the design, construction and operational maintenance of ships and other marine structures. Classification is a process that certifies adherence to these Rules.

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The ABS Type Approval program has existed in some form since 1983. Today it is formalized in the Rules. Two basic processes and certificates establish the validity of a product and all other certificates that may be issued in the program. The format imitates the format of the European Marine Equipment Directive (MED).

- Satisfactory evaluation of a product to a set of Rules or standards is recorded in the issue of a "Product Design Assessment (PDA)" certificate. The process is the same as would be followed for an ABS Design Review Letter. It imitates the Module B category of the MED.
- Satisfactory evaluation of the manufacturing (Works) facility to confirm their ability to consistently manufacture the product in accordance with the PDA is recorded in the issue of a "Manufacturing Assessment (MA)" certificate. This was previously known in ABS as the MMEC program. This imitates the modules D and E of the MED.

The IACS Ad-Hoc Committee for the Certification of Materials and Components have consensus that Type Approval requires; 1) an evaluation of the product including prototype tests (if necessary), 2) a witness of the manufacture of the product (type test), and 3) an assessment of the manufacturer's ability to consistently manufacture the product in accordance with the approved specifications. There are a multitude of derivations of this process; following is an abbreviated outline of the basic certificates:

A Type Approved Product has satisfied the processes of:

1. An Engineer's evaluation of a design to determine conformance with specifications. The manufacturer should submit sufficient information to allow ABS to determine if the product meets specification. This results in a Product Design Assessment Certificate (PDA).
2. Witnessing manufacture and testing of a type of the product to determine compliance with the specification
3. A Surveyor's evaluation of the manufacturing arrangements to confirm that the product can be consistently produced in accordance with the specification. This results in the issue of a Manufacturing Assessment Certificate

**Sea Recovery's Reverse Osmosis Desalination Systems
comply with FCC § 15.105**

United States Federal Communications Commission Compliance

FCC § 15.105

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

**Sea Recovery's Reverse Osmosis Desalination Systems
have been independently tested and determined to be in compliance
with European CE (Conformité Européenne)**



The CE Mark ('Trade Passport to Europe') is a visible declaration by the manufacturer (or his representative, importer, etc.) that the equipment which is marked complies with all the requirements of all the applicable directives. This mark allows manufacturers and exporters to circulate products freely within the 15 European Union (EU) members. Having ensured that the equipment does indeed meet all these requirements (including all the administrative requirements involved in being able to demonstrate compliance), the CE Mark may then be affixed and the product released.

The letters, "CE", indicate that the manufacturer has undertaken all assessment procedures required for the product. The CE mark indicates conformity to the legal requirements of the EU Directives.

The "CE" mark is now mandatory for regulated products sold in the European Union.

Sea Recovery Aqua Whisper II 450 - 1800 LIMITED WARRANTY

Sea Recovery warrants that the Sea Recovery Desalination System performs according to specifications for a period of twelve (12) months from the date of shipment. Sea Recovery's liability under this warranty is limited to repair or replacement of the Aqua Whisper II Desalination System at Sea Recovery's discretion. Under no circumstances is Sea Recovery liable for consequential damages arising out of or in any way connected with the failure of the system to perform as set forth herein. This limited warranty is in lieu of all other expressed or implied warranties, including those of merchantability and fitness for a particular purpose.

Warranty Period starts from the date of original shipment by Sea Recovery, or with proof of purchase from the date of sale to the original retail purchaser:

1. System and accessories: 1 (one) year
2. Repairs made by Sea Recovery after the original warranty period has expired: 3 (three) months

Normal reoccurring user maintenance listed below is not covered by this or any Sea Recovery limited warranty:

1. Sea Strainer Element
2. Cartridge Filter Elements
3. Fuses
4. Centrifugal Pump Seal Assemblies
5. Instrument Calibration

This or any Sea Recovery limited warranty does not cover installation components not supplied by Sea Recovery.

Improper installation resulting in the Sea Recovery System or component failure or decline in performance is not covered by this or any Sea Recovery limited warranty.

The Sea Recovery Reverse Osmosis Membrane Element is guaranteed to be cleanable for a minimum of one year from date of shipment, providing cleaning periods are adhered to, and fouling is acid soluble metal hydroxides and calcium carbonates or alkaline soluble organic, inorganic substances and microbiological slimes. The Sea Recovery R.O. Membrane Element is not guaranteed against iron fouling (rust), chemical or petroleum products attack, extreme temperatures (over 120° F/under 32° F), drying out, or extreme pressures (over 1000 psig).

In the event of a defect, a malfunction, or failure specifically covered by this warranty and during the warranty period, Sea Recovery will repair or replace, at its option, the product or component therein which upon examination by Sea Recovery appears to be defective.

To obtain warranty service, the defective product or part must be returned to an authorized Sea Recovery Service Center or direct to Sea Recovery. An updated listing of Sea Recovery Factory Service Centers can be found on the Sea Recovery web site at <http://www.searecovery.com>. The purchaser must pay any transportation or labor expenses incurred in removing and returning the product to the service center or to Sea Recovery.

The limited warranty does not extend to any system or system component which has been subjected to alteration, misuse, neglect, accident, improper installation, inadequate or improper repair or maintenance or subject to use in violation of instructions furnished by Sea Recovery, nor does the warranty extend to components on which the serial number has been removed, defaced, or changed.

Sea Recovery reserves the right to make changes or improvements in its product, during subsequent production, without incurring the obligation to incorporate such changes or improvements on previously manufactured equipment.

The implied warranties, which the law imposes on the sale of this product, are expressly LIMITED in duration to the time period above. Sea Recovery shall not be liable for damages, consequential or otherwise, resulting from the installation, use, and/or operation of this product or from the breach of this LIMITED WARRANTY.

CAUTION: Use of non Sea Recovery supplied parts and accessories, including but not limited to, maintenance parts, pre-filter elements, cleaning and storage chemical, spare parts, replacement parts, system components, installation components and/or system accessories, shall void all warranty expressed or implied.

Sea Recovery Corporation
P.O. Box 5288
Carson, California 90745-5288 U.S.A.

Tel: 1-310-637-3400 • Fax: 1-310-637-3430
e-mail: srccsales@searecovery.com • Web: <http://www.searecovery.com>

Sea Recovery®

Aqua Whisper II™ 450 - 1800
System Warranty Registration

INSTRUCTIONS: At the time of purchase of the Sea Recovery Reverse Osmosis water maker, please complete the warranty information listed below. After completing this form, please make a copy, and mail it to the address provided at the bottom of this form.

System Information: Aqua Whisper II 450 - 1800

Model Number:

Aqua Whisper II ____ 450-1; ____ 700-1, ____ 900-1; ____ 900-2; ____ 1400-2; ____ 1800-2

Model Style: ____ Compact; ____ Modular

Serial Number: _____

Operating Voltage:

Single Phase: ____ 110/115 VAC or ____ 220/230 VAC Cycles: ____ 50 Hz or ____ 60 Hz

Three Phase: ____ 220 VAC; ____ 380 VAC; ____ 415 VAC; or ____ 460 VAC Cycles: ____ 50 Hz or ____ 60 Hz

Date Purchased: _____

Date Commissioned: _____ (First tested or operated)

Dealer Information:

Dealer's Name: _____

Address: _____

City: _____ **State:** _____

Country: _____ **Postal Code:** _____

Dealer's Invoice Number: _____

Customer Information:

Customer's Name: _____

Address: _____

City: _____ **State:** _____

Country: _____ **Postal Code:** _____

Telephone Number: _____ **E-Mail Address:** _____

If Vessel Installation:

Boat's Manufacture: _____

Boat's Model: _____, **Length:** _____ Feet or _____ Meters.

Boat's Name: _____

Mail a copy to:

Sea Recovery Corporation

P.O. Box 5288

Carson, California 90745-5288 U.S.A.

Attention: Warranty Registration

Tel: 1-310-637-3400 • Fax: 1-310-637-3430

e-mail: srcsales@searecovery.com • Web: <http://www.searecovery.com>

[illegible]

Mail a copy to:
Sea Recovery Corporation
P.O. Box 5288
Carson, California 90745-5288 U.S.A.
Attention: Warranty Registration

Sea Recovery®
Aqua Whisper II™ 450 - 1800
System Identification Information

INSTRUCTIONS: It is important that this form is completely filled in by the owner at the time of purchase of the Sea Recovery Reverse Osmosis Desalinators. Retain this information in this Owner's Manual. This information will be requested by our Service Department and Parts Order Desk whenever contacting Sea Recovery for technical assistance or by the Sales Department whenever ordering parts.

System Information: Aqua Whisper II 450 - 1800

Model Number:

Aqua Whisper II ____ 450-1; ____ 700-1, ____ 900-1; ____ 900-2; ____ 1400-2; ____ 1800-2

Model Style: ____ Compact; ____ Vertical; ____ Modular

Serial Number: _____

Operating Voltage:

Single Phase: ____ 110/115 VAC or ____ 220/230 VAC Cycles: ____ 50 Hz or ____ 60 Hz

Three Phase: ____ 220 VAC; ____ 380 VAC; ____ 415 VAC; or ____ 460 VAC Cycles: ____ 50 Hz or ____ 60 Hz

Date Purchased: _____

Date Commissioned: _____ (First tested or operated)

Dealer Information:

Dealer's Name: _____

Address: _____

City: _____ State: _____

Country: _____ Postal Code: _____

Telephone Number: _____

Dealer's Invoice Number: _____

Sea Recovery Corporation
P.O. Box 5288
Carson, California 90745-5288 U.S.A.
Tel: 1-310-637-3400 • Fax: 1-310-637-3430
e-mail: srcsales@searecovery.com
Web: <http://www.searecovery.com>

PREFACE

Thank you for your purchase of a Sea Recovery Aqua Whisper II Reverse Osmosis Desalination System. This manual contains instructions for the installation, operation, maintenance, and repair of the Sea Recovery Desalination System. This information is provided to ensure extended life and safe operation of your Sea Recovery system.

Please read this manual thoroughly before installation or operation, and keep it for future reference. A better understanding of the system ensures optimum performance and longer service life.

Sea Recovery's Reverse Osmosis Desalination Systems are designed and engineered to function as a complete working unit. Generally speaking, the performance of each component within the System is dependent on the component prior to it and governs the performance of all components after it. Proper performance of the system is thus dependent upon proper operation of every single component within the system.

The intent of this manual is to allow the operator to become familiar with each component within the Sea Recovery system. By understanding the function, importance, and normal operation of each component within each subsystem of the unit, the operator can readily diagnose minor problems, which if detected early are usually easily corrected. However, if left unattended, a problem in one component eventually affects the rest of the system and leads to further repairs.

The major documented causes of failures and problems are from the use of third party, non Sea Recovery, parts, from improper installation, and from improper operation:

The use of third party, non Sea Recovery, consumables, spares, and assemblies have, can, and will damage the Sea Recovery system and/or specific components within the system. Do not use parts, components, consumables, or assemblies from any source other than Sea Recovery. Use of third party, non Sea Recovery, components, consumables, or assemblies will void any and all warranty of the system and/or the effected component within the system.

Sea Recovery maintains inventory for immediate shipment and our Service Dealers throughout the world maintain stock of Sea Recovery parts. Always insist on Sea Recovery supplied parts for your system in order to avoid failures, eliminate problems, and maintain your Sea Recovery Warranty.

Follow the Installation Instructions within this Owner's Manual.

From time to time, Sea Recovery may make programming changes to the Control Logic (CONTROL VER).

Other physical production changes may also be made from time to time and are tracked by Sea Recovery through the System Serial Number.

Troubleshooting and repair methods and results can vary depending on the System Serial Number and the specific pre or post filtration options installed in the System.

When requesting assistance from Sea Recovery or one of Sea Recovery's service dealers, you must inform us of your specific System Model Number and Serial Number. This allows us to look up your particular System's test records and expedites our ability to assist you. If we are given a wrong model number or wrong serial number this will lead to frustration for you, wrong troubleshooting information from us, and failure to diagnose or correct the problem. Additionally, in order for us to expedite troubleshooting and assist you accurately, we must know all optional equipment installed in the System.

ALWAYS PROVIDE THE FOLLOWING INFORMATION:

SYSTEM MODEL: AOUA WHISPER II

SERIES: COMPACT FRAME OR MODULAR

SPECIFIC CAPACITY: SINGLE R.O. MEMBRANE VESSEL: 450 GPD: 700 GPD: 900 GPD

DOUBLE R.O. MEMBRANE VESSEL: 900 GPD: 1400 GPD: 1800 GPD

OPERATING VOLTAGE CYCLES AND PHASE: **VAC.** **HZ.** **SINGLE OR THREE PHASE**

LIST OF INSTALLED PREFILTRATION AND POST FILTRATION OPTIONS:

INLINE VACUUM/PRESSURE GAUGE [4]:	___ YES	___ NO
INLINE VACUUM/PRESSURE GAUGE [6]:	___ YES	___ NO
INLINE VACUUM/PRESSURE GAUGE [8]:	___ YES	___ NO
INLINE VACUUM/PRESSURE GAUGE [11]:	___ YES	___ NO
INLINE VACUUM/PRESSURE GAUGE [15]:	___ YES	___ NO

SINGLE PLANKTON FILTER [9]:	___ YES	___ NO
DOUBLE PLANKTON FILTER [9]:	___ YES	___ NO
MULTI MEDIA FILTER [10]:	___ YES	___ NO
COMMERCIAL PREFILTER [12]:	___ YES	___ NO
OIL WATER SEPARATOR [16]:	___ YES	___ NO
DUAL 10 INCH PREFILTER [13 & 14]:	___ YES	___ NO

pH NEUTRALIZING FILTER [40]: ☐ YES ☐ NO
ULTRA VIOLET STERILIZER [41]: ☐ YES ☐ NO

REMOTE CONTROL [55]: ___ YES ___ NO
SOFT MOTOR STARTER [56]: ___ YES ___ NO

Notes:

SPECIFICATIONS

PERFORMANCE:

PRODUCT WATER PRODUCED PER HOUR AND PER DAY OF OPERATION:

(+15% at 800 psig / 56 BAR, 77°F / 25°C & 35,000 PPM TDS Feed Water Salinity)

Model Number	per 1 hour of operation:		per 24 hours of operation:	
	U.S. Gallons / Liters		U.S. Gallons / Liters	
SRC Aqua Whisper II 450-1	18.8	71	450	1703
SRC Aqua Whisper II 700-1	29.2	110.4	700	2650
SRC Aqua Whisper II 900-1	37.5	142	900	3407
SRC Aqua Whisper II 900-2	37.5	142	900	3407
SRC Aqua Whisper II 1400-2	58.3	220.8	1400	5300
SRC Aqua Whisper II 1800-2	75	283.9	1800	6814

SALT REJECTION (CHLORIDE ION): 99.4%

PRODUCT WATER TEMPERATURE: Ambient to feed water temperature

SPECIFICATIONS:

SALINITY MONITORING: Automatic computer controlled electronic monitoring. The salinity monitoring components of the system give a continuous readout in micromhos per cubic centimeter, are temperature compensated and of a fail-safe design.

SALINITY RANGE OF FEED WATER:

Seawater up to 50,000 PPM TDS (NaCl) (typical seawater salinity is 35,000 PPM)

TEMPERATURE RANGE: Max. 122°F / 50°C, Min. 33°F / .5°C

SYSTEM FEED WATER:

	Alternating Current 50 Hz	Alternating Current 60 Hz
Feed Water Flow Per Minute:	3.75 U.S. Gallons / 14.2 Liters	4.5 U.S. Gallons / 17 Liters
Feed Water Flow Per Hour:	225 U.S. Gallons / 852 Liters	270 U.S. Gallons / 1,022 Liters

REVERSE OSMOSIS MEMBRANE:

TYPE: Specifically selected High Rejection / High Yield aromatic tri-polyamide, thin film composite, spiral wound, single pass reverse osmosis membrane element.

CHLORINE TOLERANCE: 0.1 PPM.

pH RANGE: 3-11 (typical seawater pH is 8)

SYSTEM PRESSURE:

FEED WATER: Minimum 6 psi / .42 Kg/cm² / 41.4 kPa Maximum 40 psi / 2.8 Kg/cm² / 275.8 kPa

OPERATION: Seawater @ 35,000 PPM & 77° F / 25 C: Nominal 800 psi / 56.25 Kg/cm² / 5516 kPa

EXTERNAL INSTALLATION WATER CONNECTIONS:

Pipe sizes to be supplied by the installer for connection of the Sea Recovery supplied components

Aqua Whisper II

Feed Inlet:	3/4" MNPT Male National Pipe Thread U.S. Standard
Brine Discharge	3/4" MNPT Male National Pipe Thread U.S. Standard
Product	1/2" FNPT Female National Pipe Thread U.S. Standard

WEIGHT:**MODEL**

	Compact Style	Modular Style
Aqua Whisper II 450-1	147 lbs / 67 kg	113 lbs / 51 kg
Aqua Whisper II 700-1	150 lbs / 68 kg	116 lbs / 53 kg
Aqua Whisper II 900-1	153 lbs / 69 kg	119 lbs / 54 kg
Aqua Whisper II 900-2	159 lbs / 72 kg	125 lbs / 57 kg
Aqua Whisper II 1400-2	165 lbs / 75 kg	131 lbs / 59 kg
Aqua Whisper II 1800-2	170 lbs / 77 kg	136 lbs / 62 kg

ELECTRICAL MOTOR SPECIFICATIONS:

(H.P. = Horse Power; RPM = Revolutions Per Minute; FLA = Full Load Amperes; LRA = Locked Rotor Amperes @ Start Up)

ALTERNATING CURRENT SYSTEMS:**Single Phase Alternating Current:**

VAC	Hz	High Pressure Pump Motor				Booster Pump Motor			
		H.P	RPM	FLA	LRA	H.P	RPM	FLA	LRA
110	50	3	2850	23	89	.5	2850	7.4	20
220	50	3	2850	11.5	44	.5	2850	3.7	10
115	60	3	3450	25.4	86	.5	3450	9.4	20
230	60	3	3450	12.7	43	.5	3450	4.7	10

Three Phase Alternating Current:

VAC	Hz	High Pressure Pump Motor				Booster Pump Motor			
		H.P	RPM	FLA	LRA	H.P	RPM	FLA	LRA
220	50	2.5	2850	7.9	24.9	.5	2850	2.5	8.2
380	50	2.5	2850	4.6	14.4	.5	2850	1.5	4.7
230	60	3	3450	7.6	23.8	.5	3450	2.4	7.9
460	60	3	3450	3.8	11.9	.5	3450	1.2	3.9

RECOMMENDED CIRCUIT BREAKER SUPPLYING POWER TO SYSTEM AMPERAGE RATING:

Operating AC Voltage	Phase	Recommended Circuit Breaker
110 - 115 VAC	Single	50 Ampere
220 - 230 VAC	Single	25 Ampere
220 VAC	Three	15 Ampere
380 VAC	Three	10 Ampere
460 VAC	Three	10 Ampere

RECOMMENDED POWER WIRE SIZE TO Aqua Whisper II SYSTEM:

Operating Voltage	Phase	Maximum Load	Recommended Minimum Wire Size for Length of run		
			10 Ft / 3 meter	25 Ft / 8 meter	50 Ft / 15 meter
110-115 VAC	Single	34.8 Ampere	10 AWG / 6 mm ²	8 AWG / 10 mm ²	8 AWG / 10 mm ²
220-230 VAC	Single	17.4 Ampere	12 AWG / 4 mm ²	12 AWG / 4 mm ²	12 AWG / 4 mm ²
220-230 VAC	Three	10.4 Ampere	14 AWG / 2.5 mm ²	14 AWG / 2.5 mm ²	14 AWG / 2.5 mm ²
380 VAC	Three	6.1 Ampere	14 AWG / 2.5 mm ²	14 AWG / 2.5 mm ²	14 AWG / 2.5 mm ²
460 VAC	Three	5 Ampere	14 AWG / 2.5 mm ²	14 AWG / 2.5 mm ²	14 AWG / 2.5 mm ²

RECOMMENDED POWER WIRE SIZE TO Aqua Whisper II BOOSTER PUMP:

Operating Voltage	Phase	Maximum Load	Recommended Minimum Wire Size for Length of run		
			10 Ft / 3 meter	25 Ft / 8 meter	50 Ft / 15 meter
110-115 VAC	Single	9.4 Ampere	14 AWG / 2.5 mm ²	14 AWG / 2.5 mm ²	14 AWG / 2.5 mm ²
220-230 VAC	Single	4.7 Ampere	14 AWG / 2.5 mm ²	14 AWG / 2.5 mm ²	14 AWG / 2.5 mm ²
220-230 VAC	Three	2.5 Ampere	16 AWG / 1.5 mm ²	16 AWG / 1.5 mm ²	16 AWG / 1.5 mm ²
380 VAC	Three	1.5 Ampere	16 AWG / 1.5 mm ²	16 AWG / 1.5 mm ²	16 AWG / 1.5 mm ²
460 VAC	Three	1.2 Ampere	16 AWG / 1.5 mm ²	16 AWG / 1.5 mm ²	16 AWG / 1.5 mm ²

RECOMMENDED POWER WIRE SIZE TO Aqua Whisper II HIGH PRESSURE PUMP:

Operating Voltage	Phase	Maximum Load	Recommended Minimum Wire Size for Length of run		
			10 Ft / 3 meter	25 Ft / 8 meter	50 Ft / 15 meter
110-115 VAC	Single	25.5 Ampere	12 AWG / 4 mm ²	10 AWG / 6 mm ²	10 AWG / 6 mm ²
220-230 VAC	Single	12.7 Ampere	14 AWG / 2.5 mm ²	12 AWG / 4 mm ²	12 AWG / 4 mm ²
220-230 VAC	Three	7.9 Ampere	14 AWG / 2.5 mm ²	14 AWG / 2.5 mm ²	14 AWG / 2.5 mm ²
380 VAC	Three	4.6 Ampere	14 AWG / 2.5 mm ²	14 AWG / 2.5 mm ²	14 AWG / 2.5 mm ²
460 VAC	Three	3.8 Ampere	14 AWG / 2.5 mm ²	14 AWG / 2.5 mm ²	14 AWG / 2.5 mm ²

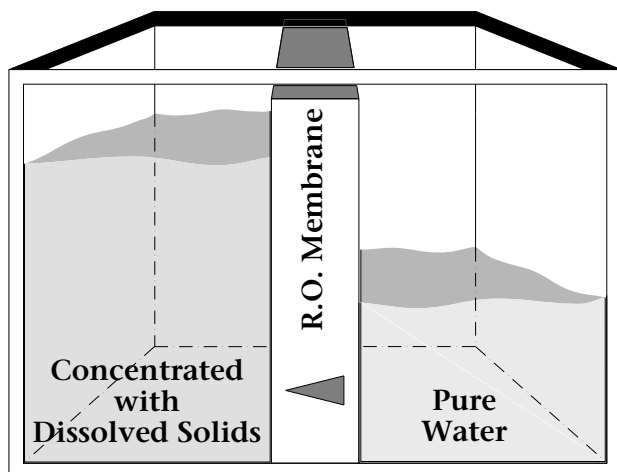
Section 1

Introduction & Component Descriptions

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Sea Recovery's Approach to Water Desalination:

The Challenge:

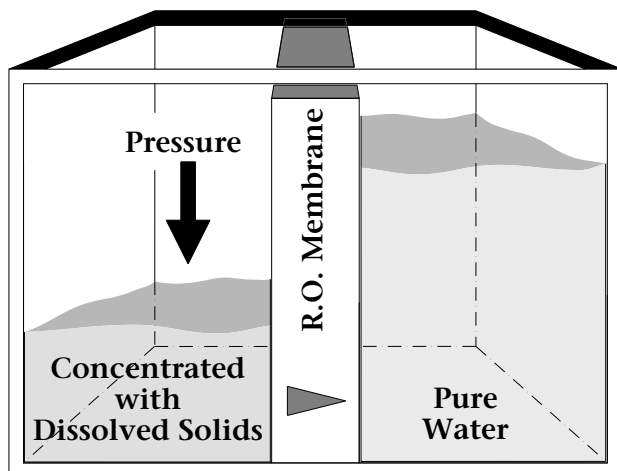


Osmosis is the diffusion of two mixable solutions through a semi permeable membrane in such a manner as to equalize their concentration. This diffusion occurs by allowing a lesser concentration, potable water, to naturally diffuse through a semi permeable membrane into a higher concentration, sea or brackish water.

Sea water or brackish water is a high concentration solution. Potable water is a low concentration solution.

Therefore, sea water or brackish water cannot naturally diffuse through a semi permeable membrane to provide potable, drinking water.

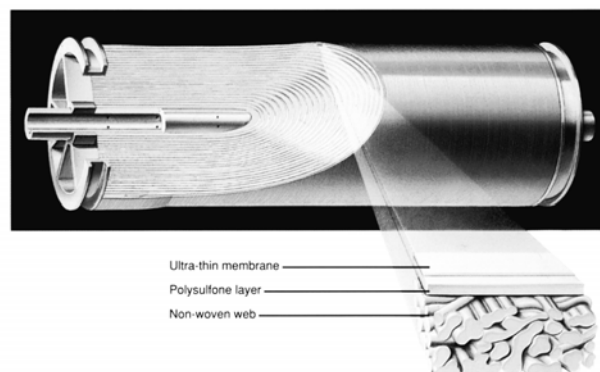
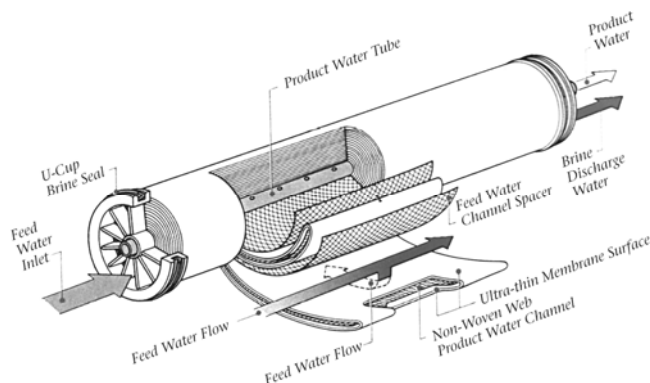
The Solution:



Reverse Osmosis, overcomes this natural phenomenon. By forcing sea or brackish water at high pressure through a semi permeable membrane potable water is realized. Reverse Osmosis Desalination Systems by Sea Recovery make possible the once impossible, potable water from undrinkable water sources.

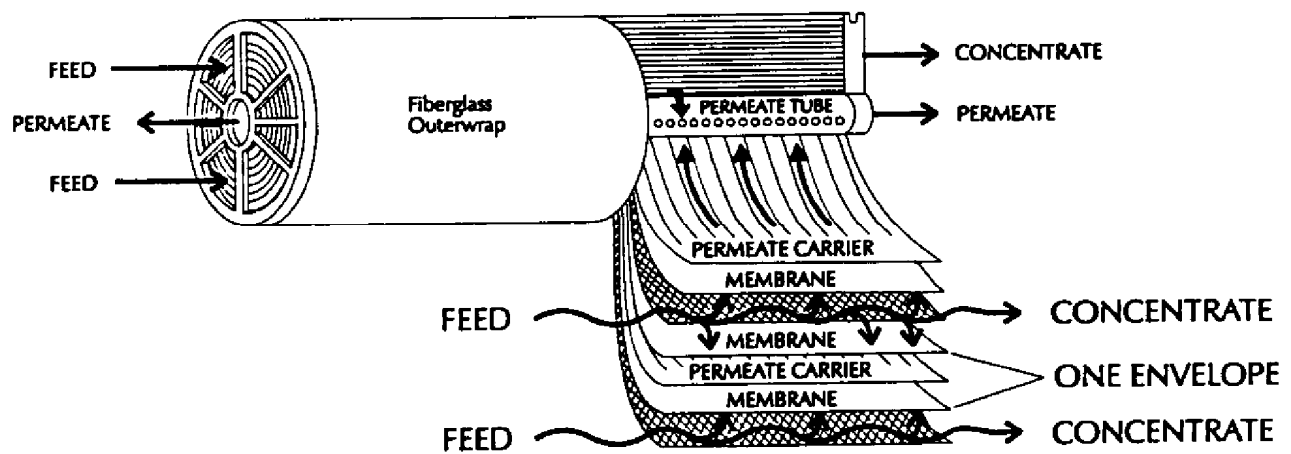
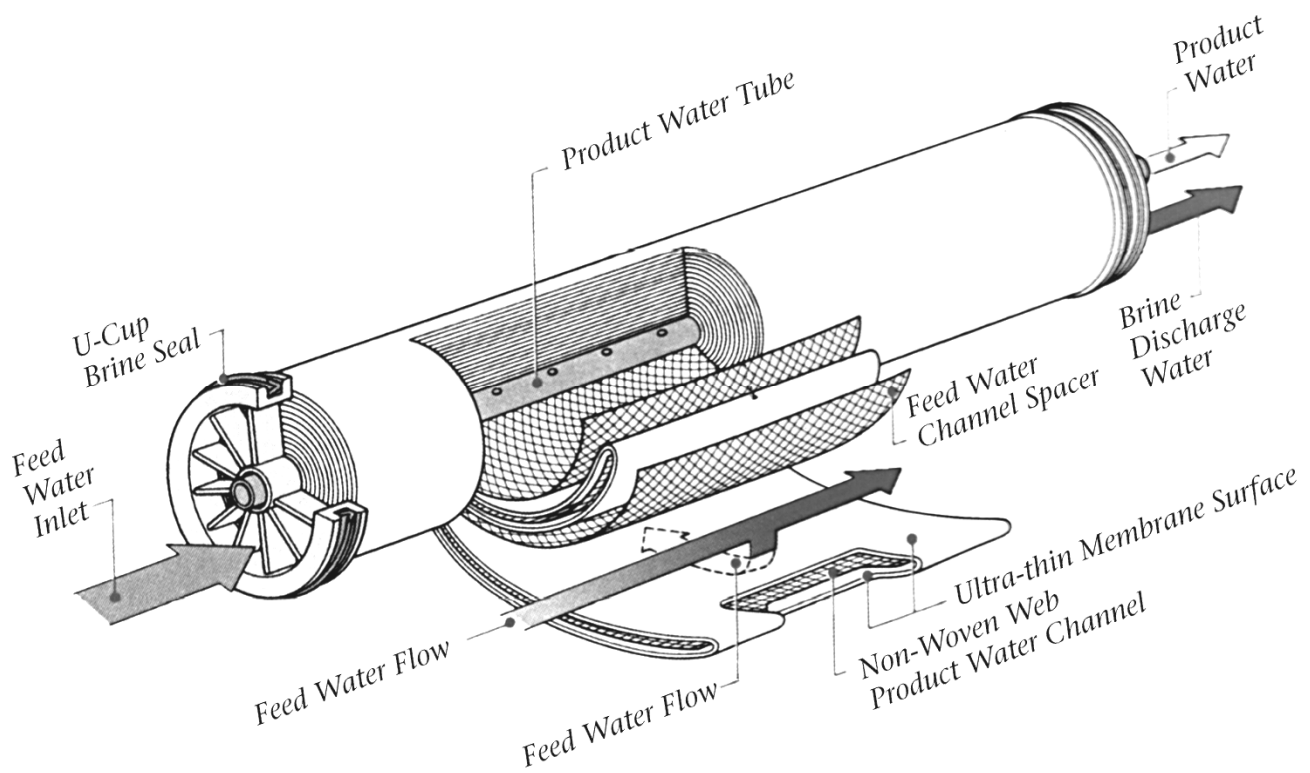
SPIRAL-WOUND REVERSE OSMOSIS MEMBRANE

ELEMENT: (larger illustration on the following page)



The spiral-wound membrane consists of one or more membrane envelopes each formed by enclosing a channelized product water carrying material between two large flat membrane sheets. The membrane envelope is sealed on three edges with a special adhesive and attached with the adhesive to a small diameter pipe to form a cylinder. A polypropylene screen is used to form the feed water channel between the membrane envelopes. A wrap is applied to the membrane element to maintain the cylindrical configuration. The center tube is also the permeate (product water) collecting channel. Several elements may be connected in series within a single or multiple pressure vessel(s).

ANATOMY OF A SPIRAL-WOUND REVERSE OSMOSIS MEMBRANE ELEMENT



1. INTRODUCTION

COMPONENT DESCRIPTIONS

All components supplied by Sea Recovery, both standard and optional, are described in this section along with items required or desired by the installer. The location, operation, and purpose of each major component are briefly explained in this section.

The descriptions in this section are listed according to the ID numbers each component is assigned in the System Piping and Interconnect Diagrams throughout this Owner's Manual such as the illustration on the following page.

The ID numbers follow the component's descriptive name and are shown in brackets. i.e., "Sea Strainer [4]".

** Indicates items supplied by installer

*** Indicates optional equipment.

Throughout this Owners Manual cautions are given to the technician, operator, and owner to ensure that you use only Sea Recovery supplied components, consumables, spares, and replacement parts. Since 1981, Sea Recovery has shipped over 10,000 R.O. Systems, and most of them are still in use today. Of all the reported problems that we help our customers with, the majority are problems caused by using third party replacement parts and consumables. Use of third party, Non Sea Recovery, components will lead to premature failure, added operating and maintenance costs, and increased labor. Using 3rd party, Non Sea Recovery, components will void any and all Sea Recovery Warranty. We only wish to help you enjoy the luxury of owning a Sea Recovery R.O. System. Treat it properly by using only Sea Recovery supplied parts, consumables, and accessories.

I.D. of Components & Options

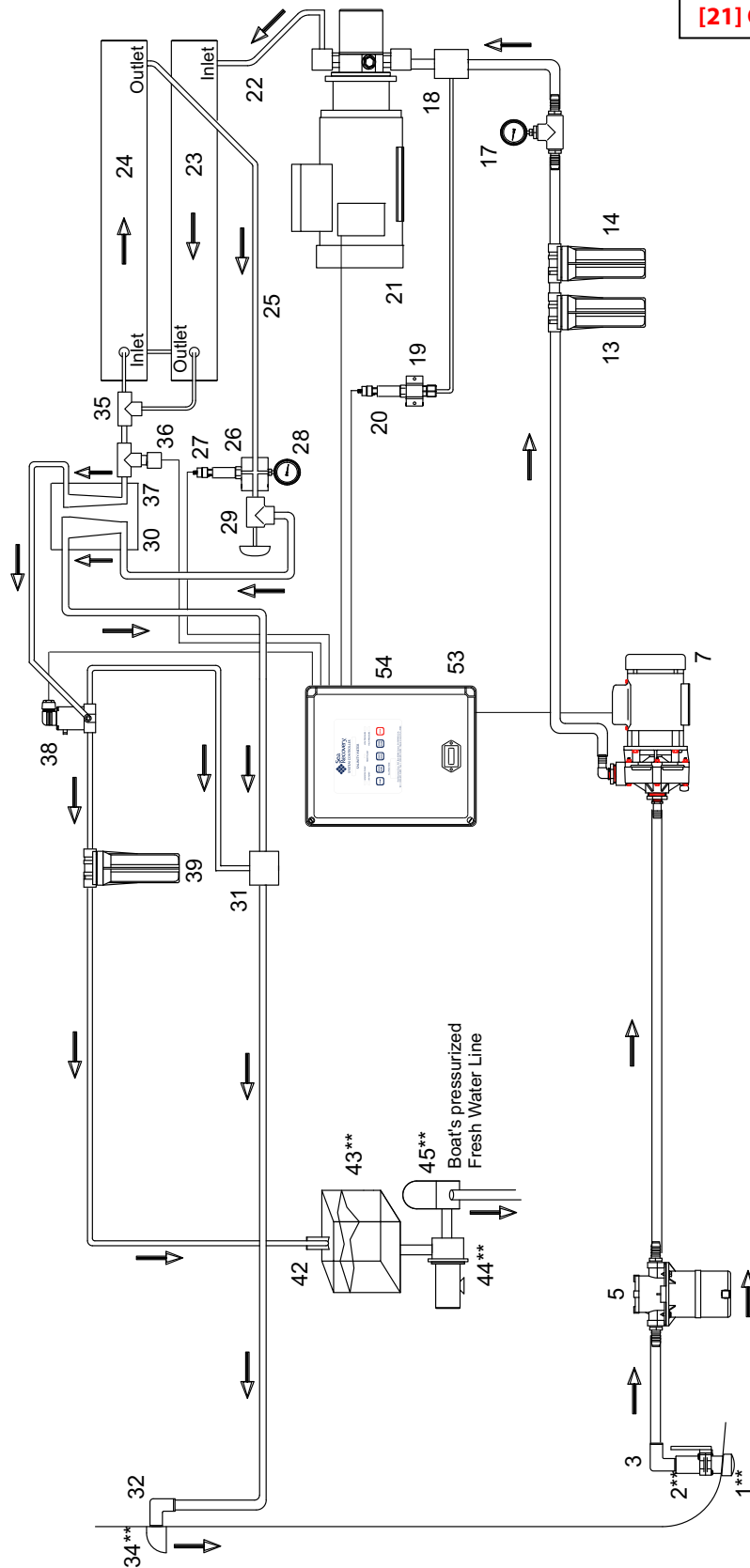
** Installer or Owner supplied

*** Optional Accessory

1. Inlet Thru Hull **
2. Sea Cock Valve **
3. Inlet Connection
4. Inline Pressure Gauge ***
5. Sea Strainer
6. Inline Pressure Gauge ***
7. Booster Pump
8. Inline Pressure Gauge ***

9. Plankton Filter ***
10. Multi-Media Filter ***
11. Inline Pressure Gauge ***
12. Commercial Prefilter
13. 25 Micron 10" Prefilter
14. 5 Micron 10" prefilter
15. Inline Pressure Gauge ***
16. Oil Water Separator
17. Inline Pressure Gauge
18. T-Connector Pressure Pick-up
19. Low Pressure Manifold
20. Low Pressure Transducer
21. High Pressure Pump & Motor
22. High Pressure Hose
23. Membrane & Vessel #1
24. Membrane & Vessel #2
25. High Pressure Hose
26. High Pressure Manifold
27. High Pressure Transducer
28. High Pressure Gauge
29. Back Pressure Regulator
30. Flow Meter - Brine Discharge
31. Discharge T-Connection
32. Brine Discharge Thru-Hull Connector
33. Multi Media Filter Waste Tee ***
34. Thru Hull Discharge Fitting
35. T-Connector Product Water
36. Salinity Probe
37. Flow Meter - Product Water
38. 3-way Diversion Valve
39. Charcoal Filter
40. pH Neutralizer ***
41. U.V. Sterilizer ***
42. Product Water Tank Connector
43. Potable Water Storage Tank **
44. Fresh Water Pressure Pump **
45. Air Entrainment Tank (Accumulator) **
46. Auto Fresh Water Flush Solenoid Valve ***
47. Auto Fresh Water Flush Check Valve ***
48. Auto Fresh Water Flush Charcoal Filter ***
49. Auto Fresh Water Flush Check Valve ***
50. Rinse Clean Inlet Valve ***
51. Rinse/Clean Outlet Valve ***
52. Rinse/Clean Container or Bucket **
53. Electrical Control Box
54. System Touch Pad
55. Remote Control Touch Pad ***
56. Soft Start ***

Aqua Whisper II Component Identification Diagram. Illustrated with no options.



**NOTE: Illustration shows
[21] Optional HP Pump.**

I.D. of Components & Options

1. Inlet Thru Hull **
2. Sea Cock Valve **
3. Inlet Connection
4. Not shown
5. Sea Strainer
6. Not shown
7. Booster Pump
8. Not shown
9. Not shown
10. Not shown
11. Not shown
12. Not shown
13. 25 Micron 10" Prefilter
14. 5 Micron 10" Prefilter

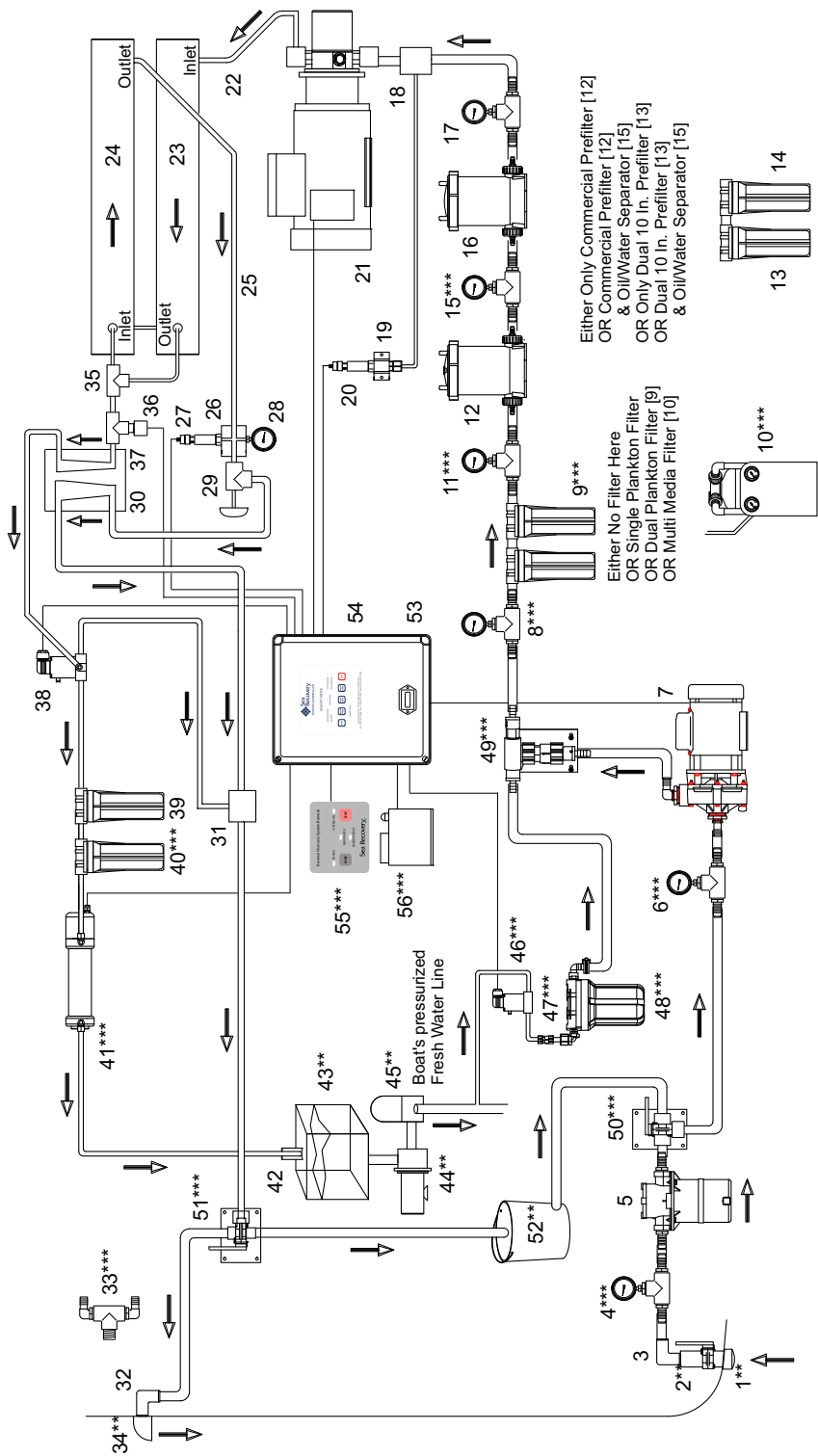
**** = Installer or Owner supplied**

15. Not shown
16. Not shown
17. Inline Pressure Gauge
18. T-Connector Pressure Pick-up
19. Low Pressure Manifold
20. Low Pressure Transducer
21. High Pressure Pump & Motor
22. High Pressure Hose
23. Membrane & Vessel #1
24. Membrane & Vessel #2
25. High Pressure Hose
26. High Pressure Manifold
27. High Pressure Transducer
28. High Pressure Gauge

***** = Optional Accessory**

29. Back Pressure Regulator
30. Flow Meter - Brine Discharge
31. Discharge T-Connection
32. Brine Discharge Connector
33. Not shown
34. Thru Hull Discharge Fitting
35. T-Connector Product Water
36. Salinity Probe
37. Flow Meter - Product Water
38. 3-way Diversion Valve
39. Charcoal Filter
40. Not shown
41. Not shown
42. Product Water Connector
43. Potable Water Storage Tank **
44. Fresh Water Pressure Pump **
45. Air Entrainment Tank (Accumulator) **
46. Not shown
47. Not shown
48. Not shown
49. Not shown
50. Not shown
51. Not shown
52. Not shown
53. Electrical Control Box
54. System Touch Pad
55. Not shown
56. Not shown

Aqua Whisper II Component Identification Diagram. Illustrated with "either / or" Prefiltration Options, all Post Filtration Options, the Rinse/Clean Valves, Remote Touch Pad, Soft Motor Starter, and Inline Pressure Gauges.



NOTE: Illustration shows [21] Optional HP Pump.

I.D. of Components & Options

- 1. Inlet Thru Hull **
- 2. Sea Cock Valve **
- 3. Inlet Connection
- 4. Inline Pressure Gauge ***
- 5. Sea Strainer
- 6. Inline Pressure Gauge ***
- 7. Booster Pump
- 8. Inline Pressure Gauge ***
- 9. Plankton Filter ***
- 10. Multi-Media Filter ***
- 11. Inline Pressure Gauge ***
- 12. Commercial Prefilter
- 13. 25 Micron 10" Prefilter
- 14. 5 Micron 10" Prefilter

** = Installer or Owner supplied

- 15. Inline Pressure Gauge ***
- 16. Oil Water Separator
- 17. Inline Pressure Gauge
- 18. T-Connector Pressure Pick-up
- 19. Low Pressure Manifold
- 20. Low Pressure Transducer
- 21. High Pressure Pump & Motor
- 22. High Pressure Hose
- 23. Membrane & Vessel #1
- 24. Membrane & Vessel #2
- 25. High Pressure Hose
- 26. High Pressure Manifold
- 27. High Pressure Transducer
- 28. High Pressure Gauge

*** = Optional Accessory

- 29. Back Pressure Regulator
- 30. Flow Meter - Brine Discharge
- 31. Discharge T-Connection
- 32. Brine Discharge Connector
- 33. Multi Media Filter Waste Tee ***
- 34. Thru Hull Discharge Fitting
- 35. T-Connector Product Water
- 36. Salinity Probe
- 37. Flow Meter - Product Water
- 38. 3-way Diversion Valve
- 39. Charcoal Filter
- 40. pH Neutralizer ***
- 41. U.V. Sterilizer ***
- 42. Product Water Connector

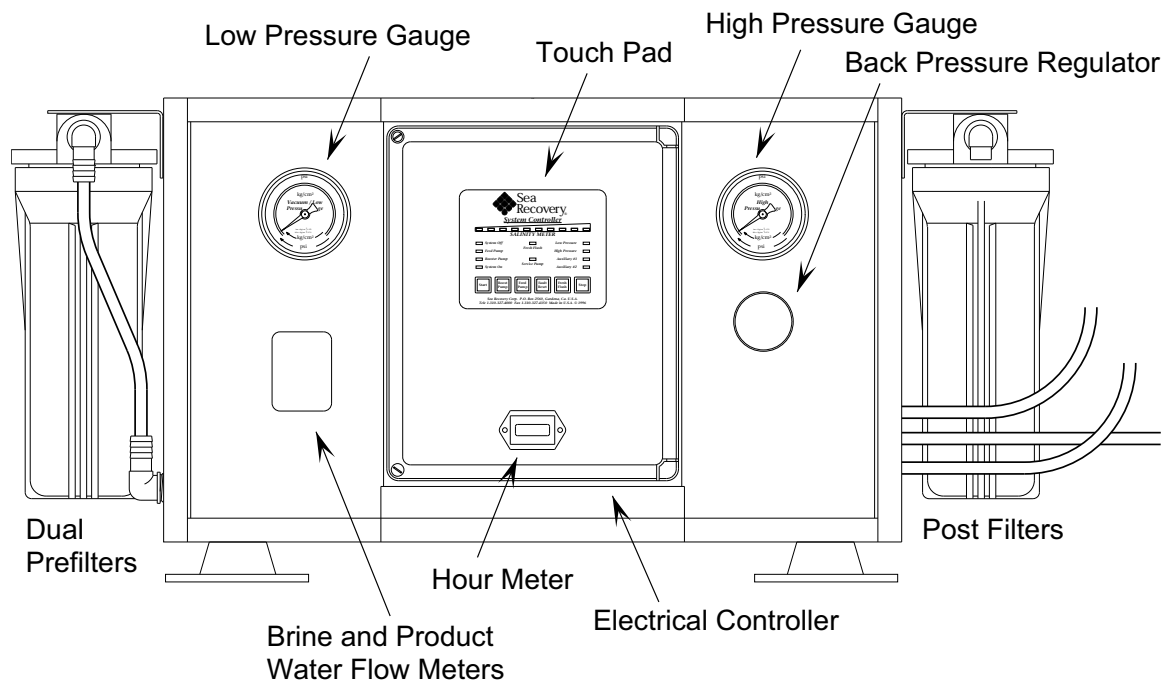
*** = Optional Accessory

- 43. Potable Water Storage Tank **
- 44. Fresh Water Pressure Pump **
- 45. Air Entrapment Tank (Accumulator) ***
- 46. Auto Fresh Water Flush Solenoid Valve ***
- 47. Auto Fresh Water Flush Check Valve ***
- 48. Auto Fresh Water Flush Charcoal Filter ***
- 49. Auto Fresh Water Flush Check Valve ***
- 50. Rinse Clean Inlet Valve ***
- 51. Rinse/Clean Outlet Valve ***
- 52. Rinse/Clean Container or Bucket **
- 53. Electrical Control Box
- 54. System Touch Pad
- 55. Remote Control Touch Pad ***
- 56. Soft Start ***

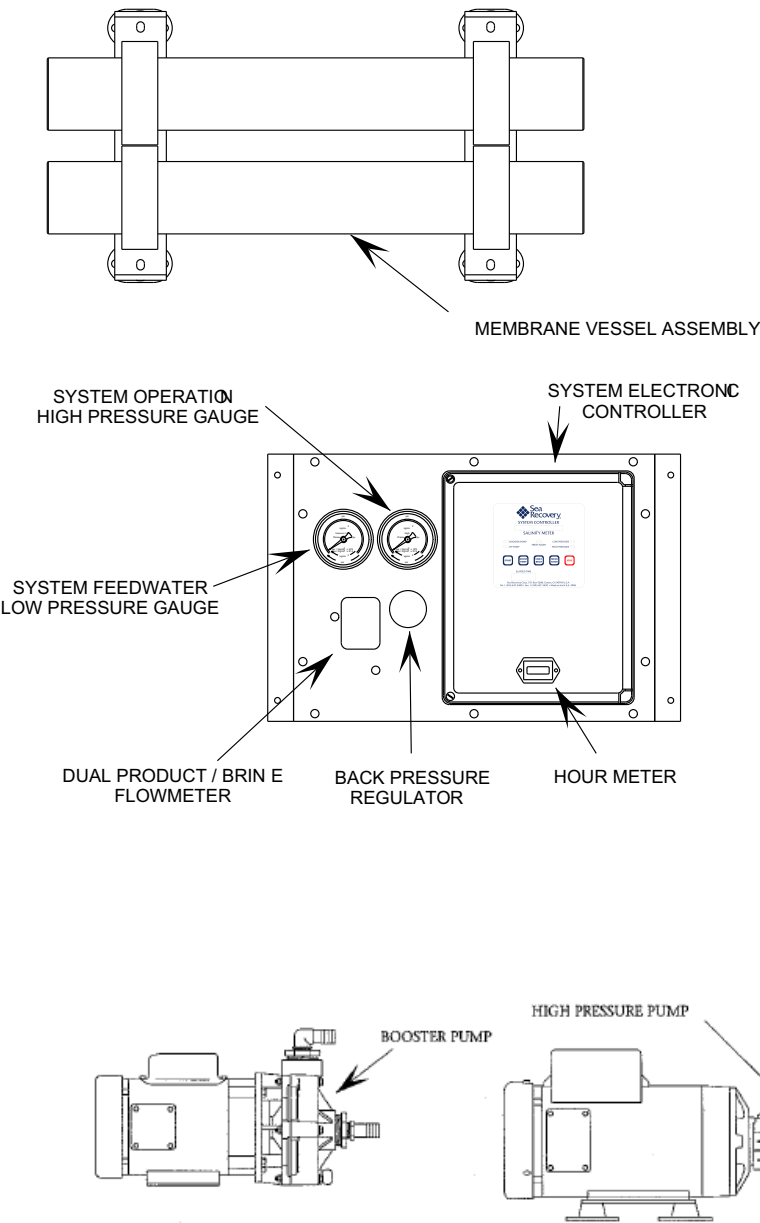
Either Only Commercial Prefilter [12]
OR Commercial Prefilter [15]
OR Only Dual 10 In. Prefilter [13]
OR Dual 10 In. Prefilter [13]
OR Multi Media Filter [15]

Either No Filter Here
OR Single Plankton Filter [9]
OR Dual Plankton Filter [10]

Aqua Whisper II Front View



Aqua Whisper II Modular Style
Components Identification



** = Installer or Owner supplied

*** = Optional Accessory

A. PREFILTRATION SECTION:

This section of the system filters and delivers the feed water into the system. The raw feed water is filtered to remove suspended solids larger than 5 Micron size (5/1,000,000 of a meter). The pre-filtration protects the High Pressure Pump from premature wear and the Reverse Osmosis Membrane Element from premature fouling.

1. Inlet Thru Hull Fitting with Forward Facing Scoop

** is the point at which the feed water enters the system. It is important that the installer utilizes a forward facing scoop so that the system receives a positive flow of water as the boat is under way.

CAUTION: A flat inlet thru-hull fitting will cause a vacuum as the boat is under way, and this will cause loss of feed water flow and cavitation of the feed water pump and high pressure pump resulting in continual system shut down due to low feed water flow and pressure. The resulting failure of the system to remain in operation is attributed to improper installation, is the liability of the installer, and is not covered by the Sea Recovery warranty.

CAUTION: If the thru-hull fitting is placed in a position on the underside of the hull that allows air to continually enter the thru-hull fitting, this will cause the system to continually shut down due to loss of feed water. The resulting failure of the system to remain in operation is attributed to improper installation, is the liability of the installer, and is not covered by the Sea Recovery warranty.

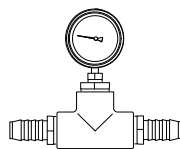
2. **Sea Cock Valve** ** is used in a ship installation for safety reasons to close the feed water line during repair, maintenance, and non-use of the system.

3. **Inlet Connector** is a 90° elbow with a hose barb fitting for attachment to the Sea Cock Valve.

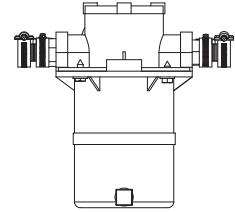


Inlet Connection

4. **Inline Vacuum/Pressure Gauge** *** allows the operator to easily monitor the condition of the inlet thru-hull fitting to determine if it has a blockage.



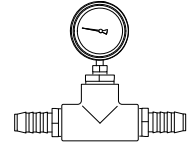
5. **Sea Strainer** has a clear bowl with bronze body filter housing containing a cleanable monel filter screen.



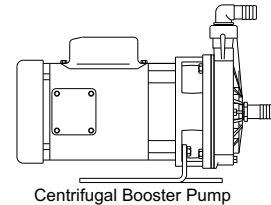
The Sea Strainer filters out large particulate matter and suspended particles that would otherwise damage the Booster Pump and prematurely foul the cartridge Prefilter Element.

6. Inline Vacuum/Pressure Gauge ***

allows the operator to easily monitor the condition of the Sea Strainer to determine if the mesh screen requires cleaning.



7. **Booster Pump** supplies a positive pressure to the Pre-filters and onward to the High Pressure Pump. The Booster Pump has a performance curve of 85 Ft Head (35 PSI) @ 60 Hz with a feed water flow of 4.5 GPM.

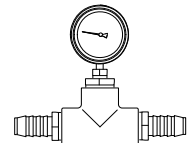


Centrifugal Booster Pump

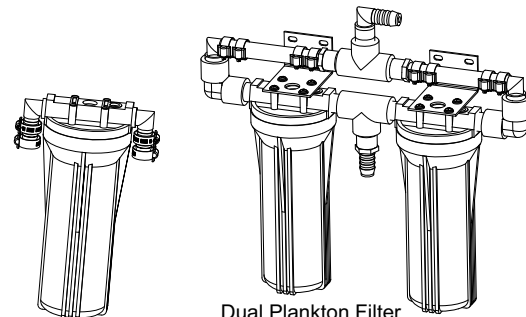
The resulting pressure at the High Pressure Pump depends on the final installation configuration and condition of Prefiltration elements.

8. Inline Vacuum/Pressure Gauge ***

allows the operator to easily monitor the condition of the Booster Pump outlet pressure to determine if the Booster Pump requires maintenance.



9. Plankton Filter ***



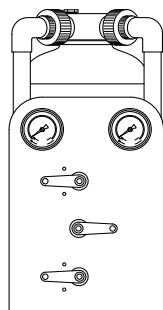
Single Plankton Filter

Dual Plankton Filter
Plumbed in Parallel

This optional filter assembly contains a cleanable ultra fine monel mesh screen. The mesh screen removes suspended solids or biological growth such as plankton. It also provides longer life to the Pre-filter Elements and in turn provides lower system

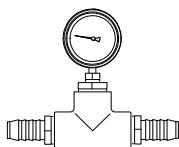
maintenance costs. The Plankton Filter is available as a single housing (shown to the left) or dual (double) housing (shown to the right).

10. **Multi Media Filter ***** This filter assembly contains a back-washable bed of sand and gravel. The sand traps suspended solids larger than 30 micron which provides longer life to the pleated cartridge prefilter elements minimizing maintenance intervals, maintenance labor, and filter element cost.



Multi Media Filter

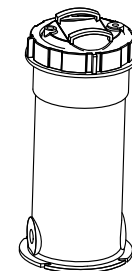
11. **Inline Pressure Gauge ***** allows the operator to easily monitor the condition of the Plankton Filter outlet pressure to determine if the Plankton Filter Mesh Screen(s) require cleaning.



PREFILTER ELEMENT WARNING: Do not use third party prefilter elements, use only Sea Recovery prefilter elements. Third party prefilter elements do not properly fit and the seams fall apart. They also allow by-pass resulting in extensive and very costly damage to the High Pressure Pump [19] as well as premature fouling of the R.O. Membrane Element(s) [22 & 23].

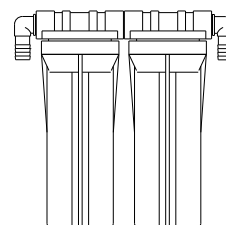
PREFILTER ELEMENT CAUTION: Do not use “string wound” or “fiber” prefilter elements. String wound and fiber filter elements are designed for the Photographic Film Developing Industry. When used in sea water, they will plug up rapidly in 1/10th or less the time of a Sea Recovery supplied prefilter cartridge element. This will cause frequent shut downs of the system and very frequent changing which will result in very high cost of maintenance, and user frustration.

12. **Commercial Prefilter ***** (no charge option) takes the place of the Dual Prefilter [13]. The 5 micron Commercial Prefilter cartridge element contains 37.5 square feet of filtering surface area. This oversize cartridge gives much longer filter element life greatly extending the time interval between required maintenance and reduces maintenance labor and prefilter element replacement cost. If installed, do not use Dual Prefilter [13&14].



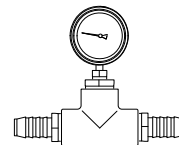
Commercial Prefilter

- 13 & 14. **Dual Prefilter** removes suspended solids in two stages. The feed water passes first through a 20 micron cartridge [13] then a 5 micron cartridge [14]. By stepping the filtration both prefilter elements gain longer life and require less maintenance labor and prefilter element replacement cost.

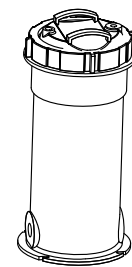


Dual 10 Inch Prefilter

15. **Inline Vacuum/Pressure Gauge ***** allows the operator to easily monitor the condition of the Prefilter element(s) to determine if it (they) require changing.

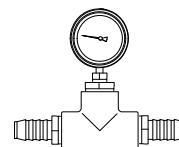


16. **Oil/Water Separator Filter ***** (no charge option) removes oil present in the feed water. **CAUTION:** Oil permanently destroys the R.O. Membrane element. It is recommended that the user avoid operating the Sea Recovery R.O. System in oil polluted waters if the Oil/Water Separator Filter is not installed.

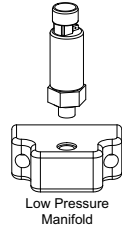
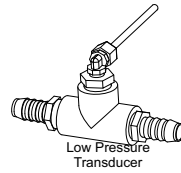
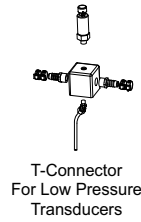


Oil/Water Separator

17. **Inline Vacuum/Pressure Gauge** allows the operator to monitor the condition of the Prefilter element(s) to determine if it (they) require changing.



18. **T-Connector Pressure Pick-up** (High Pressure Pump Inlet) for low pressure line pick up to the Low Pressure Transducer manifold [19] after all prefiltration and prior to the inlet of the High Pressure Pump [21]. The Compact Style System utilizes a block Tee as shown in the illustration top right, and the Modular Style System utilizes a fitting Tee as illustrated at the bottom right.



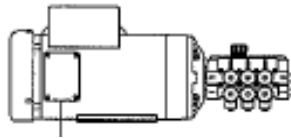
19. **Low Pressure Manifold** allows for attachment and mounting of the low pressure transducer [20].

20. **Low Pressure Transducer** measures line pressure after all prefiltration and prior to the inlet of the High Pressure Pump [21]

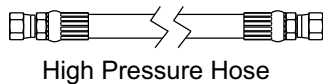
B. PRESSURIZATION SECTION:

Provides the necessary pressure to force the product water through the R.O. Membrane Element.

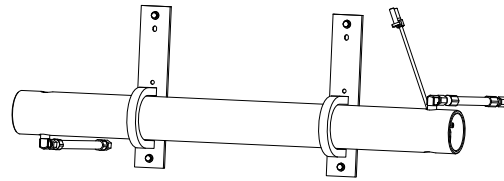
21. **High Pressure Pump & Motor Assembly** is a Radial Axial Positive Displacement Plunger Pump made of high grade Duplex material specifically designed for sea water Reverse Osmosis applications. The Pump is self lubricated and does not require oil. The Pump is connected to the attached electric motor with a flex coupler and safety bell housing.



22. **High Pressure Hose, HP Pump Outlet to R.O. Membrane & Vessel Assembly Inlet**, transfers pressurized sea water from the High Pressure Pump to the inlet of the R.O. Membrane Element.



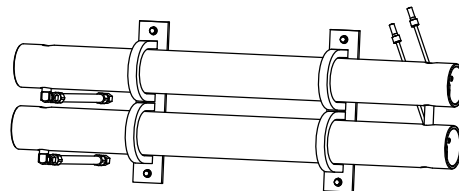
23. R.O. Membrane Element & Vessel #1



Single R.O. Membrane and Vessel Assembly

The Membrane Element allows potable water molecules to pass through while rejecting the salt ions. Only 7% to 28%, depending on specific model, of the Seawater Feed becomes fresh Product Water. The remainder carries the rejected salt ions out of the R.O. Membrane Element in a concentrated brine stream. The R.O. System may have one or two R.O. Membrane Element & Vessel in series depending on the specific model and system capacity.

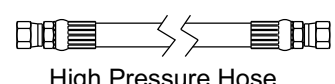
24. R.O. Membrane Element & Vessel #2



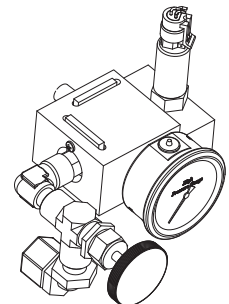
Double R.O. Membrane & Vessel Assembly

is connected in series with the first R.O. Membrane Element & Vessel. The Sea Recovery R.O. System will have either one or two R.O. Membrane Element & Vessel depending on exact model. The 2nd R.O. Membrane Element & Vessel may be added at any time to a system with only one. Adding the 2nd R.O. Membrane Element & Vessel will double the System's production.

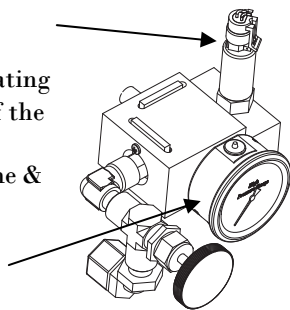
25. **High Pressure Hose R.O. Membrane Vessel Assembly** High Pressure Hose Outlet to High Pressure Manifold Inlet.



26. **High Pressure Manifold** connects the High Pressure Hose, High Pressure Transducer, High Pressure Gauge, and Back Pressure Regulator.

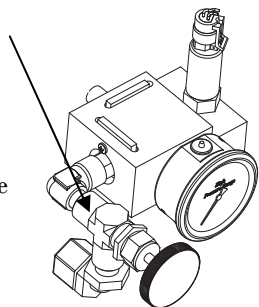


27. **High Pressure Transducer** measures the System Operating Pressure from the Outlet of the High Pressure Pump [21] through the R.O. Membrane & Vessel(s) [23 & 24].



28. **High Pressure Gauge** registers the System Operating Pressure applied to the R.O. Membrane Element(s).

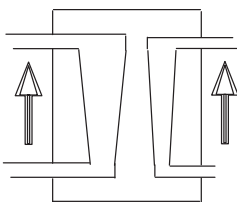
29. **Back Pressure Regulator** controls the operating pressure applied to the R.O. Membrane Element(s). The operator rotates the handle to increase or decrease system operating pressure to gain specified performance.



C. BRINE DISCHARGE SECTION:

This section of the System carries the Brine Discharge water, exiting from the R.O. Membrane Element, back to the feed source.

30. **Brine Discharge Flow Meter** (positioned on the left) measures the brine water rate of flow from the R.O. Membrane Element in gallons or liters per hour. By adding the amount of Product Water flow to the Brine Discharge Flow the operator is able to determine the total Feed Water Flow.



31. **Brine Discharge T Connector** collects the brine discharge water and unpotable product water.

32. **Brine Discharge Connector** attaches to the over board thru-hull fitting for connecting the brine discharge hose. When the Multi Media Filter is installed this Brine Discharge Connector is replaced with a Multi Media Filter Waste "T" ** [33]



33. **Multi Media Filter Waste "T" ***** is included with the Multi Media Filter. This waste T is installed in line at the Brine Discharge fitting to allow discharge of the waste from the Multi Media Filter during the back wash and rinse procedure, and



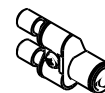
the brine discharge water from the system.

34. **Thru Hull Brine Discharge Fitting **** should be installed above water level for discharge of the Brine Discharge Water from the system.

D. PRODUCT WATER SECTION:

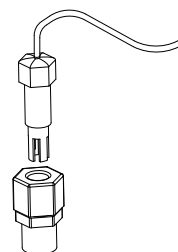
This section of the system gives a visual indication of the clarity, quantity, and quality of the product water. Post Filtration is the final step in Product Water quality control. The Post Filtration Subsystem is designed to limit unpleasant odor and taste, adjust the pH to neutral, and sterilize biological matter which may have passed through the R.O. Membrane Element.

35. **Product Water T Collector** combines the product water from the two individual R.O. Membrane Elements [23 & 24]

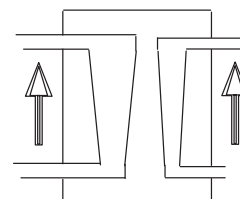


Product Water T-Collector

36. **Temperature Compensated Salinity Probe** electronically determines whether the salinity content of the Product Water is acceptable. This Salinity Probe is temperature compensated and provides an accurate measurement of Product Water quality.



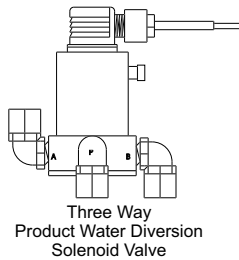
37. **Flow Meter, Product Water** (positioned on the right) measures the rate of Product Water flow from the R.O. Membrane Element(s).



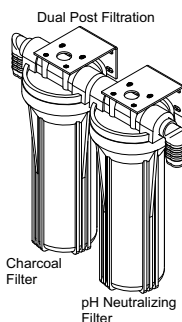
38. 3-Way Product Water Diversion Valve

Electric Solenoid Actuated. The Controller energizes this valve to the “Potable” position when the system produces water which meets the low salinity requirement. If the Product Water being produced is “Un-potable”, high in

salinity, then no signal is sent to the valve, and it thus remains in the normal open position. The “fail safe” normal open position diverts the un-potable Product Water to discharge.



- 39. Charcoal Filter** (shown on the left of the illustration) removes foul odors from the Product Water. Sulfurous odor (rotten egg smell) is caused when biological matter dies and decays in the feed water section. Fresh water flushing of the system helps to minimize this.



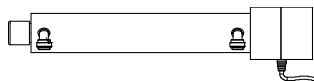
- 40. pH Neutralizer Filter ***** (shown to the right in the above illustration). The **pH** value of pure water is pH7 which is regarded as neutral. **pH** values from 0-7 indicate acidity and **pH** values from 7-14 indicate alkalinity.

The product water from an R.O. system will be slightly acidic because most of the naturally occurring high pH calcium carbonate has been removed. The product water from an R.O. system will also be very soft for the same reason.

The product water pH will be approximately 6.5 pH. The pH Neutralizer Filter dissolves calcium carbonate back into the product water bringing the pH level to neutral at approximately pH 7.

41. Ultra Violet Sterilizer ***

(optional) sterilizes at least 99.9% of any virus, bacteria, and other micro-organisms which may pass through the R.O. Membrane Element. The U.V. sterilizer is recommended if the Product Water Storage Tank is not otherwise treated by means such as chlorination.



- 42. Product Water Connector** attaches to the non pressurized Potable Water

tank for connection of the Product Water hose.

- 33. Potable Water Storage Tank **** holds the potable water for the boat’s fresh water piping system.

- 44. Fresh Water Pressure Pump **** pressurizes the boat’s potable water system.

- 45. Air entrainment tank (accumulator) **** is used by some boats, depending on the type of fresh water pressure pump, to minimize cycling of the fresh water pressure pump.

E. FRESH WATER FLUSH SECTION *:**

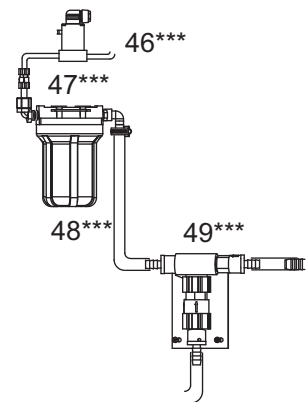
Includes a 2-way solenoid valve, fresh water check valve, carbon filter, and a feed water line check valve. The fresh water flush process is automatic at each shut down of the system and repeats automatically every 7 days. Fresh Water Flushing replaces the seawater in the system with less corrosive fresh water, and this also reduces the biological growth and subsequent decay that naturally occur if the feed water (sea water) is not flushed from the system with fresh water.

- 46. Fresh Water Flush 2-way solenoid valve**
***automatically actuates at system shut down and every 7 days there after to flush the system with fresh water.

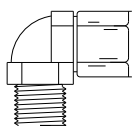
- 47. Fresh Water Flush Check Valve ***** prevents feed water from entering the fresh water line.

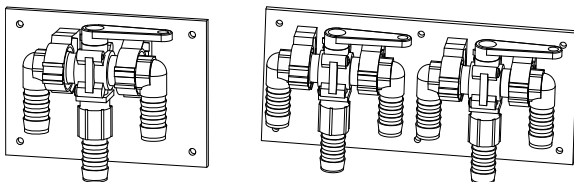
- 48. Fresh Water Flush Charcoal Filter ***** removes chlorine, if present, in the fresh water prior to flowing through the R.O. Membrane Element.

- 49. Fresh Water Flush Check Valve ***** routs the fresh water through the system.



Elbow 90 Male

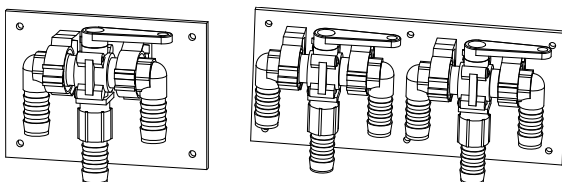


50. Rinse Clean Inlet Valve ***

These Optional Valves are available from Sea Recovery mounted separately on singular individual plates as shown in the illustration above on the left, or together on a double plate as illustrated above on the right.

The Rinse Clean Inlet Valve is used in conjunction with the Rinse Clean Outlet Valve [51] simplifies the storage and cleaning procedures by allowing the operator to turn

a valve rather than disconnect a hose. Also used for a manual fresh water flush if the Automatic Fresh Water Flush System [46 & 49] is not installed. The Rinse Clean Valves are available on single mounting plates or together on a double valve mounting plate.

51. Rinse Clean Outlet Valve ***

(optional) used in conjunction with and identical to the Rinse Clean Inlet Valve [46] simplifies the storage and cleaning procedures by allowing the operator to turn a valve rather than disconnect a hose.

- 52. Cleaning Container or Bucket **** can be any non ferrous container capable of holding at least 10 U.S. Gallons of water. This container is used during the R.O. Membrane Element cleaning, storing, or winterizing process.

G. ELECTRONIC SECTION:

This subsystem measures water quality, controls the direction of Product Water flow, Starts and Stops the pumps, and contains the central electrical connection point of the system. It also ensures only potable Product Water passes into the Product Water Storage Tank.

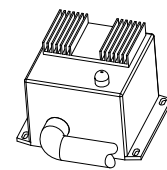
- 53. Electrical Control Box** contains all electrical and electronic components that control the system.

- 54. System Touch Pad** is where all system user command functions are accessed by touching the appropriate switch, and where all operating conditions are monitored.

- 55. Remote Control Touch Pad** *** (optional) allows for remote control, operation, and monitoring of the system.



- 56. Soft Start *** (optional)** The soft start, used only in AC (Alternating Current) Single Phase systems, reduces the initial startup amperes required to start the High Pressure Pump Motor and in turn allows a smaller sized KW generator to start the system. Starting amperage is reduced by 40% with the Soft Start installed.



Soft Motor Starter

Not Numbered:

- Fresh Water Tank High Level Switch **** owner/installer supplied provides an optional feature to the System Control Logic that allows the System to shut off automatically when the Fresh Water Tank [43] is full.

When installed and connected to the Main Printed Circuit Board, the Fresh Water Tank High Level Switch must be connected as a N.C. (Normally Closed) 1PST (One Pole Single Throw) switch.

While the System is in operation, if the high level switch trips (opens) this signals the System logic that the Fresh Water Tank [43] is Full and the System will shut down within 60 seconds.

With the High Level Switch connected, the system will not operate, and will not start if the high level switch is open at the time the Start Switch is pressed.

In order to operate the System when the Fresh Water Tank is full a jumper must be installed at the High Level Switch connection on the Main Printed Circuit Board. Or an inline by-pass switch must be installed.

Helpful Terms to become familiar with:

BOUNDARY LAYER / CONCENTRATION

POLARIZATION: When water permeates through the membrane, nearly all the salt is left behind in the brine channel. In any dynamic hydraulic system, the fluid adjacent to the wall of the vessel is moving relatively slowly. Even though the main body of the stream is turbulent, a thin film adjacent to the wall (membrane) is laminar. This thin film is called the boundary layer.

BRINE DISCHARGE: The concentrated solution, original feed water less the recovered product water, that is ejected from the System.

BRINE VELOCITY: The brine flow over the membrane surface is very important to both product water quality and quantity. At low flows, concentration polarization occurs, causing the water quality to decline. In addition to inferior product water quality, low brine flow can increase the precipitation of sparingly soluble salts which will foul the membrane surface. If this occurs, the product water flux (production) will decline.

COMPACTION: Some densification of the membrane structure may take place while operating at elevated pressures, above 1000 PSI. The change is known as compaction and is accompanied by a reduction in the water permeation rate.

FEED WATER: The raw water that enters the system

OSMOTIC PRESSURE: The transfer of the water from one side of the membrane to the other will continue until the head (pressure) is great enough to prevent any net transfer of the solvent (water) to the more concentrated (feed water) solution. At equilibrium, the quantity of water passing in either direction is equal (no passage), and the pressure is then defined as the "**Osmotic Pressure**" of the solution having that particular concentration of dissolved solids.

PRESSURE: The operating pressure has a direct effect on product water quality and quantity. Both factors will increase as the system pressure increases (within design limits). The system must be operated at the lowest pressure required to achieve the designed product water flow rate. This parameter also affects compaction, which proceeds at a faster rate at higher pressures as well as at higher temperatures.

PRODUCT WATER (PERMEATE): The potable water produced from the Reverse Osmosis Membrane Element.

RECOVERY: The percentage of product water recovered from the feed water.

REJECTION: The percentage of Dissolved Solids rejected from the Feed Water to Brine Discharge by the R.O. Membrane Element.

TDS - TOTAL DISSOLVED SOLIDS: All dissolved solids in water (everything except H²O (water). When referring to Product Water from the R.O. System the TDS is generally expressed as NaCl (Sodium Chloride - Salt).

WATER TEMPERATURE EFFECT: The product water that flows through the membrane is significantly affected by the water temperature. At any given pressure this flow increases with increasing water temperature and is reduced at lower temperatures.

Section 2

Pre-Installation R.O. Membrane Care

Installation aboard a Boat

Notes:

[illegible]

1. SYSTEM STORAGE AND INSTALLATION PRECAUTIONS AND INFORMATION:

A. STORAGE PRIOR TO UNCRATING:

1. Adhere to crate markings:

- **DO NOT** expose to or store in direct sunlight;
- **DO NOT** expose to or store above 120 degrees F / 50 degrees C;
- **DO NOT** expose to or store below 33° F / 1° C;
- **DO NOT** freeze;
- **DO NOT** store longer than 4 months without flushing with storage chemical;
- **STORE ONLY** on base with **ARROWS UP**.
- **KEEP THE R.O. MEMBRANE ELEMENT(S) WET AT ALL TIMES.**

2. Refer to Chapter 5 of this manual for further cautions of the R.O. Membrane Element.

B. REVERSE OSMOSIS MEMBRANE ELEMENT SUSCEPTIBILITY TO CHEMICAL ATTACK:

CAUTION: Do Not expose the Sea Recovery System to intake Feed Water containing:

Hydrogen peroxide	chloramines	chloramines-T	N-chloroisocyanurates
Chlorine dioxide	hypochlorite	chlorine	iodine
Bromine	Bromide	phenolic disinfectants	petroleum products
Any chemical, not approved in writing by Sea Recovery.			

USE OF NON-AUTHORIZED OR MISUSE OF AUTHORIZED CHEMICALS VOIDS SYSTEM WARRANTY.

Do not connect any water line to the System that may contain any of the above listed chemicals. Example: Do not connect the inlet of the System to the ship's potable water system if the system contains chlorinated or brominated water. These chemicals destroy the copolymer components within the system. These oxidants and others also damage the R.O. Membrane Element. The Sea Recovery Optional Fresh Water Flush Accessory removes chlorine and bromine from the ship's potable water system.

C. ARE YOU INSTALLATION COMPETENT?

Installing this Reverse Osmosis Desalination System will require understanding of:

- | | |
|--|--|
| • Thru-Hull under water fitting installation | • Hydraulic Systems and Pumps |
| • Thru-Hull above water fitting installation | • Liquid Pressures and Flows |
| • Electrical Circuits | • Electro Mechanical Systems |
| • Electronic Circuits | • Mechanical knowledge and skills |
| • Electric Motors | • Piping and Plumbing knowledge and skills |

Do not attempt installation if you are not familiar with or are not proficient in the above fields of expertise.

D. CAUTION, DO NOT PERFORM INSTALLATION UNLESS:

1. The System Feed Water Sea Cock Valve [2] is closed.
2. The system main electrical disconnect switch is switched **"OFF"**, **LOCKED**, and **TAGGED**.

WARNING: ELECTRICAL SHOCK HAZARD. A Volt / Ohm Meter will be necessary. The following installation procedures expose the installer to High Voltage and electrical shock hazard. Only attempt this if you are a qualified electrician and only if surrounding conditions are safe.

2. SPECIAL CONSIDERATIONS:

A. INSTALLATION CAUTIONS:

1. Do not over tighten PVC fittings. If threaded pipe fittings leak after installation, remove the fitting, clean the mating threads, apply 3 to 4 wraps of Teflon tape to the male threads, apply liquid Teflon pipe sealer sparingly, and thread the parts back together. PVC fittings will crack if over tightened, snug with a wrench but do not over tighten.
2. The Sea Cock Valve [2], Inline Vacuum/Pressure Gauge [4], Sea Strainer [5], Rinse Clean Inlet Valve [50], Automatic Fresh Water Flush Check Valve [49], Inline Vacuum/Pressure Gauge [6], and Booster Pump [7] should be installed below water level. This will aid the Booster Pump in priming.
3. Always allow hoses and tubes to enter and exit straight from the connection for a minimum of one inch prior to a bend. If stress is placed on the fitting due to a tight bend the fitting will leak and may break.
4. **WARNING:** Avoid skin and eye contact with the membrane packaging solution. In case of skin contact, rinse the skin thoroughly with water. In case of eye contact, flush repeatedly with water and notify a physician immediately. R.O. Membrane Elements are stored in “sodium bisulfite”.
5. **NEVER** mount any liquid holding component of the system above an electrical or electronic circuit or device. Extensive damage to the electrical or electronic device or circuit will result if water spills from the system during maintenance and or component failure.

B. CONNECTION LINE CAUTIONS:

1. All connection lines should be as short and straight as possible using minimum fittings.
Increased length causes line pressure loss in the Feed Water line.
Increased length causes excessive pressure build up in the Brine Discharge line.
Increased length causes excessive pressure build up in the Product Water line.
2. The connection lines must not be “kinked”.
Kinks in the Feed Water line cause cavitation and continual System shut down.
Kinks in the Brine Discharge line cause excessive pressure build up and damage.
Kinks in the Product Water line cause excessive pressure build up and damage.

C. ACCESSIBILITY CAUTIONS:

1. This is a simple rule: Install the system and its supporting components in an accessible manner. The Aqua Whisper II system requires regular operator maintenance such as filter element changing. As with any Electro Mechanical system utilized in the Marine environment the Aqua Whisper II system will require repair from time to time. Hidden or out of reach items may become forgotten, not maintained, and cause damage to other system components. Sea Recovery will refer any end user customer complaints regarding accessibility or installation problems back to the installer.
2. The System Control Panel must be accessible for operation and monitoring of the system.

D. ELECTRICAL POWER REQUIREMENTS:

1. Refer to the Specifications and to the specific electrical information provided in Section 8 of this Owner's Manual and ensure that the power source is sufficiently sized to provide the correct voltage and cycles during Start Up and Operation of the Sea Recovery Aqua Whisper II Reverse Osmosis Desalination System.

3. DISTANCE BETWEEN COMPONENTS:

1. 50 feet (15 meters) of 3/4" (19 mm) I.D. clear braided hose is supplied for connecting the Suction Line, Low Pressure Line, Brine Discharge Line, and Fresh Water Flush Line.
2. 50 feet (15 meters) of 1/2" (12.7mm) I.D. clear braided hose is supplied for connecting the Product Water Line.
3. 1/4" (6.35 mm) OD nylon tubing is supplied with applicable components for connecting Pressure Pick Up points for the Low Pressure Transducer, and Inline Pressure Gauges.

4. TOOLS REQUIRED FOR INSTALLATION:

Not all installations are typical, therefore, it is recommended to have a full set of Mechanic's and Electrician's tools available. No special system tools are required for installation. A separate TDS Meter, available from Sea Recovery will assist in confirming system product water quality. A volt/ohm meter (VOM) is required for system installation and commissioning to ensure proper electrical power and connection.

5. COMPONENTS SUPPLIED BY INSTALLER OR OWNER:

CAUTION: All fittings, valving, and piping installed prior to, within, and after the Sea Recovery system must not contain iron. They must be non-ferrous material (not containing iron). Iron fittings or piping will cause rust fouling and failure of the R.O. Membrane Element. The resulting failure of the R.O. Membrane Element is attributed to improper installation, is the liability of the installer, and is not covered by the Sea Recovery warranty.

1. **Inlet Thru Hull Fitting** [1] with Forward Facing Scoop. The inlet Thru Hull Fitting must be minimum 3/4" and dedicated to only the Sea Recovery system. It is important that the installer utilizes a forward facing scoop so that the system receives a positive flow of water as the boat is under way. The fitting must be installed on the boats hull in a position that provides continual feed water flow without air to the system.

CAUTION: A flush inlet thru-hull fitting will cause a vacuum as the boat is under way, and this will cause loss of feed water flow and cavitation of the Booster Pump and High Pressure Pump resulting in continual system shut down due to low feed water flow and low pressure. The resulting failure of the system to remain in operation is attributed to improper installation, is the liability of the installer, and is not covered by the Sea Recovery warranty.

CAUTION: The Sea Recovery System must receive an uninterrupted supply of feed water without air. If the thru-hull fitting is placed in a position on the underside of the hull that allows air to continually enter the thru-hull fitting, this will cause the system to continually shut down due to loss of feed water. The resulting failure of the system to remain in operation is attributed to improper installation, is the liability of the installer, and is not covered by the Sea Recovery warranty.

CAUTION: The Sea Recovery System must not be tied into another existing auxiliary water line already supplying another accessory on the boat. Using one Thru Hull fitting for other equipment will cause the Sea Recovery System to draw air or cavitate leading to continual system shut down. The resulting failure of the system to remain in operation is attributed to improper installation, is the liability of the installer, and is not covered by the Sea Recovery warranty.

CAUTION: If the Sea Recovery System is connected to a Sea Chest or Stand Up Pipe, **do not plumb the Sea Recovery System feed line to the "top" of the Sea Chest or Stand Up Pipe.** If plumbed into the top of

these feed water arrangements, the Sea Recovery System will experience continual shut down due to air inducement into the system. The resulting failure of the system to remain in operation is attributed to improper installation, is the liability of the installer, and is not covered by the Sea Recovery warranty. **Plumb the Sea Recovery System to the “bottom” of such feed water arrangements to ensure a continual air free supply of feed water to the system.**

2. **Brine Discharge Thru Hull Fitting** [34] minimum 3/4” size with a 3/4” MNPT connection for mating to the supplied 3/4” FNPT Brine Discharge Connector [32] fitting, or the 3/4” FNPT Multi Media Filter Waste Tee [33] supplied with the optional Multi Media Filter. The Brine Discharge Thru Hull Fitting should be installed above water level. Installing the brine discharge above water level will aid the operator in troubleshooting brine flow abnormalities. Installing the Brine Discharge Thru Hull Fitting above water level ensures Brine Discharge Water exits to atmospheric pressure with no restriction. Do not install a valve in the Brine Discharge line. A blockage or closed valve will cause EXTENSIVE damage to the System. The resulting damage to the system or failure of the system to start is attributed to improper installation or operation, is the liability of the installer or operator, and is not covered by the Sea Recovery warranty.
3. **Inlet Sea Cock Valve** [2] Quarter turn ball valve min.3/4” size, with a 3/4” MNPT connection for mating to the supplied 3/4” FNPT Inlet Connection [3] fitting.
4. **Water Connections to be supplied by the installer:**

Feed Inlet at [2]:	3/4” MNPT (Male National Pipe Thread U.S. Standard)
Brine Discharge at [34]:	3/4” MNPT (Male National Pipe Thread U.S. Standard)
Product at [42]:	1/2” FNPT (Female National Pipe Thread U.S. Standard)
Pressurized Fresh Water at [46]:	1/4” FNPT (Female National Pipe Thread U.S. Standard)
5. **Connection of the Sea Recovery Product Water Line to the boat’s UNPRESSURIZED Potable Water Storage Tank** [43] requires a 1/2” FNPT connection for mating to the supplied 1/2” MNPT Product Water Connector [42] fitting. In order to avoid problems such as reverse flow (osmosis) from the tank to the system and chlorination attack of the R.O. Membrane Element, the fitting must terminate above the maximum water level. No valves should be installed in this line. A blockage or closed valve in the Product Water Line will cause extensive damage to the System and R.O. Membrane Element. The resulting damage to the system and R.O. Membrane Element is attributed to improper installation or operation, is the liability of the installer or operator, and is not covered by the Sea Recovery warranty.
6. **Connection of the Sea Recovery Fresh Water Flush sub assembly to the boat’s PRESSURIZED Potable Water Line** [45] requires a 1/4” FNPT connection for mating to the 1/4” MNPT fitting supplied with the Fresh Water Flush sub assembly.
7. **Circuit Breaker** with appropriate Amperage Rating. Refer to Section 8 of this Owner’s Manual.
8. **Properly sized Power Cables.** Refer to Section 8 of this Owner’s Manual.
9. **An electrical power source** capable of delivering the required constant voltage and cycles during start up and operation of the System. Refer to Section 8 of this Owner’s Manual.

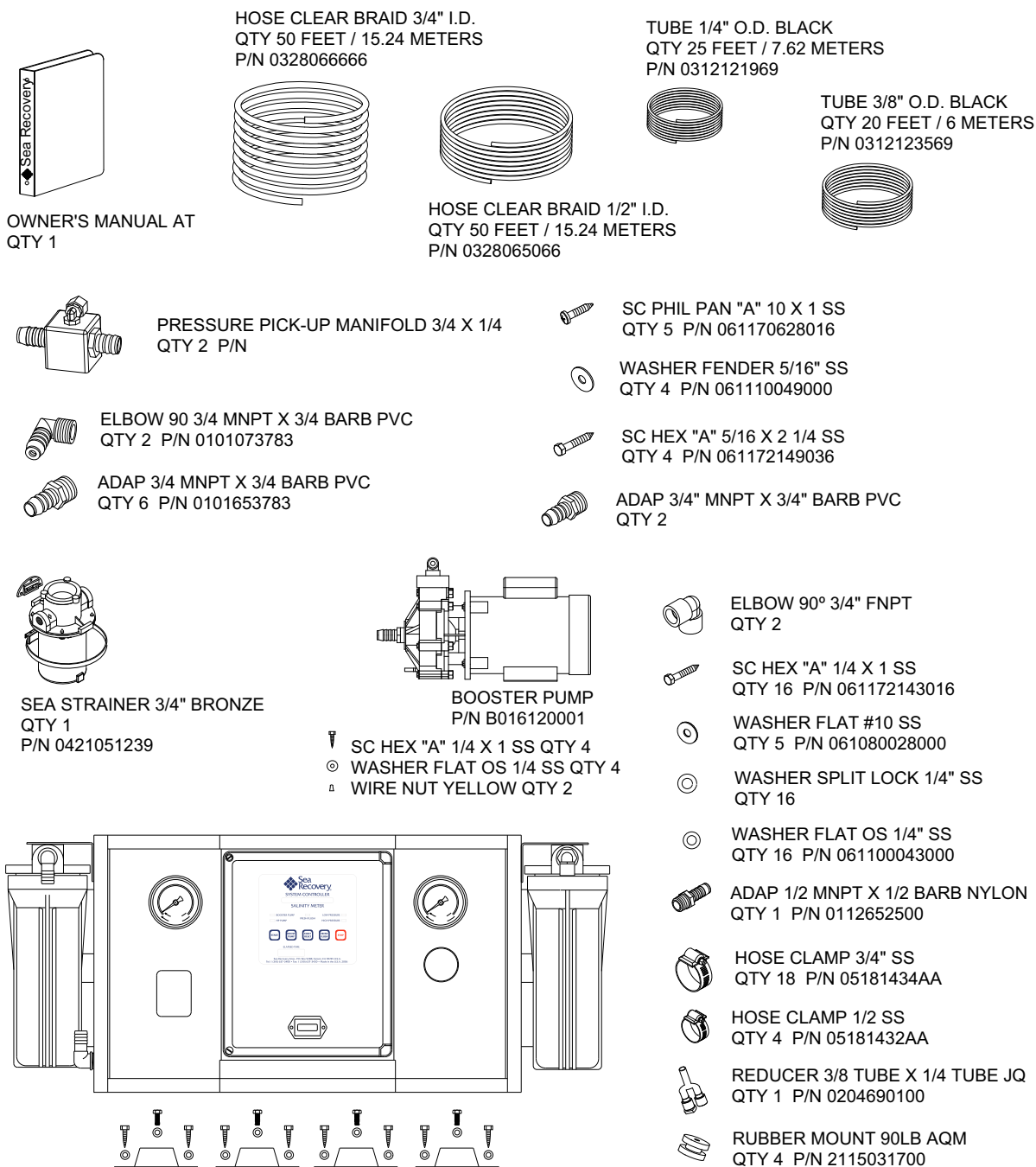
6. VISUAL PACKING LIST Aqua Whisper II COMPACT STYLE:

A. UNCRATING:

1. **DO NOT DISCARD ANY PACKAGING UNTIL YOU HAVE FOUND & IDENTIFIED ALL PARTS!**
2. Remove the Aqua Whisper II system from the shipping carton.
3. Some of the components are loose or separately packaged in the shipping container.

CONTENTS OF SHIPPING CRATE Aqua Whisper II COMPACT Style

INSTALLATION KIT AT Modular QTY 1



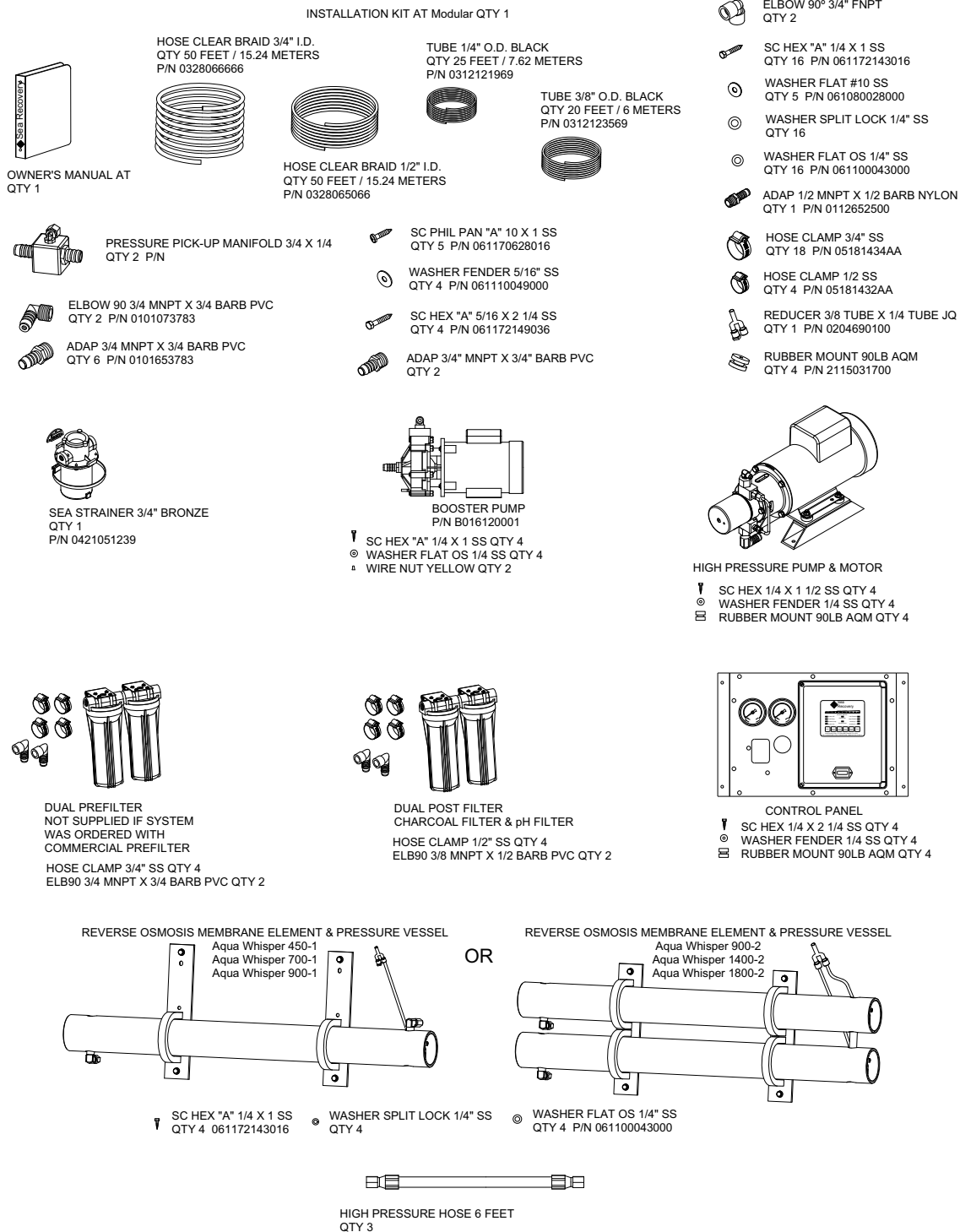
7. VISUAL PACKING LIST Aqua Whisper II MODULAR STYLE:

NOTE: Illustration shows the Optional HP Pump.

A. UNCRATING:

1. DO NOT DISCARD ANY PACKAGING UNTIL YOU HAVE FOUND & IDENTIFIED ALL PARTS!
2. Remove the Aqua Whisper II Modular system's components from the shipping carton.
3. The components are loose or separately packaged in the shipping container.

CONTENTS OF SHIPPING CRATE Aqua Whisper II MODULAR Style

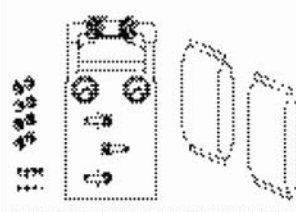


8. VISUAL PACKING LIST Aqua Whisper II External Components & Options:

A. UNCRATING:

1. DO NOT DISCARD ANY PACKAGING UNTIL YOU HAVE FOUND & IDENTIFIED ALL PARTS!
2. Remove the Aqua Whisper II Modular system's components from the shipping carton.
3. The components are loose or separately packaged in the shipping container.

**OPTIONAL ACCESSORIES
FOR THE AQUA WHISPER**



MULTIMEDIA FILTER ASSEMBLY P/N 887080032
MEDIA SAND A100 QTY: 25 LBS
MEDIA GARNET 6-12 QTY: 17 LBS
HOSE CLAMP 3/4" SS QTY: 8
SC HEX "A" 1/4" x 1" SS QTY: 4
WASHER FLAT OS 1/4" SS QTY: 4



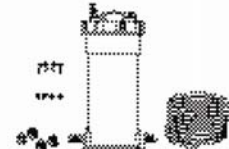
DUAL PLANKTON FILTER P/N 888800032
HOSE CLAMP 3/4" SS QTY: 4
SC HEX "A" 1/4" x 1" SS QTY: 8
SC HEX "A" 1/4" x 1" SS QTY: 8



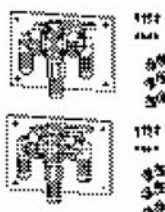
PLANKTON FILTER SINGLE P/N 888800032
HOSE CLAMP 3/4" SS QTY: 4
SC HEX "A" 1/4" x 1" SS QTY: 4
WASHER FLAT OS 1/4" SS QTY: 4



CORNERICAL PREFILTER P/N 888800031
ADAP 3/4" MPT x 3/4" BARB QTY: 2
HOSE CLAMP 3/4" SS QTY: 4
SC HEX "A" 1/4" x 1" SS QTY: 4
WASHER FLAT OS 1/4" SS QTY: 4
TUBE 1/4" OD BLACK NYLON QTY: 15 FT



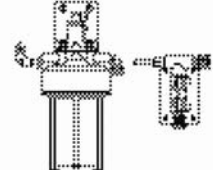
OIL/WATER SEPARATOR P/N 888800031
ADAP 3/4" MPT x 3/4" BARB QTY: 2
HOSE CLAMP 3/4" SS QTY: 4
SC HEX "A" 1/4" x 1" SS QTY: 4
WASHER FLAT OS 1/4" SS QTY: 4
TUBE 1/4" OD BLACK NYLON QTY: 15 FT



CLEANING & RINSE VALVE KIT P/N 888800031
HOSE CLAMP 3/4" SS QTY: 12
SC PHIL PAN "A" #10 x 1" SS QTY: 8
WASHER FLAT OS #10 NYLON QTY: 8



DIFFERENTIAL LOW PRESSURE TRANSDUCER ASSEMBLY P/N 888800031
TRANSDUCER 0-200 PSI SS QTY: 1
MANIFOLD DIFFERENTIAL PRESSURE TEE QTY: 1
ADAP 3/4" MPT x 3/4" BARB PVC QTY: 2
HOSE CLAMP 3/4" SS QTY: 2
TUBE 1/4" OD BLACK QTY: 10 FT
ELBOW 1/4" OD TUBE x 1/4" MPT PLASTIC QTY: 1



FRESH WATER FLUSH SYS AW-AT (888800032)
CARBON FILTER WITH ATTACHED BRACKET QTY: 1
CHECK VALVE WITH BRACKET QTY: 1
BOWL TIGHTENING WRENCH QTY: 1
HOSE CLAMP 3/4" SS QTY: 4
SC HEX "A" #10 x 1 1/4" SS QTY: 4
WASHER FLAT OS #10 SS QTY: 4
SC PHIL PAN "A" #10 x 1" SS QTY: 4
WASHER FLAT OS #10 SS QTY: 4



UV STERILIZER 1 GPM 12 WDC 888800033
UV STERILIZER 1 GPM 12 WDC QTY: 1
ELBOW 1/4" OD TUBE x 1/4" MPT PLASTIC QTY: 2
SC HEX 1/4" x 1" 1/4" SS QTY: 2
NUT LOCKING 1/4" x 1 1/4" SS QTY: 2



REMOTE AQUA WHISPER



B16000001 DIFFERENTIAL LOW PRESS GAUGE ASSEMBLY



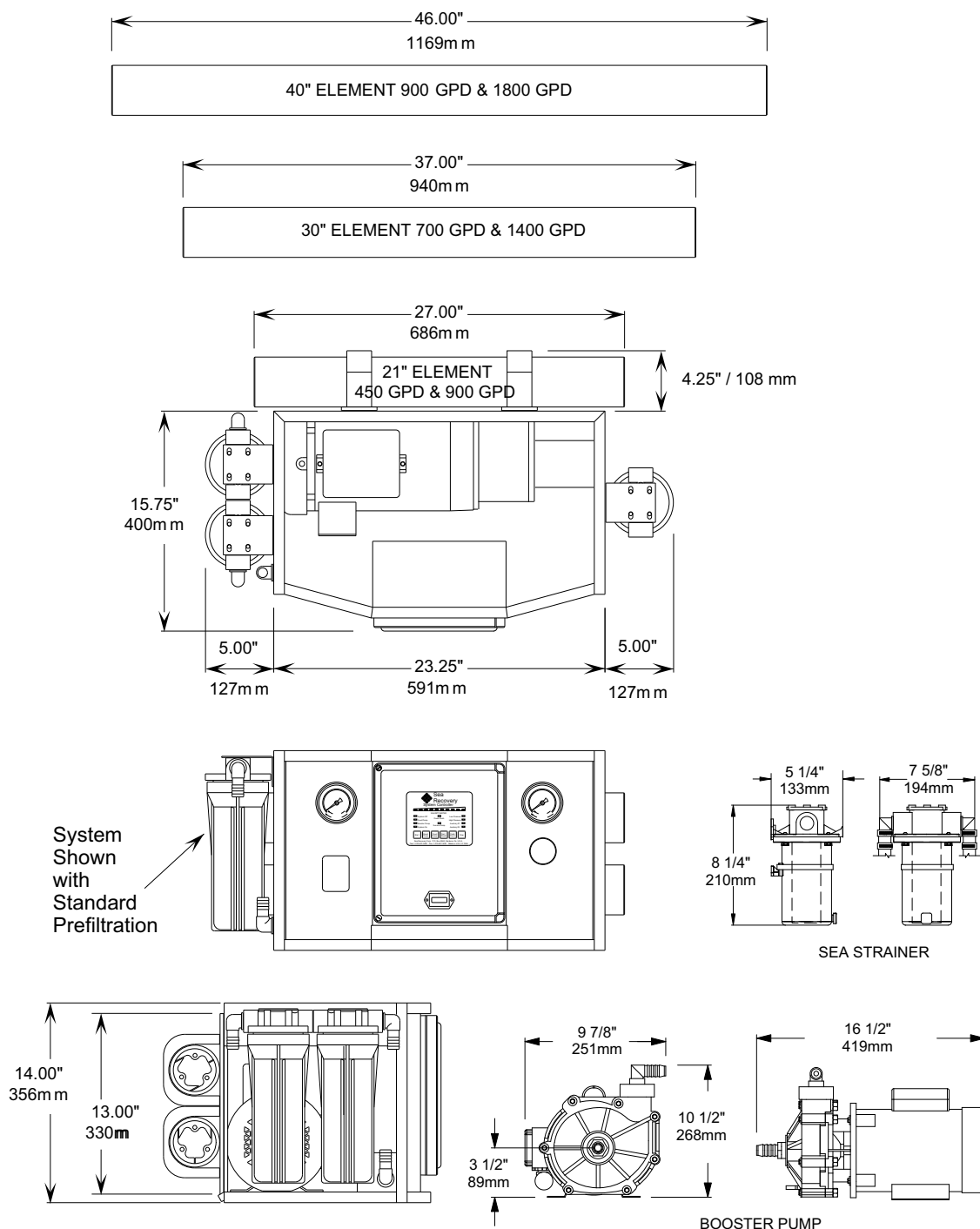
SOFT START ASSEMBLY AW P/N 888800038
SOFT START ASSEMBLY 10 FOOT GAUGE QTY: 1
STRAIN RELIEF 90° 0200-0200 (FOR HRP MOTOR) QTY: 1
STRAIN RELIEF 90°-90° (FOR CONTROL BOX) QTY: 1
SC PHIL PAN "A" #10 x 1" SS QTY: 2
WASHER FLAT OS #10 SS QTY: 2

9. DIMENSIONS Aqua Whisper II COMPACT STYLE:

- Aqua Whisper II Modular Component Dimensions are Illustrated below.
- Other Aqua Whisper II Modular Individual Component Dimensions, standard and optional, are Illustrated on page 12 of this section.

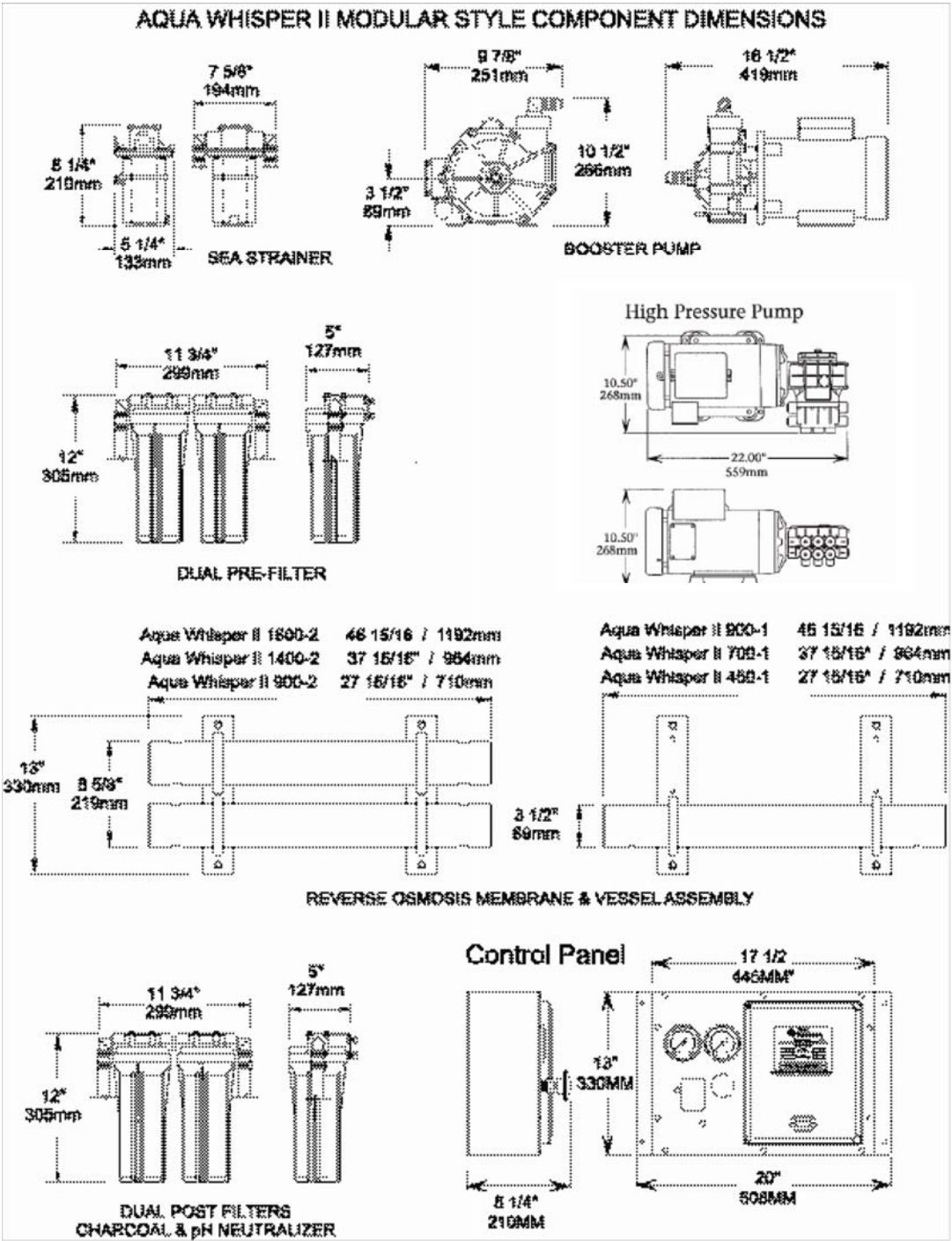
Aqua Whisper II Compact Style Dimensions

System Shown with Standard Prefiltration

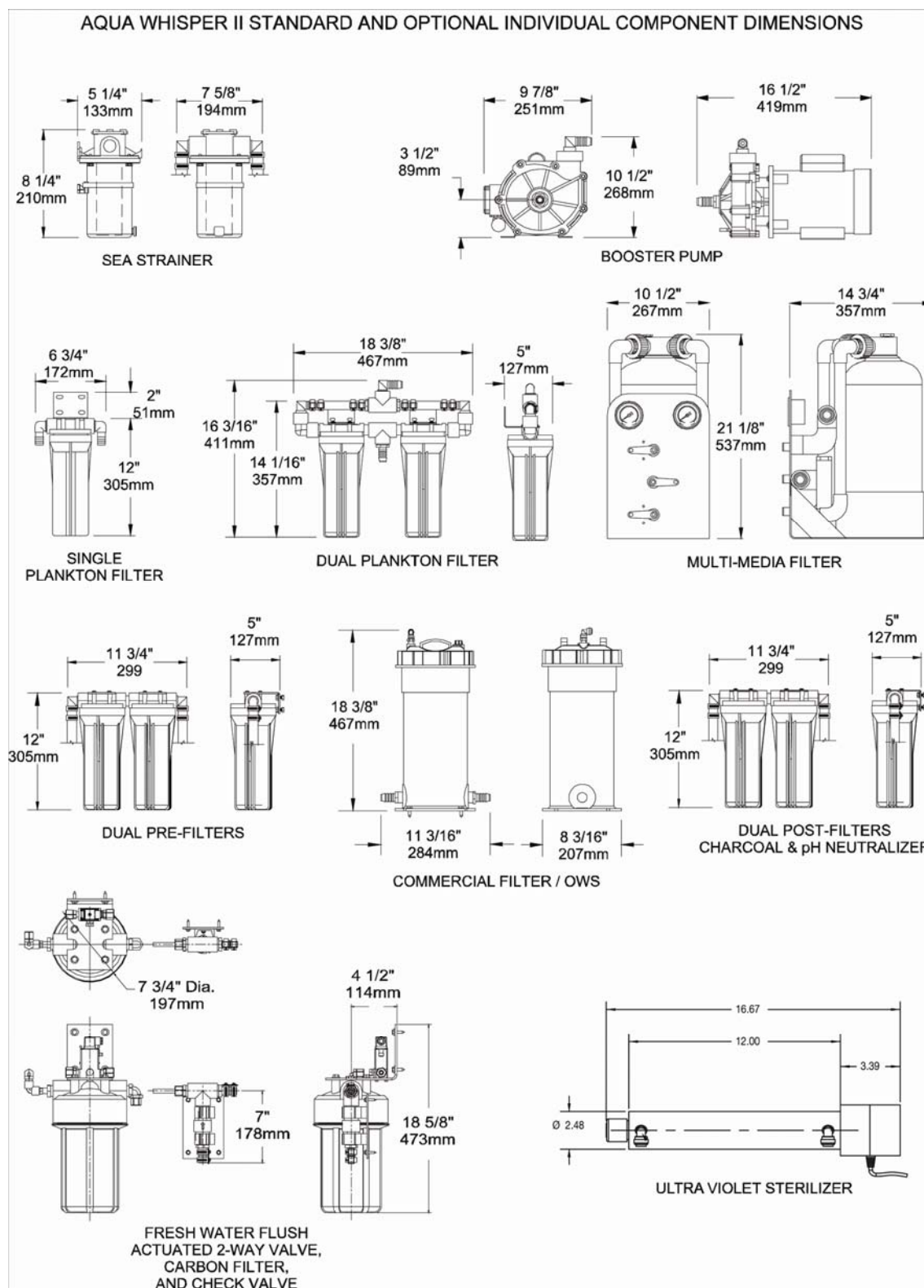


10. DIMENSIONS Aqua Whisper II MODULAR STYLE:

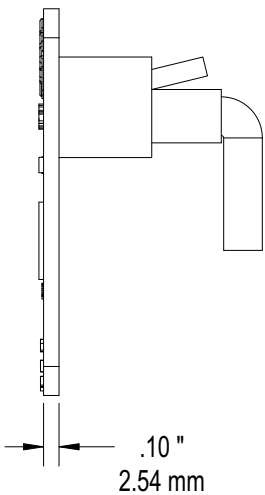
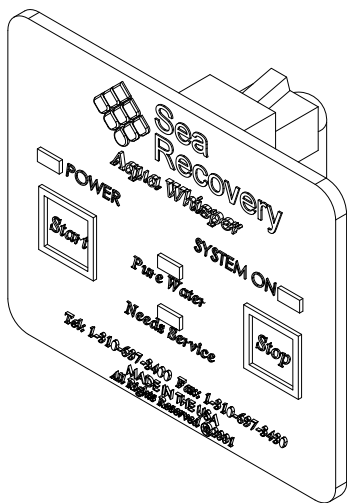
- a. Aqua Whisper II Modular Component Dimensions are Illustrated below.
- b. Other Aqua Whisper II Modular Individual Component Dimensions, standard and optional, are Illustrated on page 12 of this section.



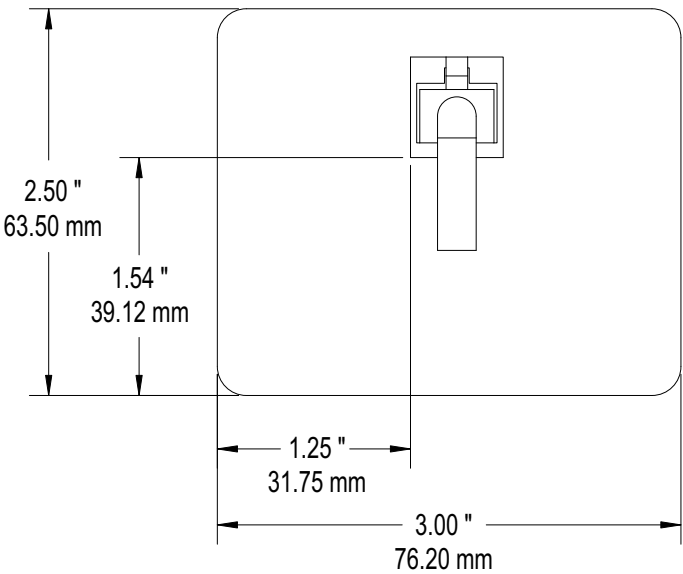
11. DIMENSIONS Aqua Whisper II Separate Components and Optional Accessories:



REMOTE TOUCH PAD PART NUMBER B61122003



RIGHT END VIEW
SHOWING THICKNESS
DRAWING NOT TO SCALE



REAR VIEW SHOWING OVERALL DIMENSIONS
FOR INSTALLATION AND MOUNTING
DRAWING NOT TO SCALE

12. PIPING AND INTERCONNECT DIAGRAMS

Several different Piping and Interconnect Diagrams are illustrated on the following pages. These illustrations include Standard configurations as well as various Optional Accessory configurations.

Determine the Prefiltration and Post Filtration components that were supplied with the Aqua Whisper II being installed. Locate the appropriate diagram from the following pages. Interconnect the components as per the appropriate diagram.

Following the reference only Piping and Interconnect Diagram on page 14 are specific Piping and Interconnect Diagrams illustrating various Prefiltration, Cleaning System, Fresh Water Flush, and Inline Pressure Gauge options on pages 15 - 19.

On pages 20 - 24 simpler illustrations are shown that high light these various options and configurations.

I.D. of Components & Options

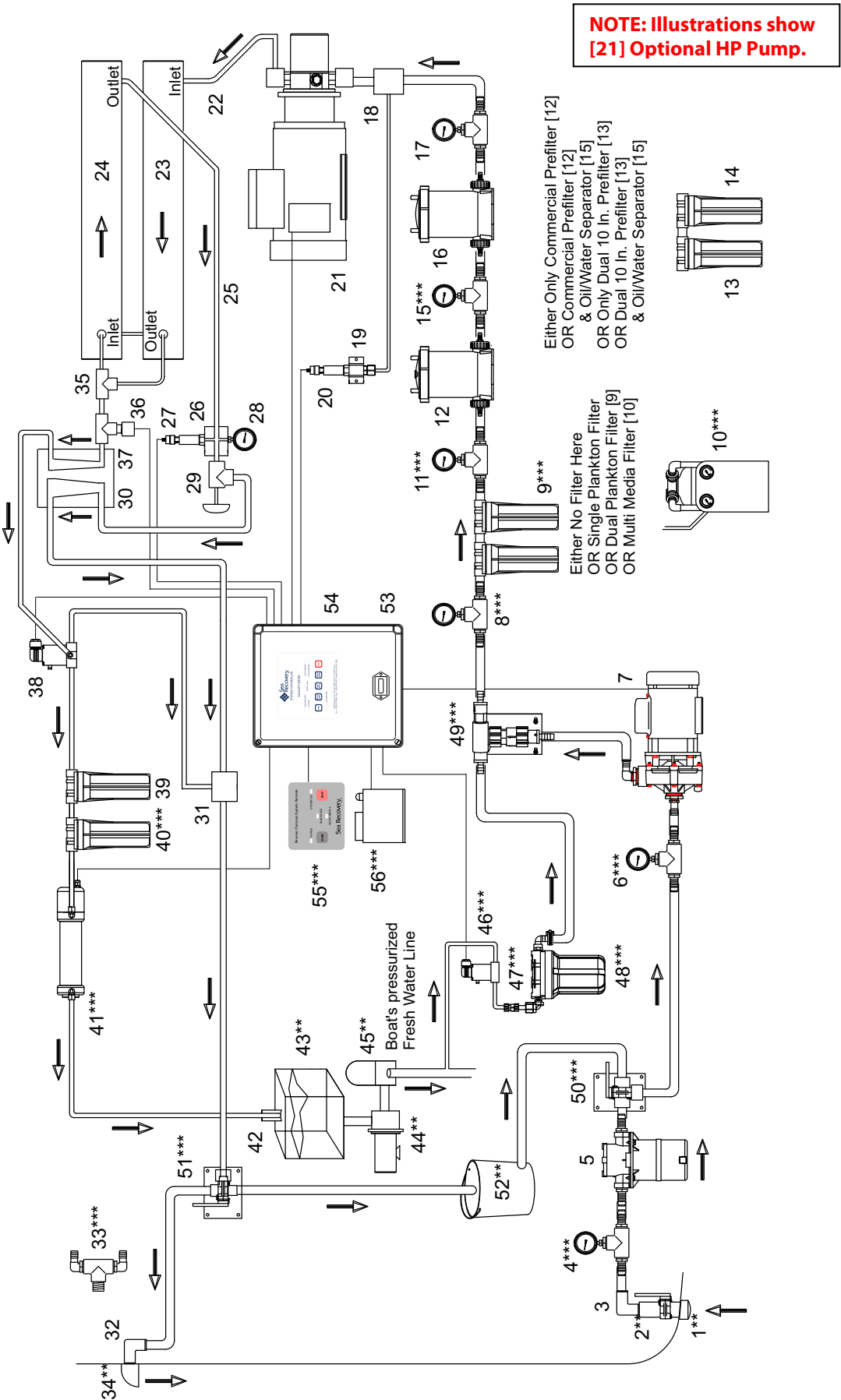
I.D. of Components & Options

** Installer or Owner supplied

*** Optional Accessory

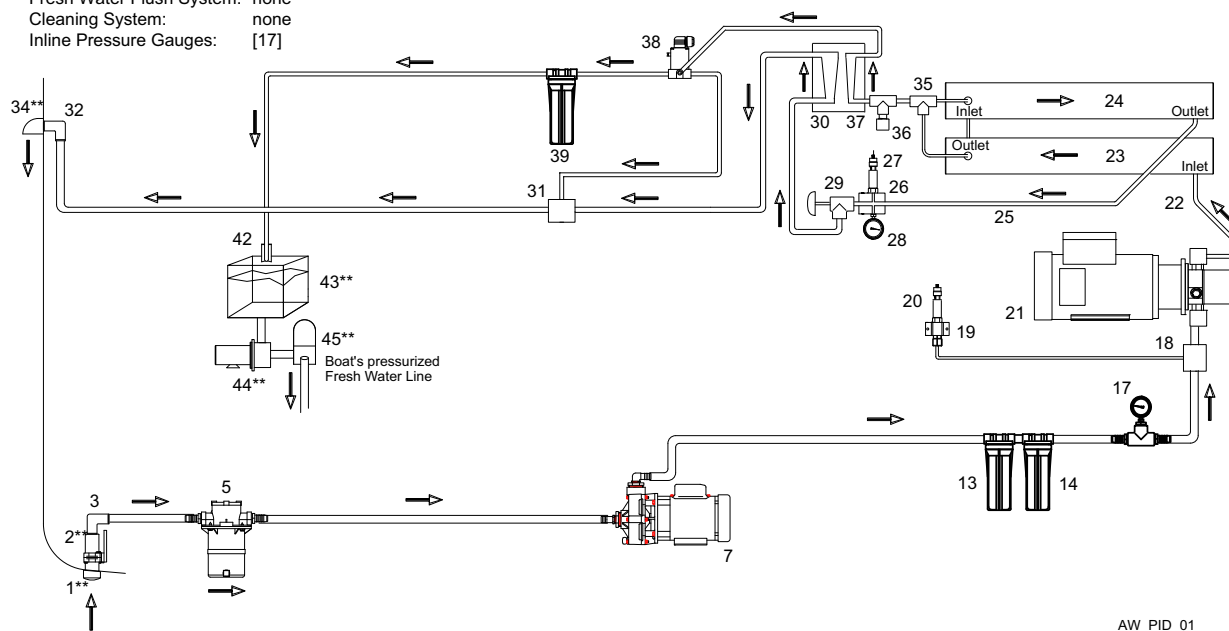
- | | |
|----------------------------------|--|
| 1. Inlet Thru Hull ** | 28. High Pressure Gauge |
| 2. Sea Cock Valve ** | 29. Back Pressure Regulator |
| 3. Inlet Connection | 30. Flow Meter - Brine Discharge |
| 4. Inline Pressure Gauge *** | 31. Discharge T-Connection |
| 5. Sea Strainer | 32. Brine Discharge Thru-Hull Connector |
| 6. Inline Pressure Gauge *** | 33. Multi Media Filter Waste Tee *** |
| 7. Booster Pump | 34. Thru Hull Discharge Fitting |
| 8. Inline Pressure Gauge *** | 35. T-Connector Product Water |
| 9. Plankton Filter *** | 36. Salinity Probe |
| 10. Multi-Media Filter *** | 37. Flow Meter - Product Water |
| 11. Inline Pressure Gauge *** | 38. 3-way Diversion Valve |
| 12. Commercial Prefilter | 39. Charcoal Filter |
| 13. 25 Micron 10" Prefilter | 40. pH Neutralizer *** |
| 14. 5 Micron 10" prefilter | 41. U.V. Sterilizer *** |
| 15. Inline Pressure Gauge *** | 42. Product Water Tank Connector |
| 16. Oil Water Separator | 43. Potable Water Storage Tank ** |
| 17. Inline Pressure Gauge | 44. Fresh Water Pressure Pump ** |
| 18. T-Connector Pressure Pick-up | 45. Air Entrainment Tank (Accumulator) ** |
| 19. Low Pressure Manifold | 46. Auto Fresh Water Flush Solenoid Valve *** |
| 20. Low Pressure Transducer | 47. Auto Fresh Water Flush Check Valve *** |
| 21. High Pressure Pump & Motor | 48. Auto Fresh Water Flush Charcoal Filter *** |
| 22. High Pressure Hose | 49. Auto Fresh Water Flush Check Valve *** |
| 23. Membrane & Vessel #1 | 50. Rinse Clean Inlet Valve *** |
| 24. Membrane & Vessel #2 | 51. Rinse/Clean Outlet Valve *** |
| 25. High Pressure Hose | 52. Rinse/Clean Container or Bucket ** |
| 26. High Pressure Manifold | 53. Electrical Control Box |
| 27. High Pressure Transducer | 54. System Touch Pad |
| | 55. Remote Control Touch Pad *** |
| | 56. Soft Start *** |

Aqua Whisper Component Identification Diagram. Illustrated with "either / or" Prefiltration Options, all Post Filtration Options, the Rinse/Clean Valves, Remote Touch Pad, Soft Motor Starter, and Inline Pressure Gauges.



Aqua Whisper II 450-1800

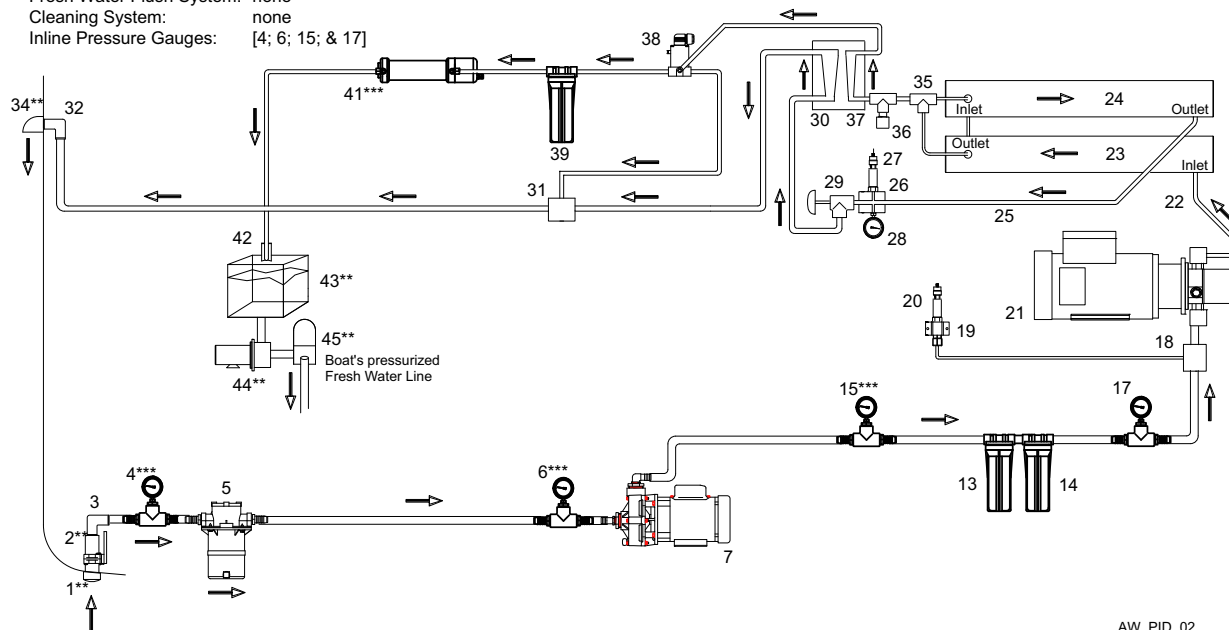
Aqua Whisper Piping and Interconnect Diagram Including:
 Prefiltration: Dual 10 inch Prefilters [13 and 14]
 Post Filtration: Charcoal Filter [39]
 Fresh Water Flush System: none
 Cleaning System: none
 Inline Pressure Gauges: [17]



AW_PID_01

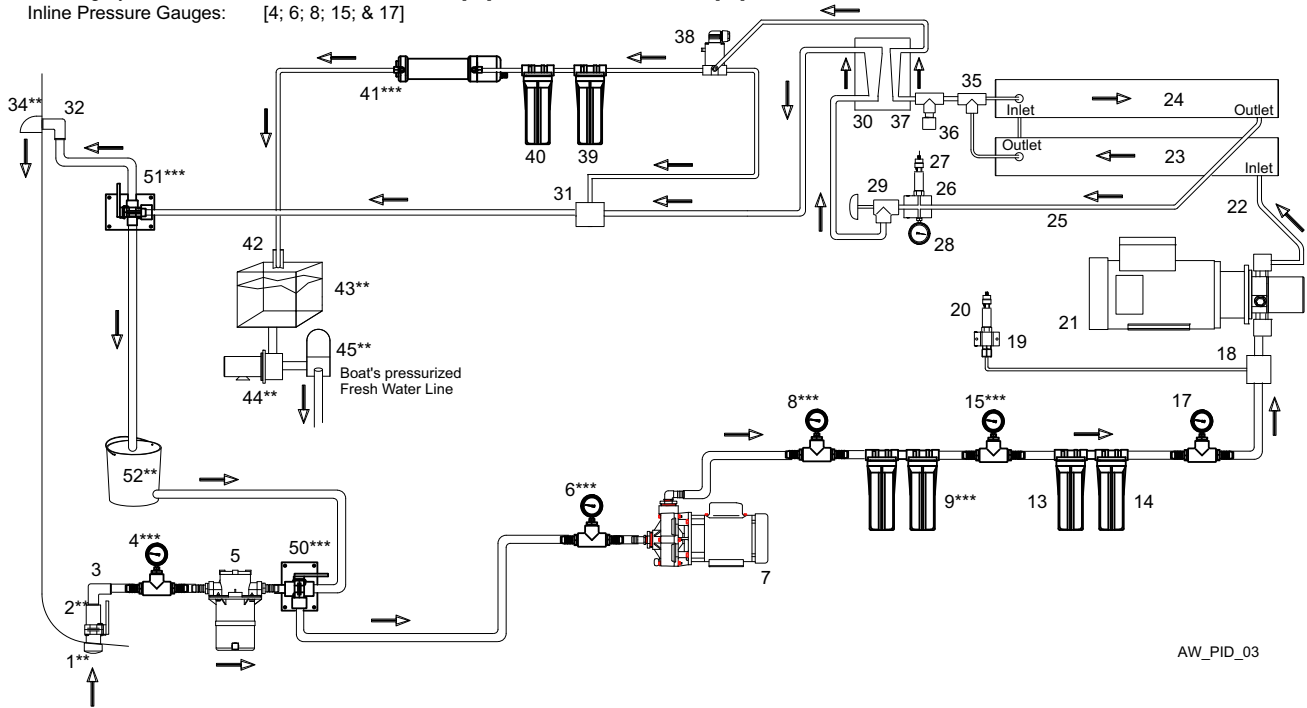
**NOTE: Illustrations show
[21] Optional HP Pump.**

Aqua Whisper Piping and Interconnect Diagram Including:
 Prefiltration: Dual 10 inch Prefilters [13 and 14]
 Post Filtration: Charcoal Filter [39]; Ultra Violet Sterilizer [41]
 Fresh Water Flush System: none
 Cleaning System: none
 Inline Pressure Gauges: [4; 6; 15; & 17]



AW_PID_02

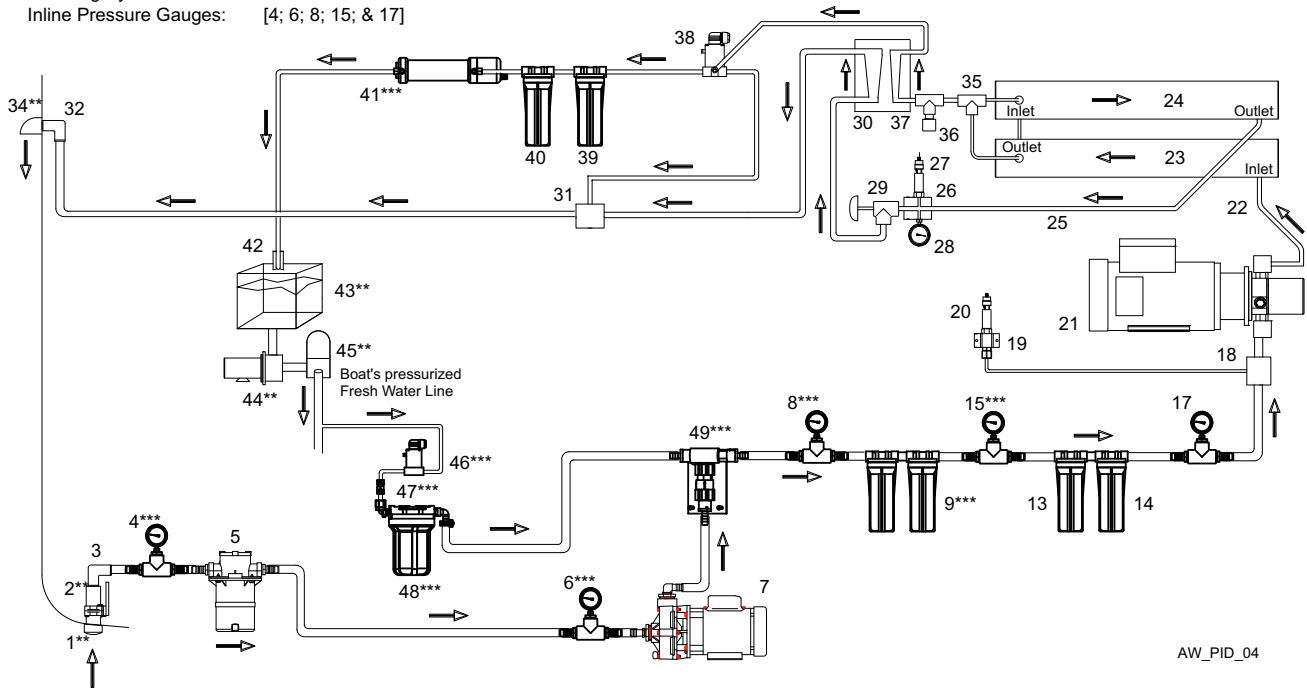
Aqua Whisper Piping and Interconnect Diagram Including:
Prefiltration: Dual Plankton Filter [9]; Dual 10 inch Prefilters [13 and 14]
Post Filtration: Charcoal Filter [39]; pH Neutralizing Filter [40]; Ultra Violet Sterilizer [41]
Fresh Water Flush System: none
Cleaning System: Rinse/Clean Inlet Valve [50]; Rinse/Clean Outlet Valve [51]
Inline Pressure Gauges: [4; 6; 8; 15; & 17]



AW_PID_03

NOTE: Illustrations show [21] Optional HP Pump.

Aqua Whisper Piping and Interconnect Diagram Including:
Prefiltration: Dual Plankton Filter [9]; Dual 10 inch Prefilters [13 and 14]
Post Filtration: Charcoal Filter [39]; pH Neutralizing Filter [40]; Ultra Violet Sterilizer [41]
Fresh Water Flush System: Fresh Water Flush [46 - 49]none
Cleaning System: none
Inline Pressure Gauges: [4; 6; 8; 15; & 17]

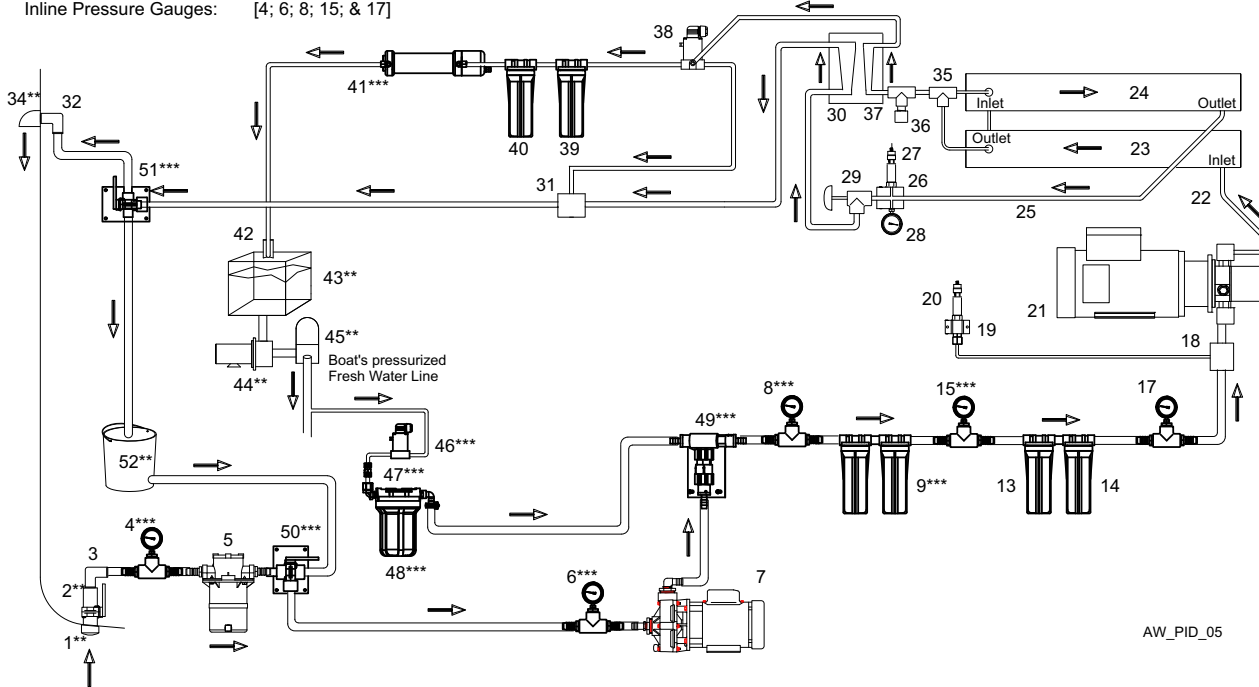


AW_PID_04

Aqua Whisper II 450-1800

Aqua Whisper Piping and Interconnect Diagram Including:

Prefiltration: Dual Plankton Filter [9]; Dual 10 inch Prefilters [13 and 14]
 Post Filtration: Charcoal Filter [39]; pH Neutralizing Filter [40]; Ultra Violet Sterilizer [41]
 Fresh Water Flush System: Fresh Water Flush [46 - 49]
 Cleaning System: Rinse/Clean Inlet Valve [50]; Rinse Clean Outlet Valve [51]
 Inline Pressure Gauges: [4; 6; 8; 15; & 17]

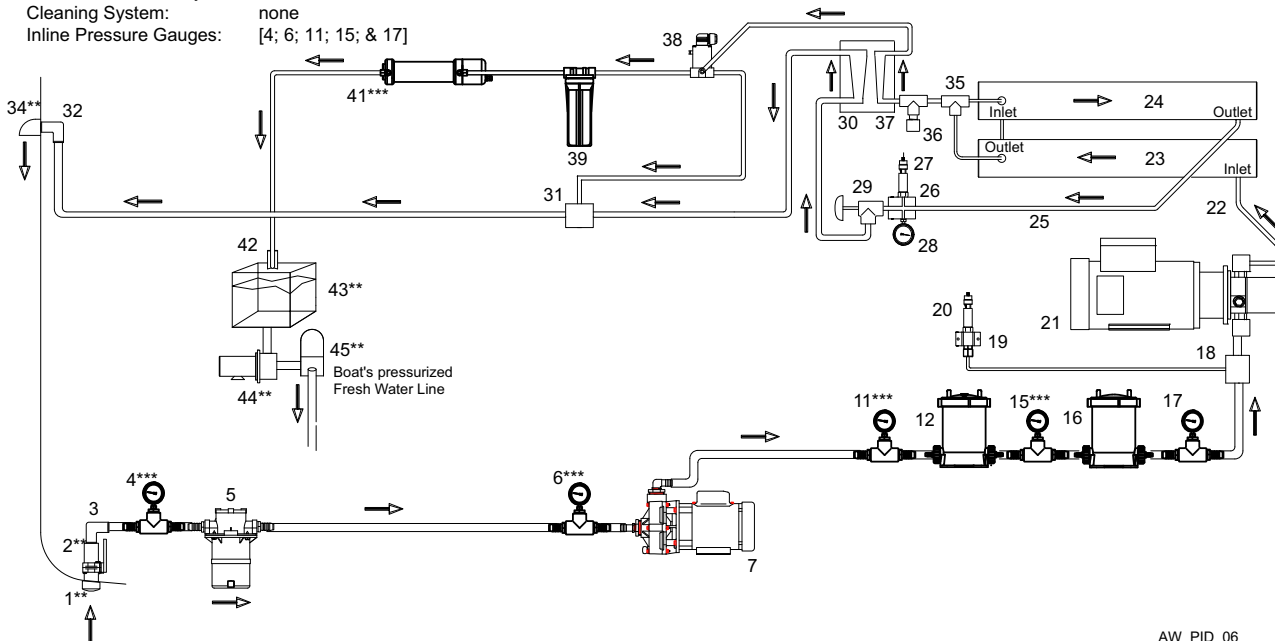


AW_PID_05

**NOTE: Illustrations show
[21] Optional HP Pump.**

Aqua Whisper Piping and Interconnect Diagram Including:

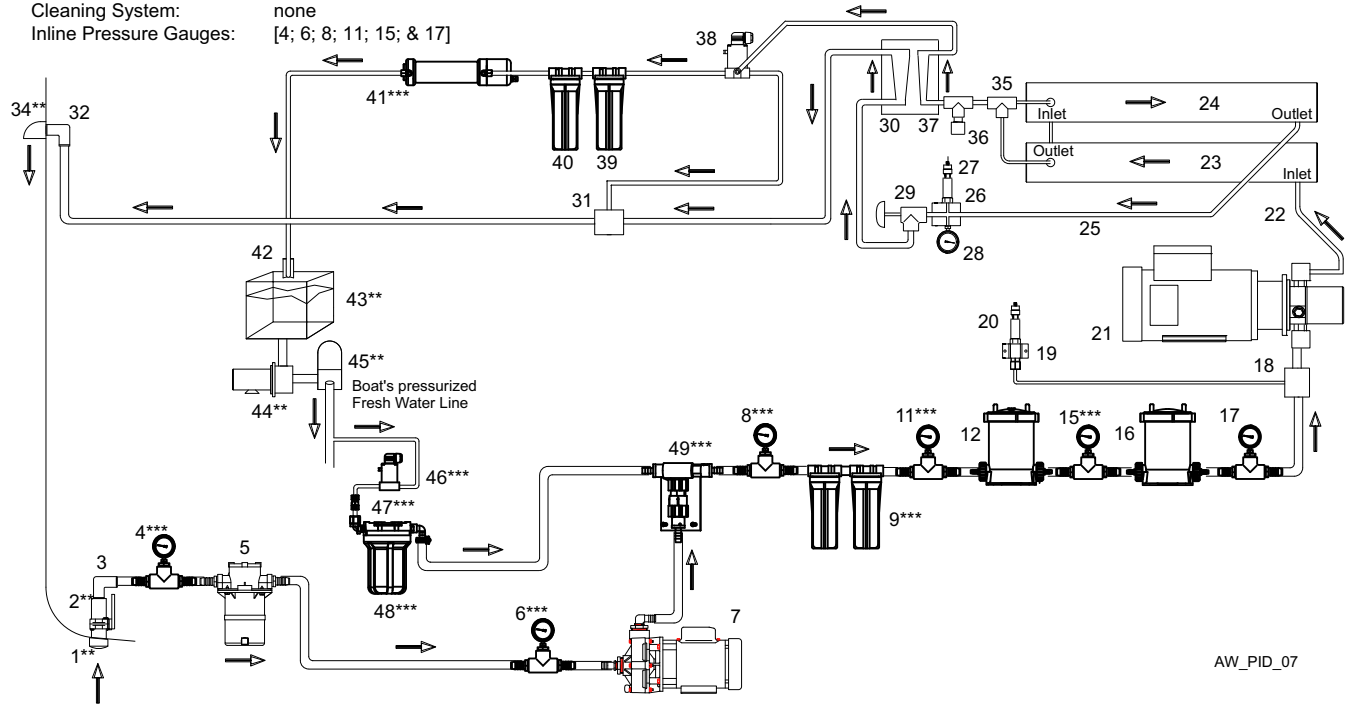
Prefiltration: Commercial Prefilter [12]; Oil Water Separator [16]
 Post Filtration: Charcoal Filter [39]; Ultra Violet Sterilizer [41]
 Fresh Water Flush System: none
 Cleaning System: none
 Inline Pressure Gauges: [4; 6; 11; 15; & 17]



AW_PID_06

Aqua Whisper Piping and Interconnect Diagram Including:

Prefiltration: Dual Plankton Filter [9]; Commercial Prefilter [12]; Oil Water Separator [16]
 Post Filtration: Charcoal Filter [39]; pH Neutralizer Filter [40]; Ultra Violet Sterilizer [41]
 Fresh Water Flush System: Fresh Water Flush [46 - 49]
 Cleaning System: none
 Inline Pressure Gauges: [4; 6; 8; 11; 15; & 17]

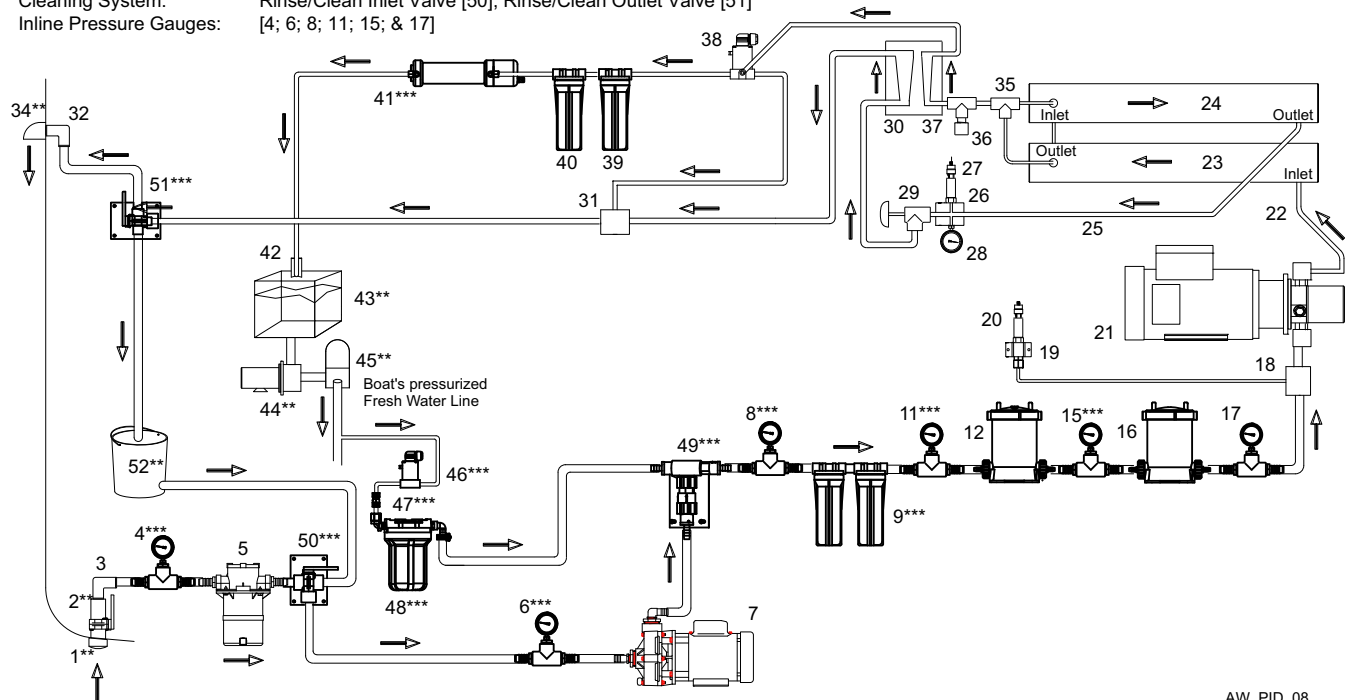


AW_PID_07

NOTE: Illustrations show [21] Optional HP Pump.

Aqua Whisper Piping and Interconnect Diagram Including:

Prefiltration: Dual Plankton Filter [9]; Commercial Prefilter [12]; Oil Water Separator [16]
 Post Filtration: Charcoal Filter [39]; pH Neutralizer Filter [40]; Ultra Violet Sterilizer [41]
 Fresh Water Flush System: Fresh Water Flush [46 - 49]
 Cleaning System: Rinse/Clean Inlet Valve [50]; Rinse/Clean Outlet Valve [51]
 Inline Pressure Gauges: [4; 6; 8; 11; 15; & 17]



AW_PID_08

Aqua Whisper II 450-1800

Aqua Whisper Piping and Interconnect Diagram Including:

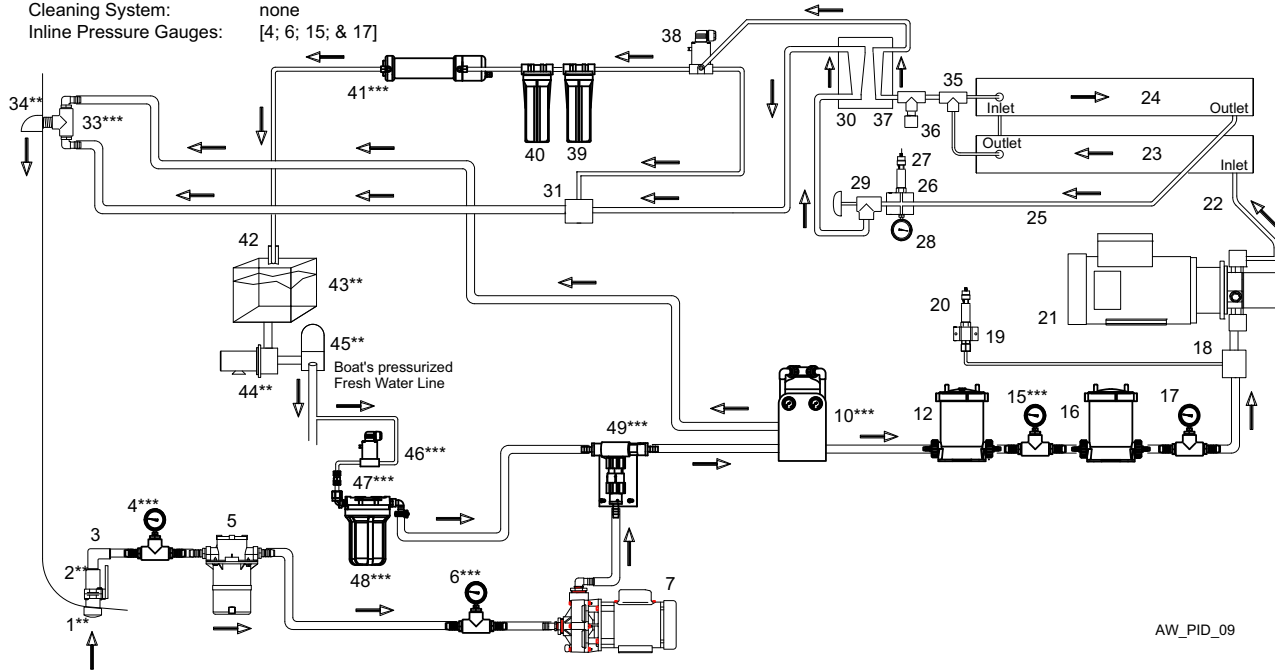
Prefiltration: Multi Media Filter [10]; Commercial Prefilter [12]; Oil Water Separator [16]

Post Filtration: Charcoal Filter [39]; pH Neutralizer Filter [40]; Ultra Violet Sterilizer [41]

Fresh Water Flush System: Fresh Water Flush [46 - 49]

Cleaning System: none

Inline Pressure Gauges: [4; 6; 15; & 17]



**NOTE: Illustrations show
[21] Optional HP Pump.**

Aqua Whisper Piping and Interconnect Diagram Including:

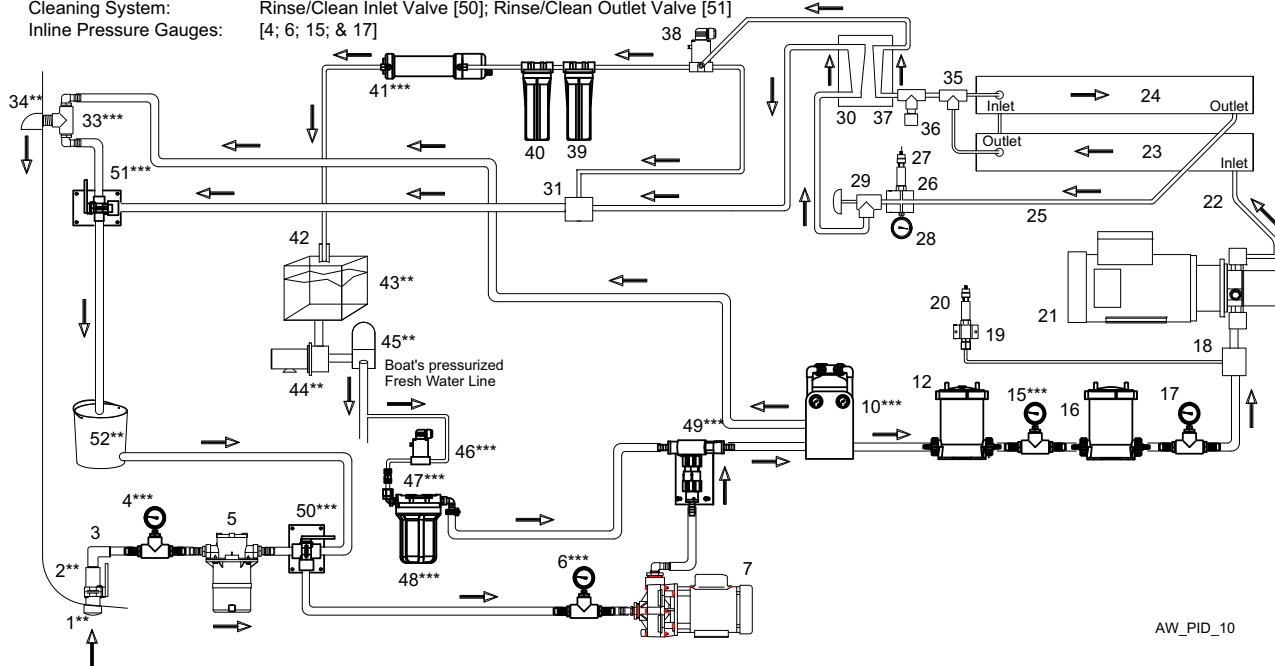
Prefiltration: Multi Media Filter [10]; Commercial Prefilter [12]; Oil Water Separator [16]

Post Filtration: Charcoal Filter [39]; pH Neutralizer Filter [40]; Ultra Violet Sterilizer [41]

Fresh Water Flush System: Fresh Water Flush [46 - 49]

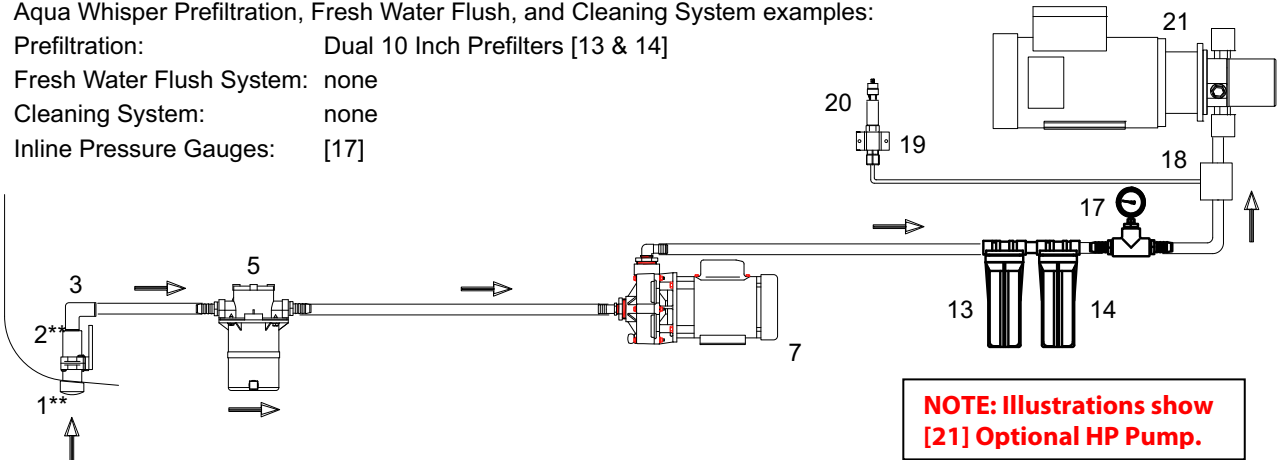
Cleaning System: Rinse/Clean Inlet Valve [50]; Rinse/Clean Outlet Valve [51]

Inline Pressure Gauges: [4; 6; 15; & 17]



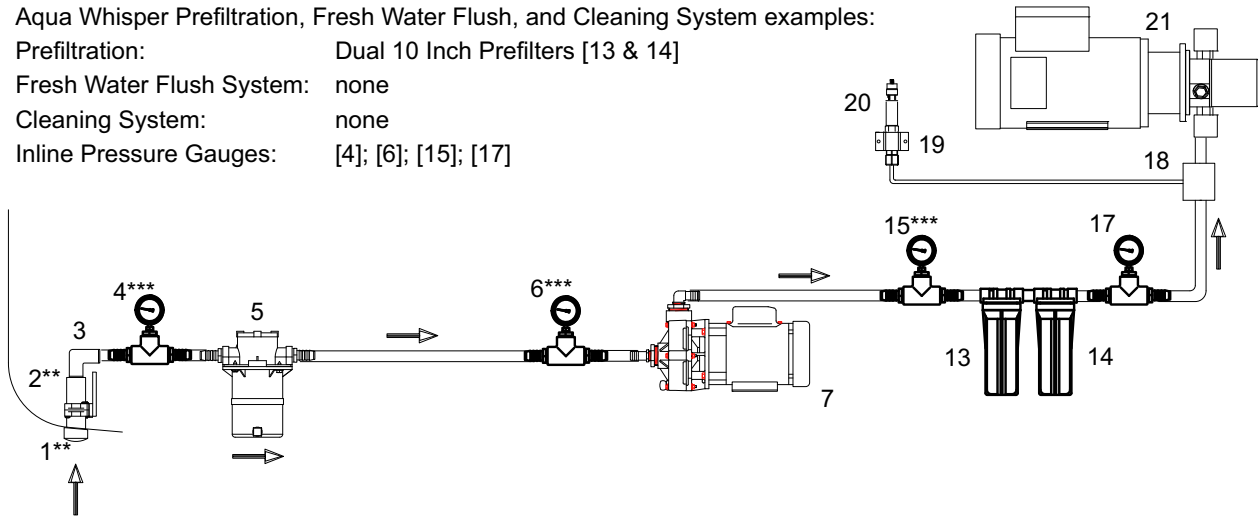
Aqua Whisper Prefiltration, Fresh Water Flush, and Cleaning System examples:

Prefiltration: Dual 10 Inch Prefilters [13 & 14]
Fresh Water Flush System: none
Cleaning System: none
Inline Pressure Gauges: [17]



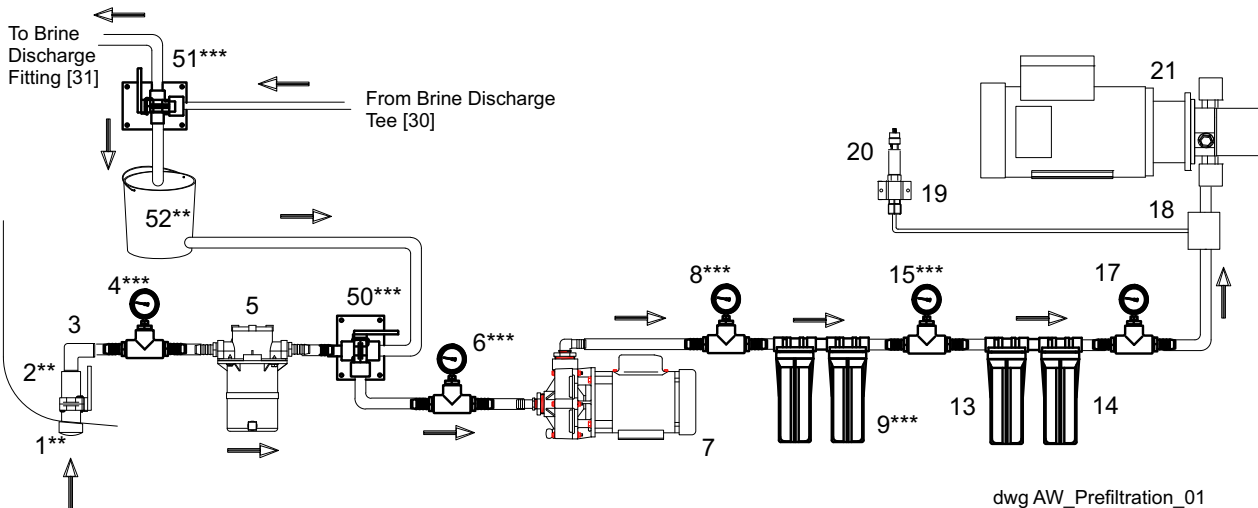
Aqua Whisper Prefiltration, Fresh Water Flush, and Cleaning System examples:

Prefiltration: Dual 10 Inch Prefilters [13 & 14]
Fresh Water Flush System: none
Cleaning System: none
Inline Pressure Gauges: [4]; [6]; [15]; [17]



Aqua Whisper Prefiltration, Fresh Water Flush, and Cleaning System examples:

Prefiltration: Dual Plankton Filter [9]; Dual 10 Inch Prefilters [13 & 14]
Fresh Water Flush System: none
Cleaning System: Rinse/Clean Inlet Valve [50]; Rinse/Clean Outlet Valve [51]
Inline Pressure Gauges: [4]; [6]; [8]; [15]; [17]



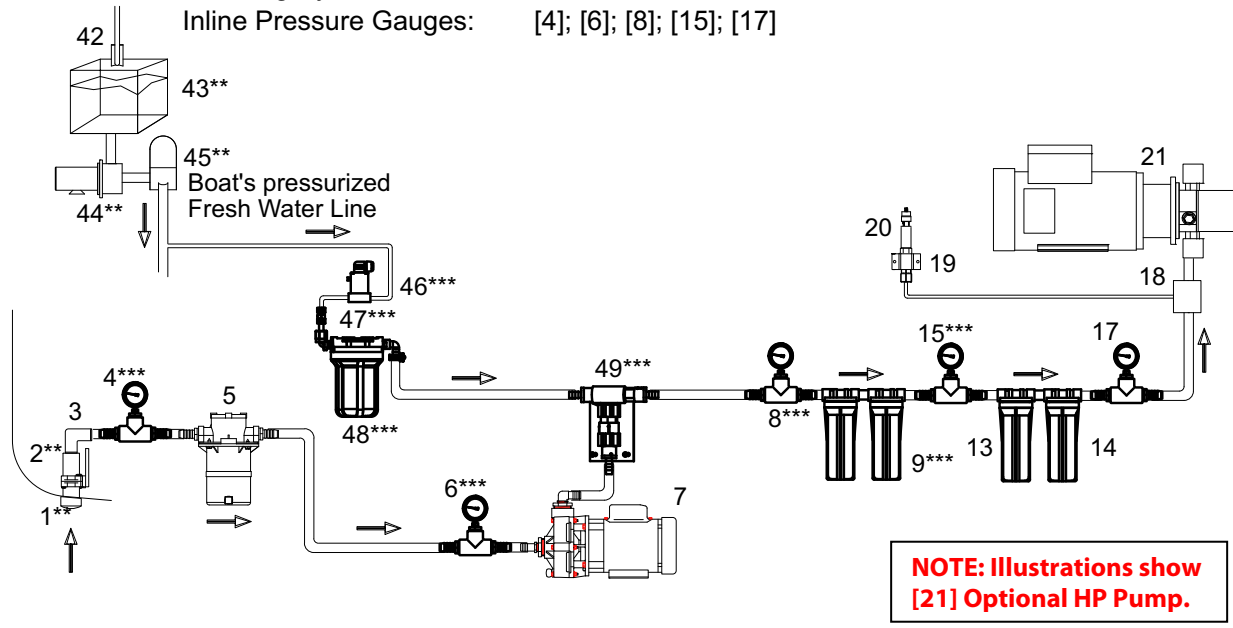
Aqua Whisper Prefiltration, Fresh Water Flush, and Cleaning System examples:

Prefiltration: Dual Plankton Filter [9]; Dual 10 Inch Prefilters [13 & 14]

Fresh Water Flush System: Fresh Water Flush [46 - 49]

Cleaning System: None

Inline Pressure Gauges: [4]; [6]; [8]; [15]; [17]



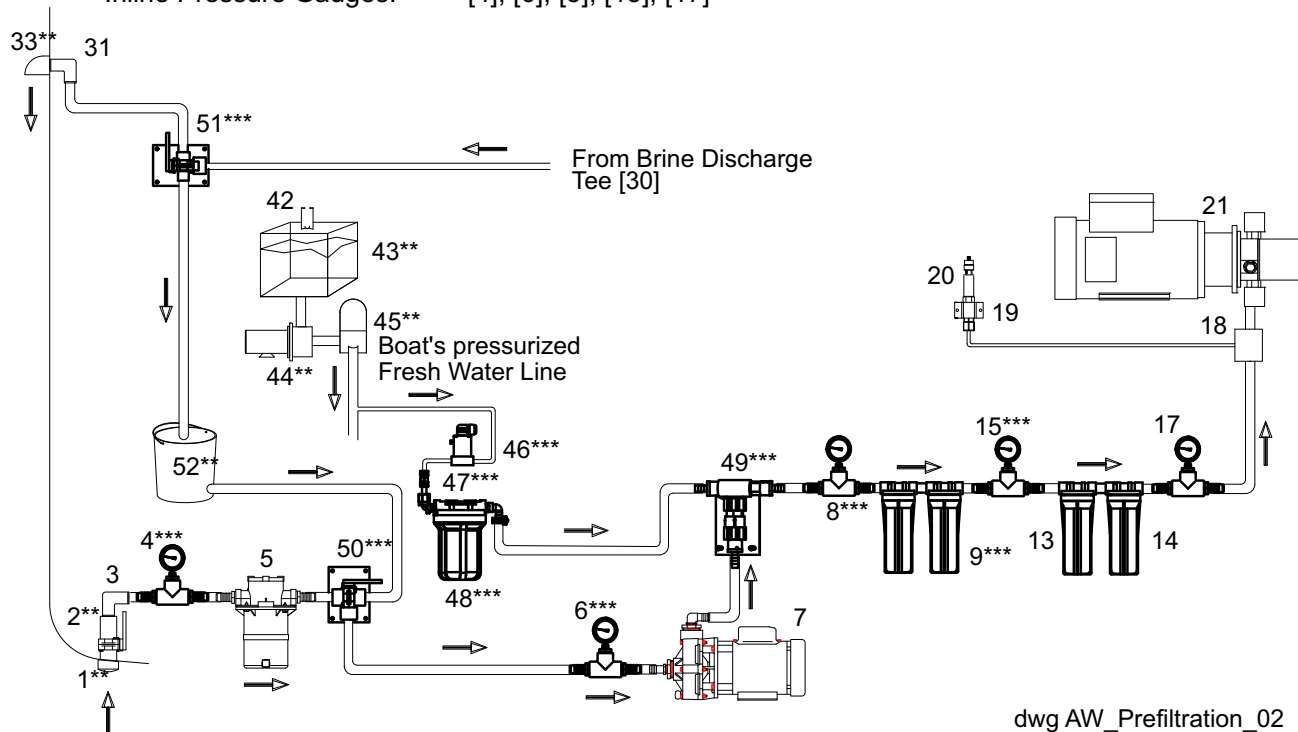
Aqua Whisper Prefiltration, Fresh Water Flush, and Cleaning System examples:

Prefiltration: Dual Plankton Filter [9]; Dual 10 Inch Prefilters [13 & 14]

Fresh Water Flush System: Fresh Water Flush [46 - 49]

Cleaning System: Rinse/Clean Inlet Valve [50]; Rinse/Clean Outlet Valve [51]

Inline Pressure Gauges: [4]; [6]; [8]; [15]; [17]



dwg AW_Prefiltration_02

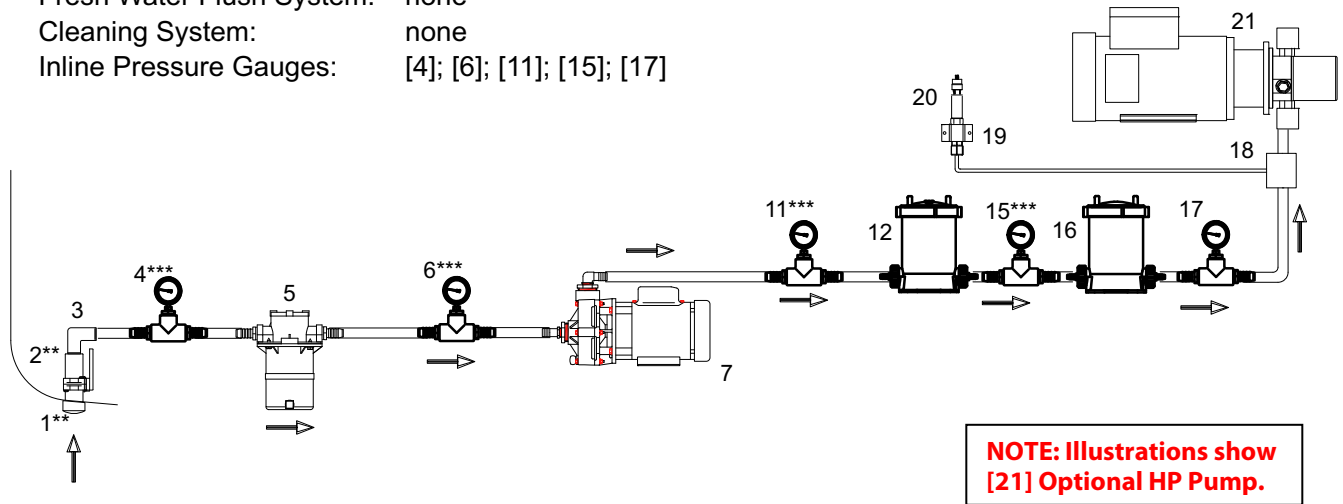
Aqua Whisper Prefiltration, Fresh Water Flush, and Cleaning System examples:

Prefiltration: Commercial Prefilter [12]; Oil/Water Separator [16]

Fresh Water Flush System: none

Cleaning System: none

Inline Pressure Gauges: [4]; [6]; [11]; [15]; [17]



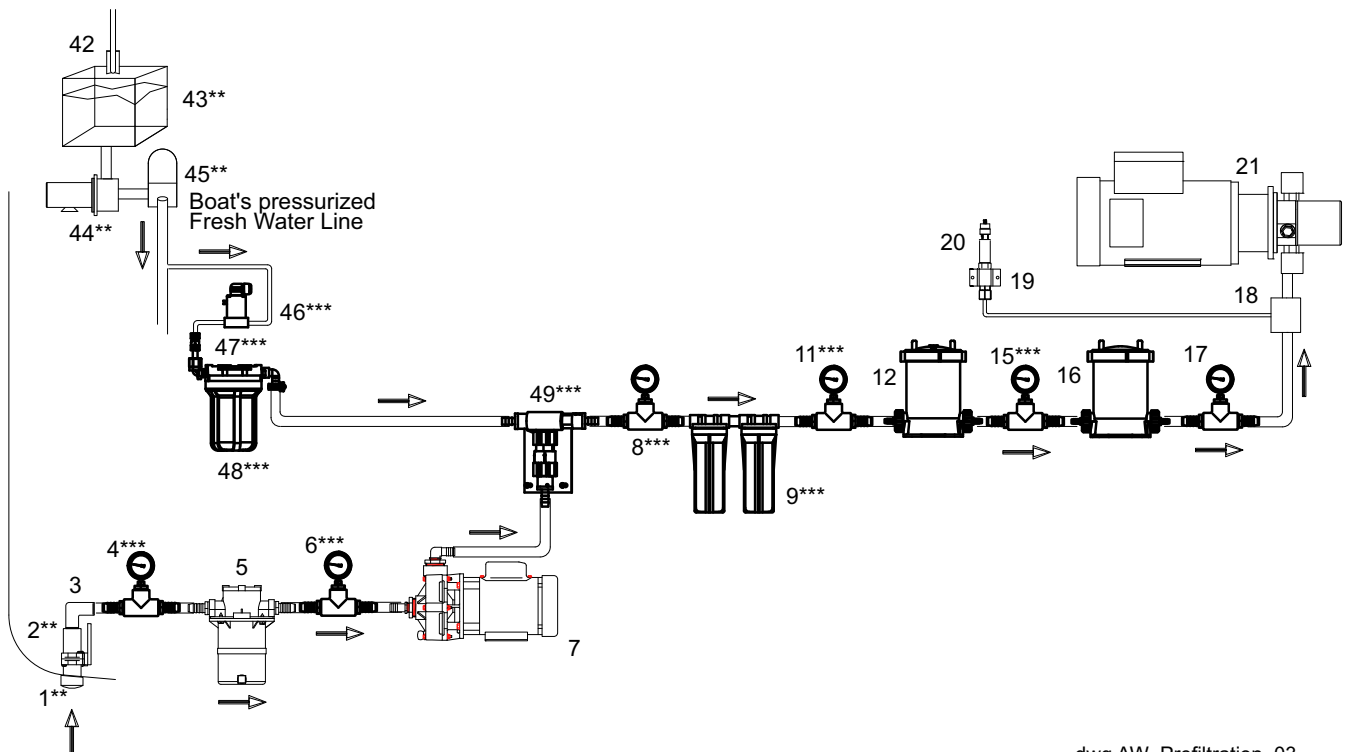
Aqua Whisper Prefiltration, Fresh Water Flush, and Cleaning System examples:

Prefiltration: Dual Plankton Filter [9]; Commercial Prefilter [12]; Oil/Water Separator [16]

Fresh Water Flush System: Fresh Water Flush [46 - 49]

Cleaning System: none

Inline Pressure Gauges: [4]; [6]; [8]; [11]; [15]; [17]]



dwg AW_Prefiltration_03

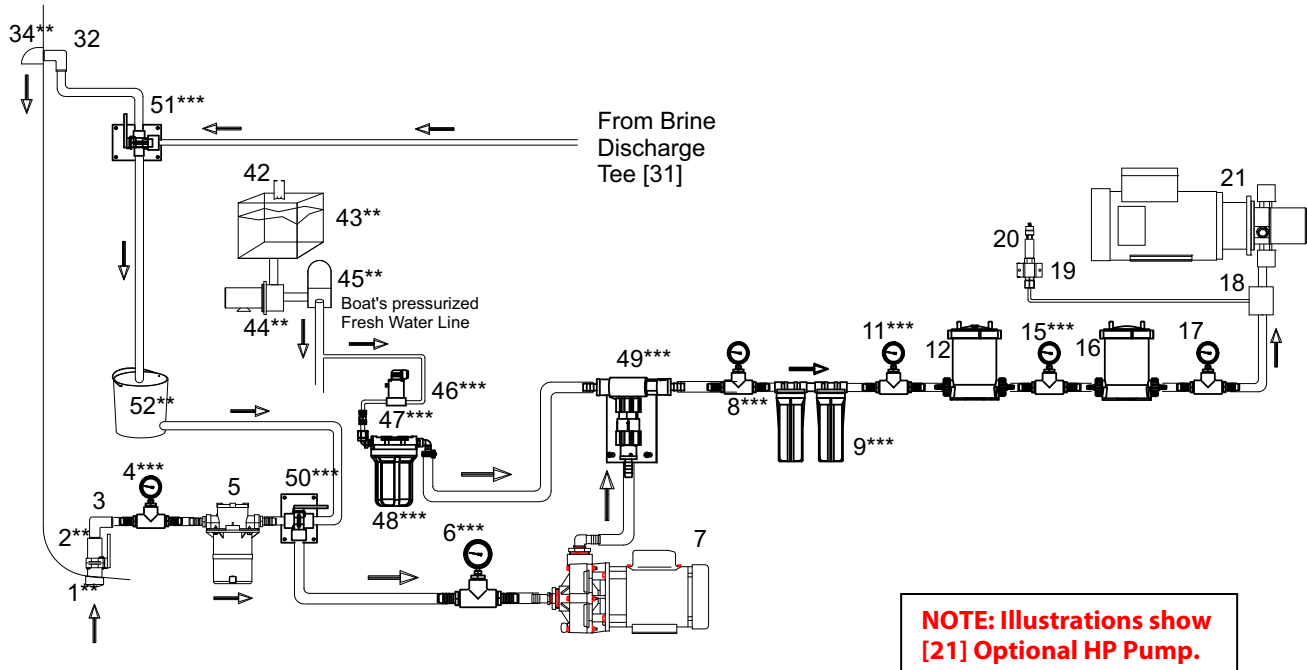
Aqua Whisper Prefiltration, Fresh Water Flush, and Cleaning System examples:

Prefiltration: Dual Plankton Filter [9]; Commercial Prefilter [12]; Oil/Water Separator [16]

Fresh Water Flush System: Fresh Water Flush [46 - 49]

Cleaning System: Rinse/Clean Inlet Valve [50]; Rinse/Clean Outlet Valve [51]

Inline Pressure Gauges: [4]; [6]; [8]; [11]; [15]; [17]



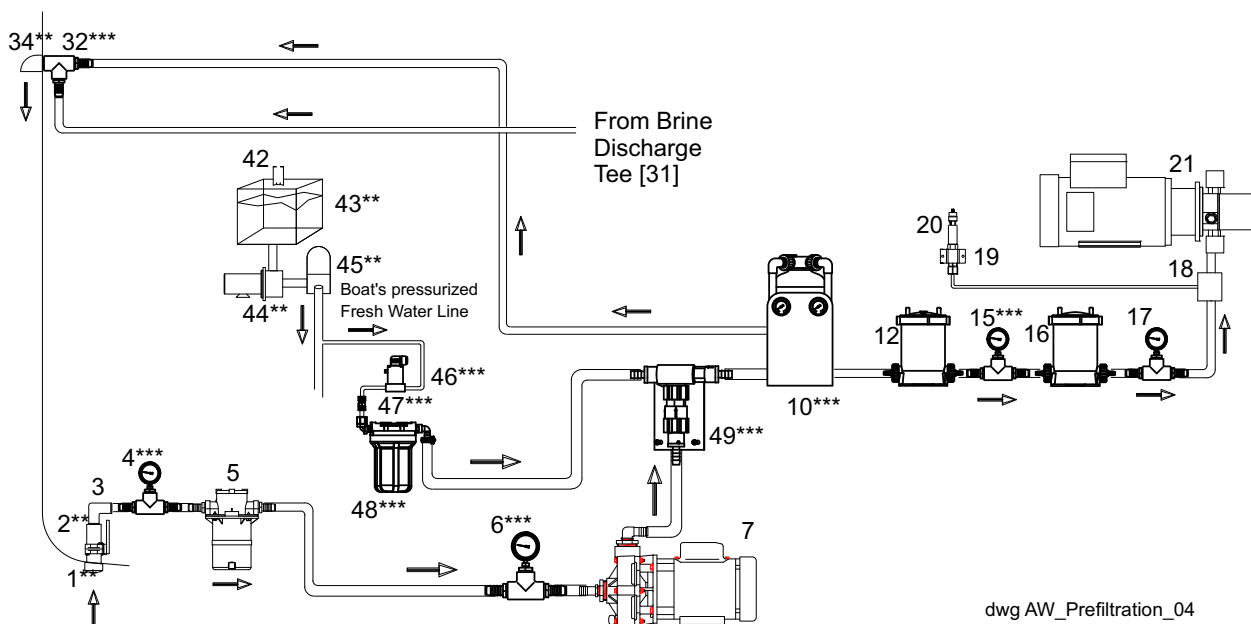
Aqua Whisper Prefiltration, Fresh Water Flush, and Cleaning System examples:

Prefiltration: Multi Media Filter [10]; Commercial Prefilter [12]; Oil/Water Separator [16]

Fresh Water Flush System: Fresh Water Flush [46 - 49]

Cleaning System: none

Inline Pressure Gauges: [4]; [6]; [15]; [17]



dwg AW_Prefiltration_04

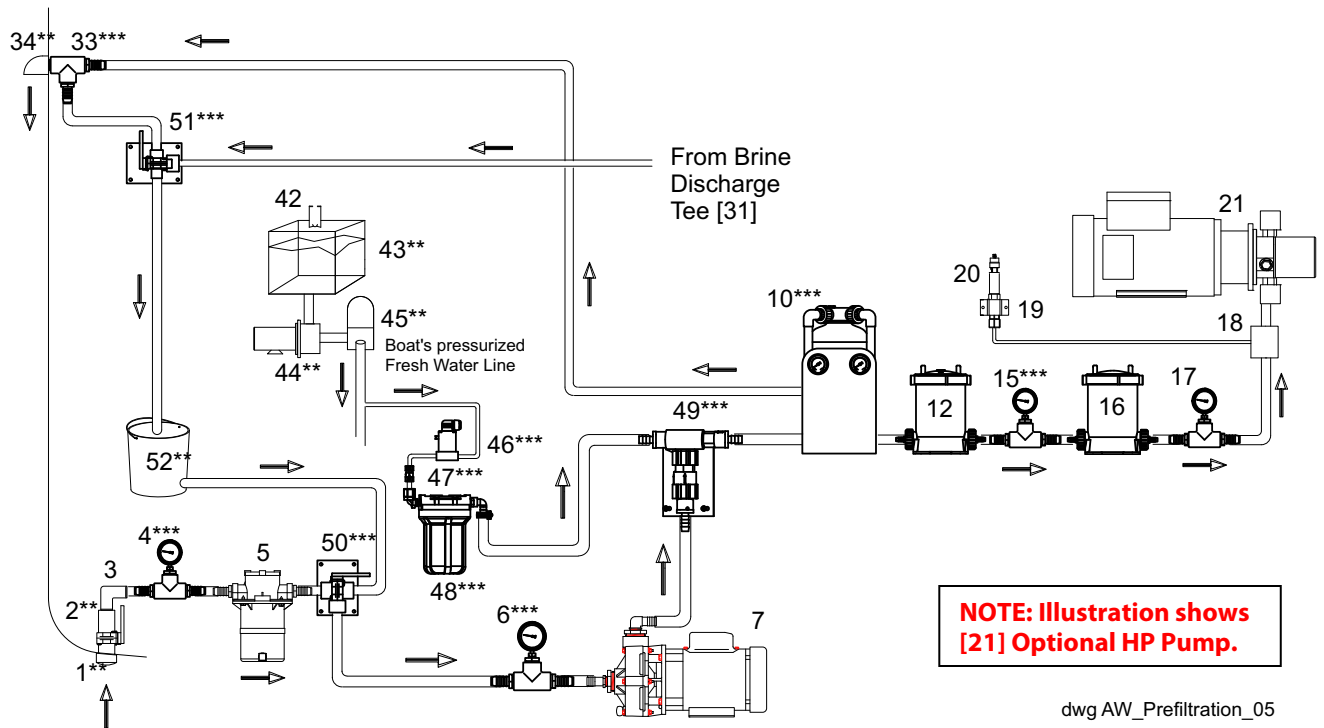
Aqua Whisper Prefiltration, Fresh Water Flush, and Cleaning System examples:

Prefiltration: Multi Media Filter [10]; Commercial Prefilter [12]; Oil/Water Separator [16]

Fresh Water Flush System: Fresh Water Flush [46 - 49]

Cleaning System: Rinse/Clean Inlet Valve [50]; Rinse/Clean Outlet Valve [51]

Inline Pressure Gauges: [4]; [6]; [15]; [17]

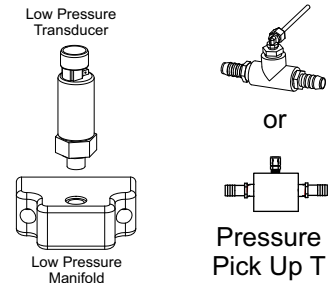


13. EXPLANATION OF PRESSURE TRANSDUCER:

The Illustration to the immediate right shows the Low Pressure Transducer included with each Aqua Whisper II System. It is located inside the Compact Style Frame or behind the Modular Style Control Panel. Connection to the Low Pressure Manifold is done with a 1/4" low pressure tube connected from the Pressure Pick-Up T [18], shown at the far right, to the Automation Control Box.

The Pressure Pick Up T [18] is located inside the Aqua Whisper II Compact System Frame and pre-connected by Sea Recovery.

For an Aqua Whisper II Modular System Installation the Pressure Pick Up T [18] is installed inline after the last prefiltration component and prior to the inlet of the high pressure pump [21].



14. PREFILTRATION CONFIGURATIONS:

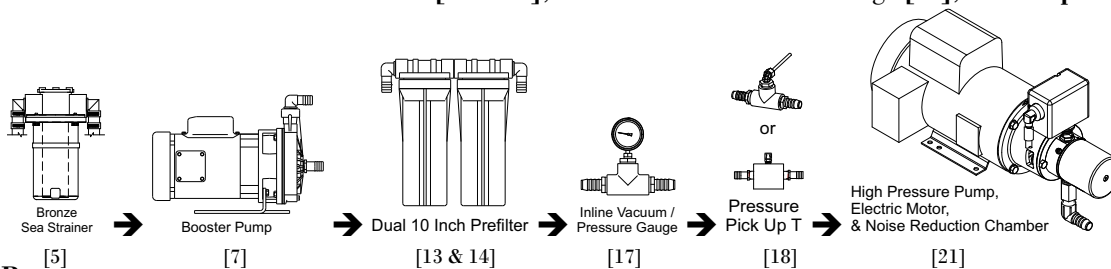
The following Illustrations show various Prefiltration Installation configurations. Determine which prefiltration configuration your system has been supplied with and plan component placement accordingly.

The 10 inch Dual Prefilters and the Commercial Prefilter serve the same function. Use either the 10 inch Dual Prefilters or the Commercial Prefilter. Do not use both. Using both is redundant and will lead to line pressure loss.

The Multi Media Filter and Plankton Filter serve the same function. The Multi Media filter has greater loading capacity but takes up more space for installation. When installing the Plankton Filter do not install a Multi Media Filter. When installing a Multi Media Filter do not install a Plankton Filter.

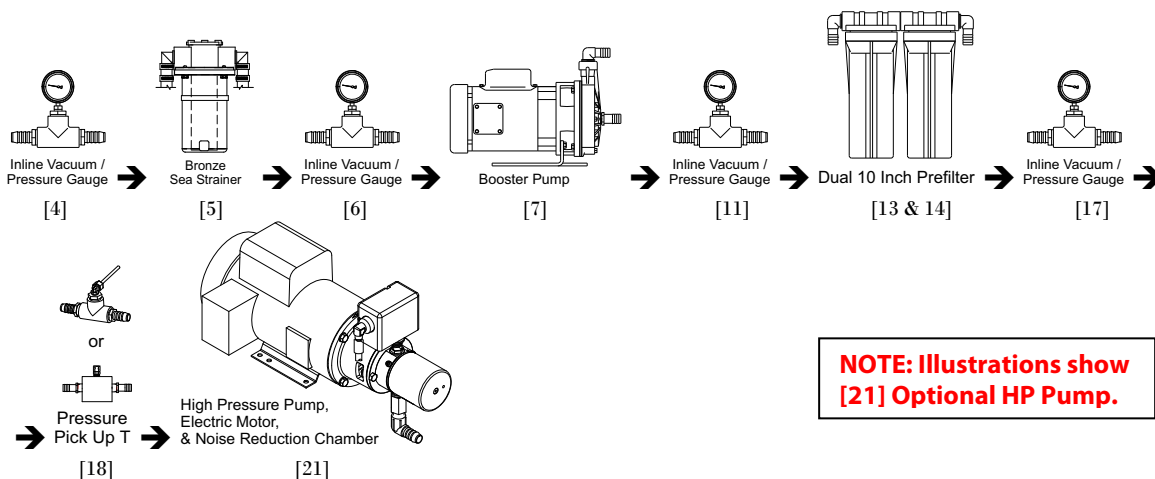
EITHER

With Standard Dual 10 Inch Prefilters [13 & 14], Inline Vacuum/Pressure Gauge [17], and no optional prefiltration:



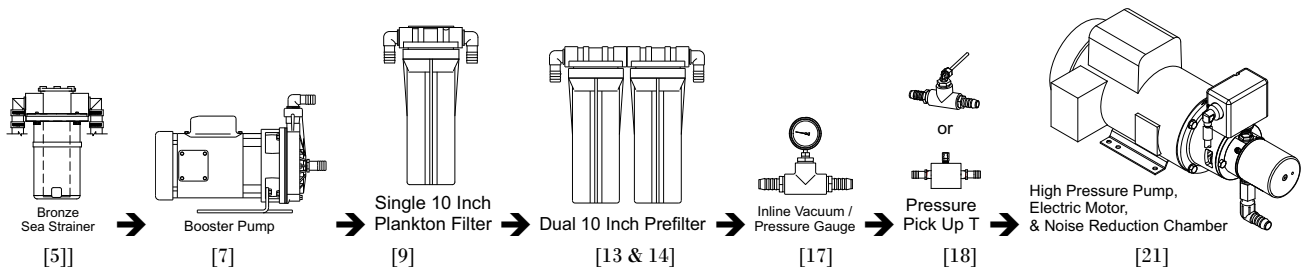
OR

With Standard Dual 10 Inch Prefilters [13 & 14] & Inline Vacuum/Pressure Gauges [4], [6], [11], & [17]:



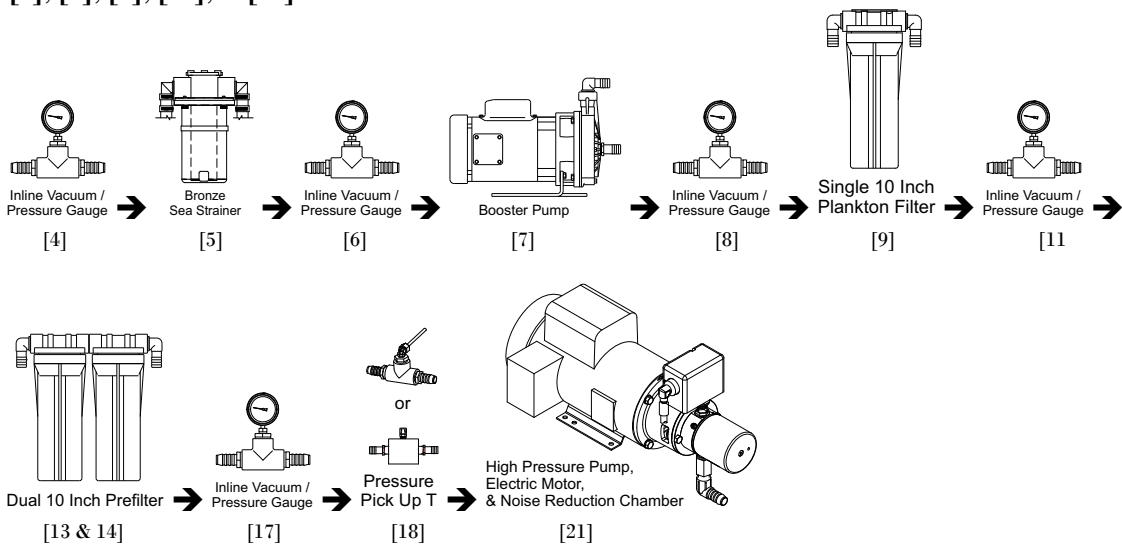
OR

With Single Plankton Filter [9], Standard Dual 10 Inch Prefiltration [13 & 14], and Inline Vacuum/Pressure Gauge [17]:



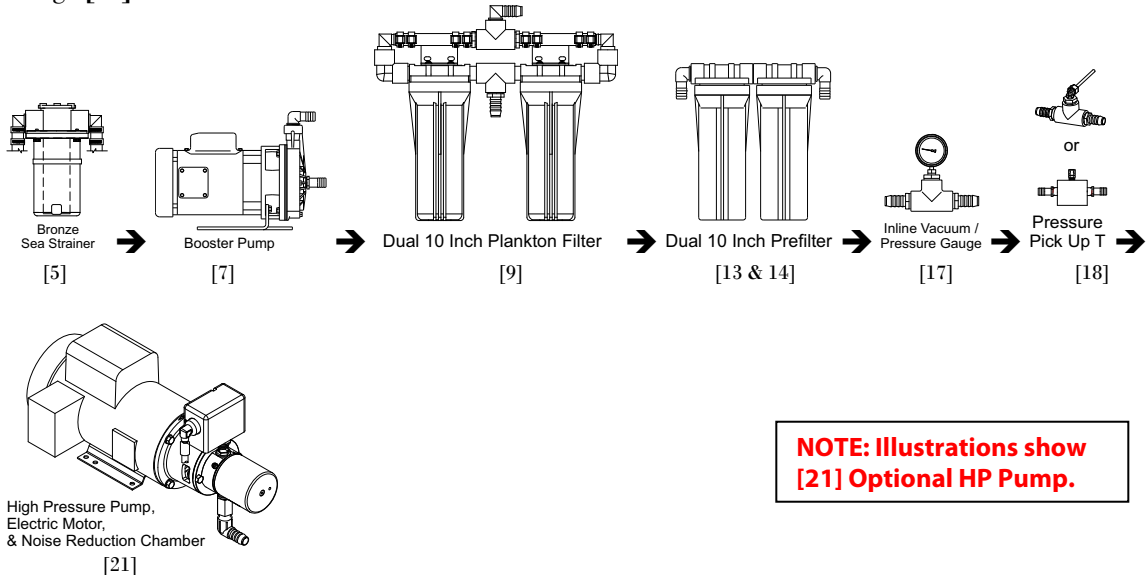
OR

With Single Plankton Filter [9], Standard Dual 10 Inch Prefiltration [13 & 14], and Inline Vacuum/Pressure Gauges [4], [6], [8], [11], & [17]:



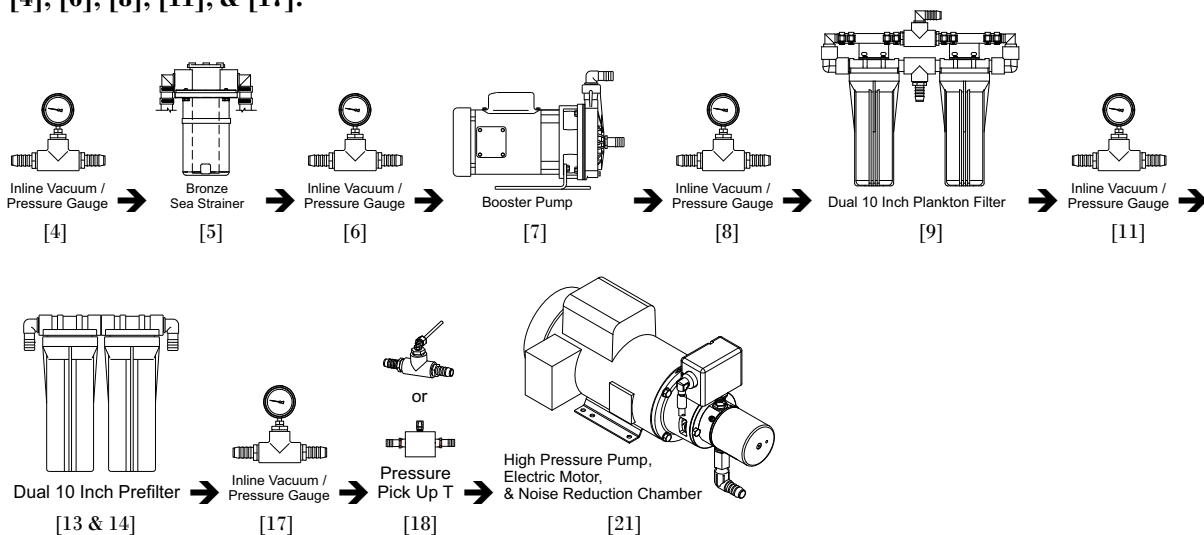
OR

With Dual Plankton Filter [9] and Standard Dual 10 Inch Prefiltration [13 & 14], and Inline Vacuum/Pressure Gauge [17]:



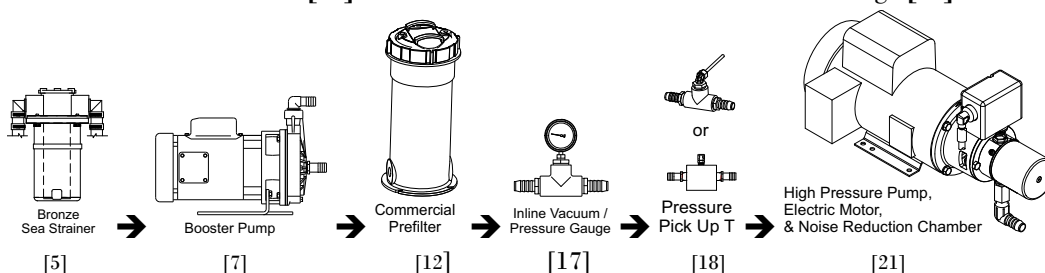
OR

With Dual Plankton Filter[9], Standard Dual 10 Inch Prefiltration [13 & 14], and Inline Vacuum/Pressure Gauges [4], [6], [8], [11], & [17]:



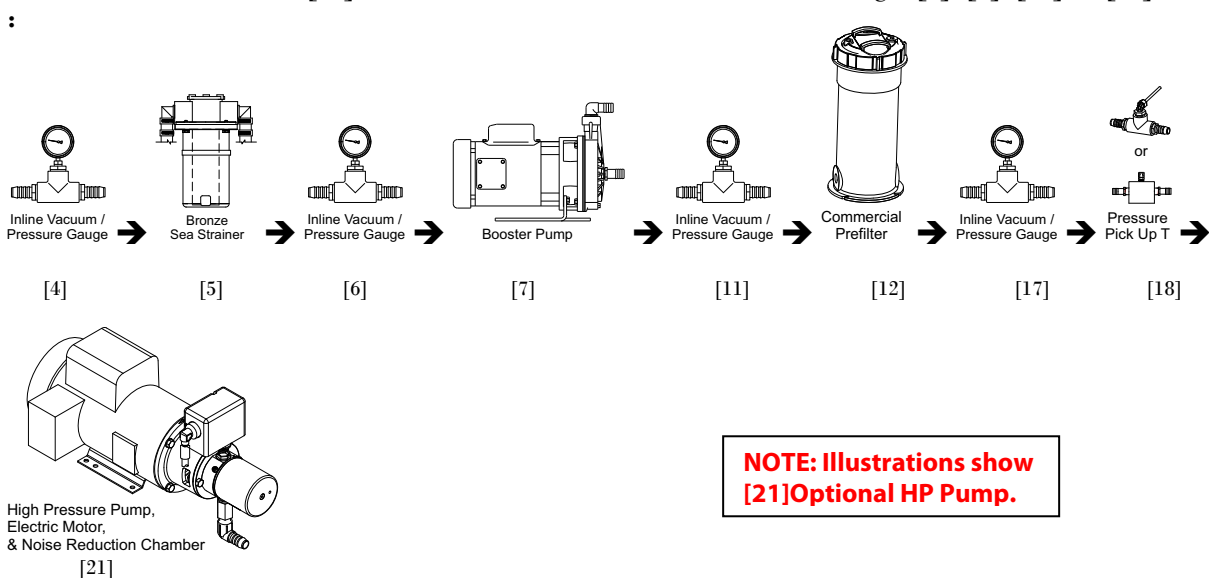
OR

With Commercial Prefilter [12] Prefiltration: and Inline Vacuum/Pressure Gauge [17]:



OR

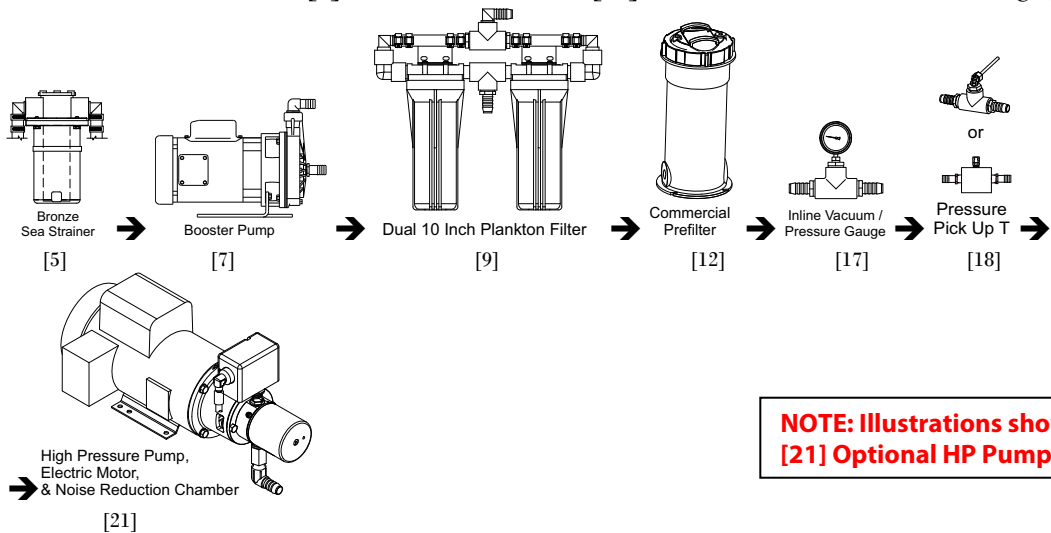
With Commercial Prefilter [12] Prefiltration, and Inline Vacuum/Pressure Gauges [4], [6], [11], & [17]:



NOTE: Illustrations show [21]Optional HP Pump.

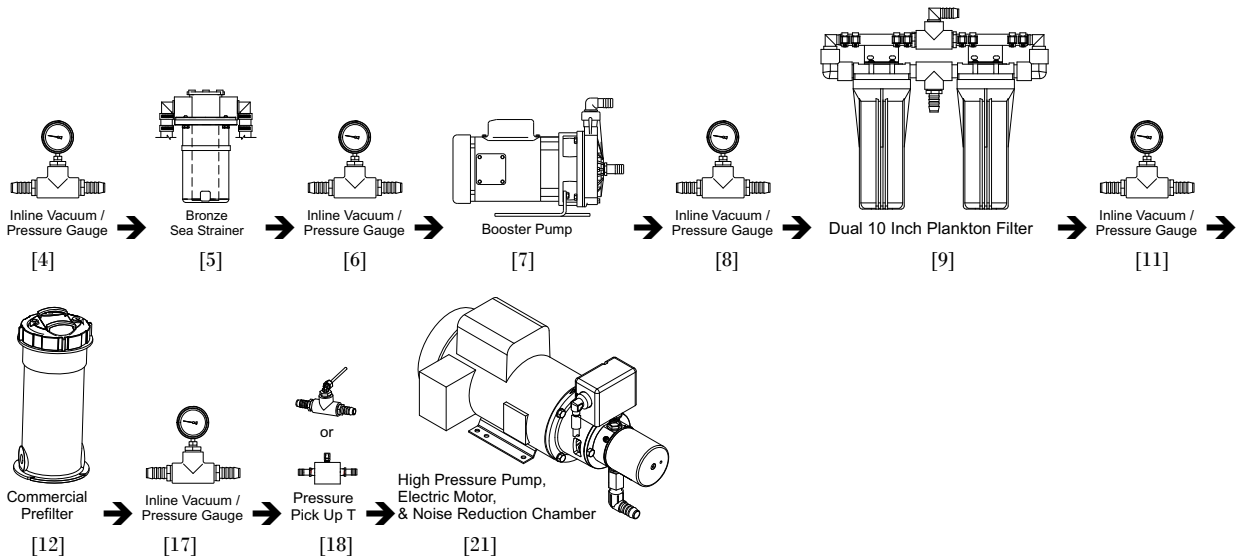
OR

With Dual Plankton Filter [9], Commercial Prefilter [12], and Inline Vacuum/Pressure Gauge [17]:



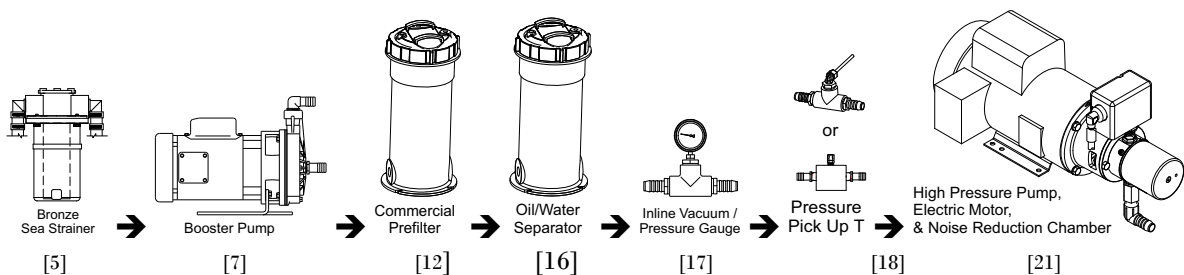
OR

With Dual Plankton Filter [9], and Commercial Prefilter [12] Prefiltration, and Inline Vacuum/Pressure Gauges [4], [6], [8], [11], & [17]:



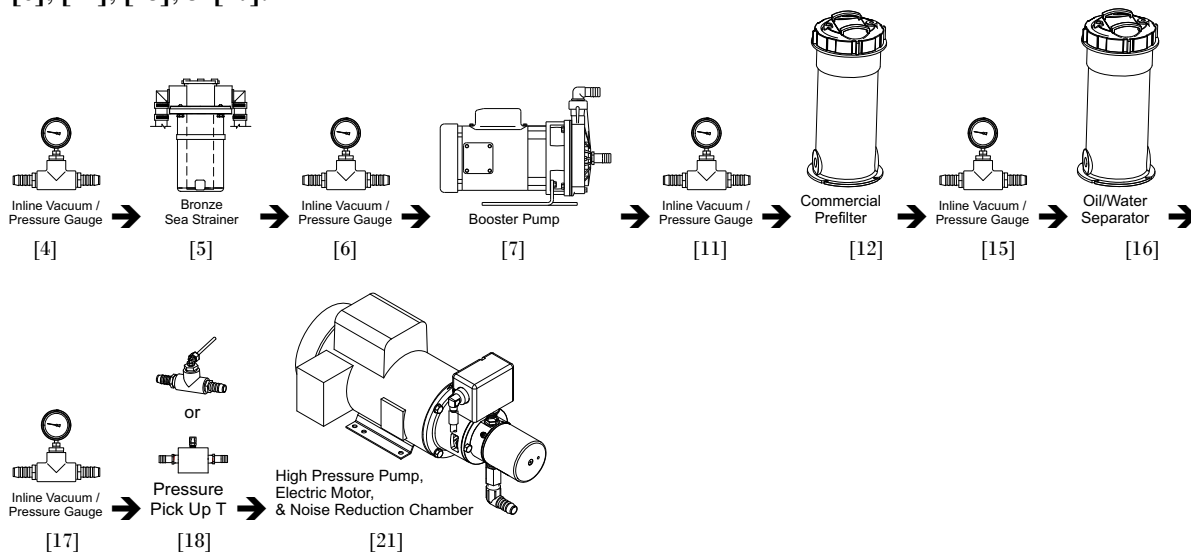
OR

With Commercial Prefilter [12] and Oil/Water Separator [16] Prefiltration, and Inline Vacuum/Pressure Gauge [17]:



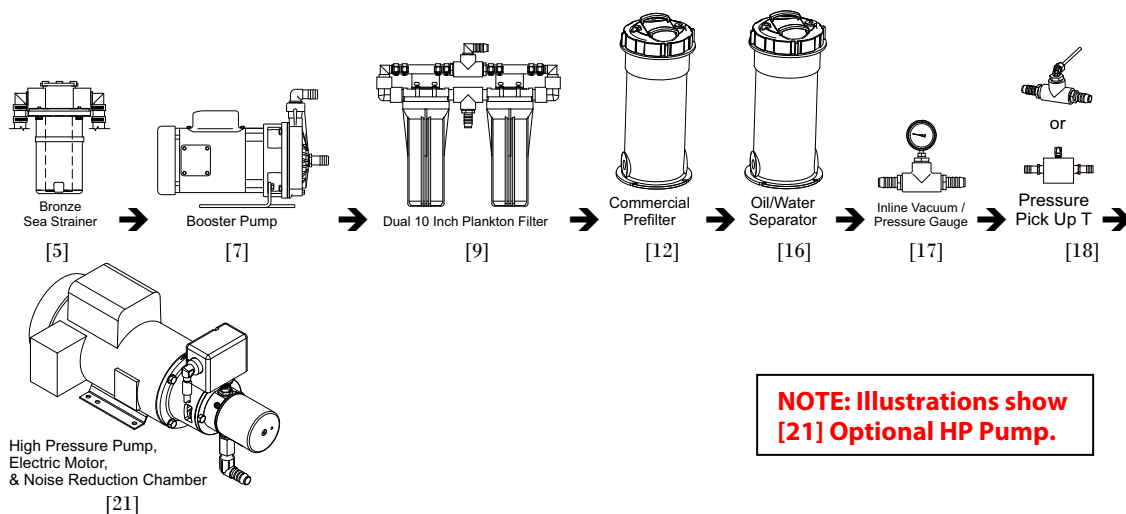
OR

With Commercial Prefilter [12] and Oil/Water Separator [16] Prefiltration, and Inline Vacuum/Pressure Gauges [4], [6], [11], [15], & [17]:



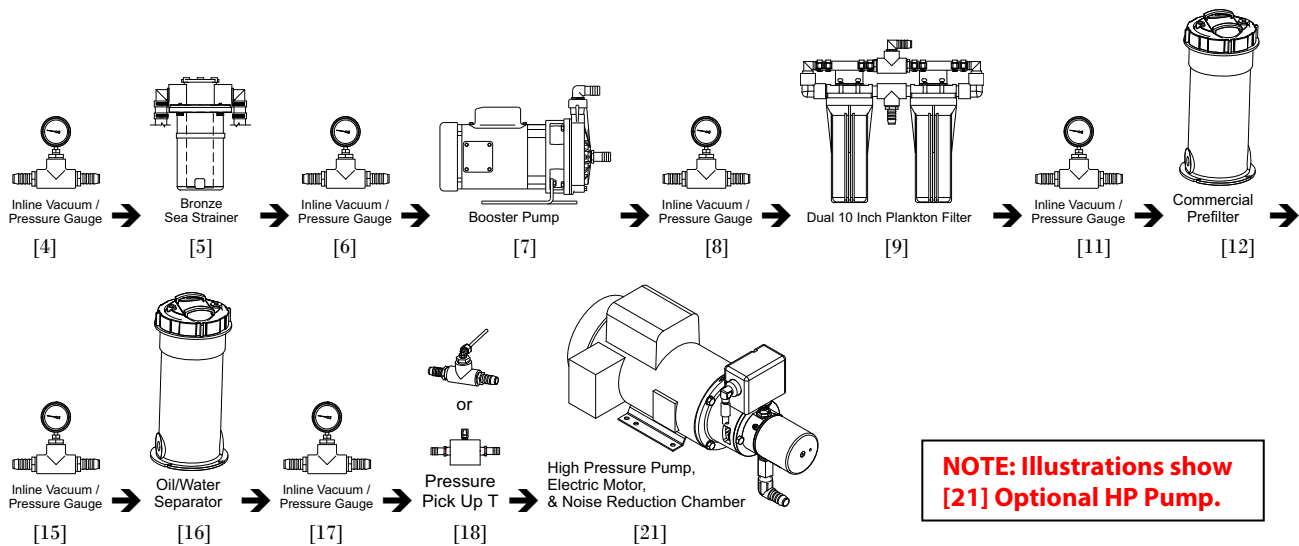
OR

With Dual Plankton Filter [9], Commercial Prefilter [12] and Oil/Water Separator [16] Prefiltration:



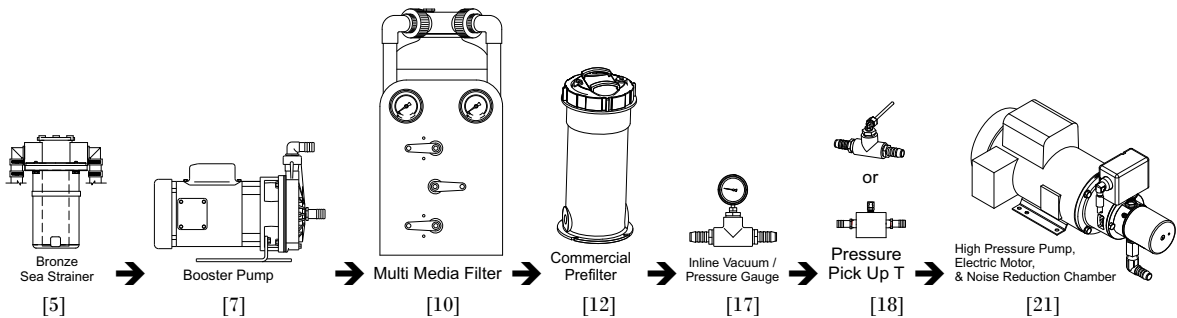
OR

With Dual Plankton Filter [9], Commercial Prefilter [12] and Oil/Water Separator [16] Prefiltration, and Inline Vacuum/Pressure Gauges [4], [6], [8], [11], [15], & [17]:



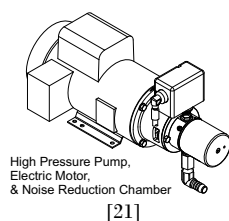
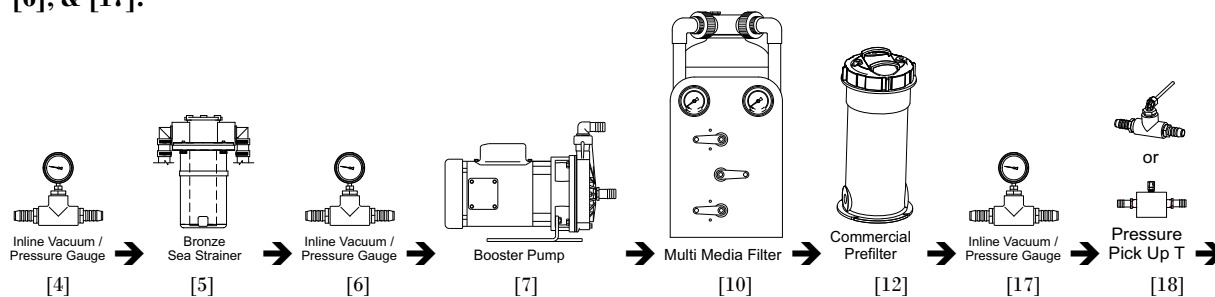
OR

With Multi Media Filter [10], and Commercial Prefilter [12], Prefiltration, and Inline Vacuum/Pressure Gauge [17]:



OR

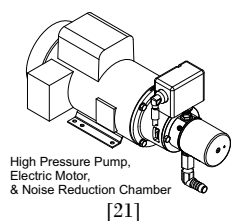
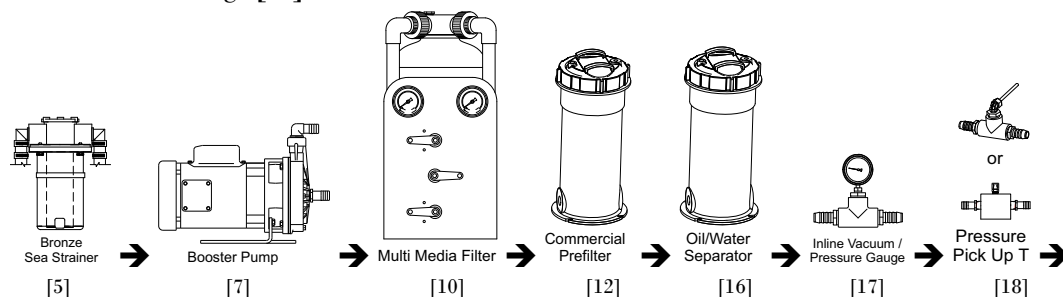
With Multi Media Filter [10], and Commercial Prefilter [12], Prefiltration, and Inline Vacuum/Pressure Gauges [4], [6], & [17]:



**NOTE: Illustrations show
[21] Optional HP Pump.**

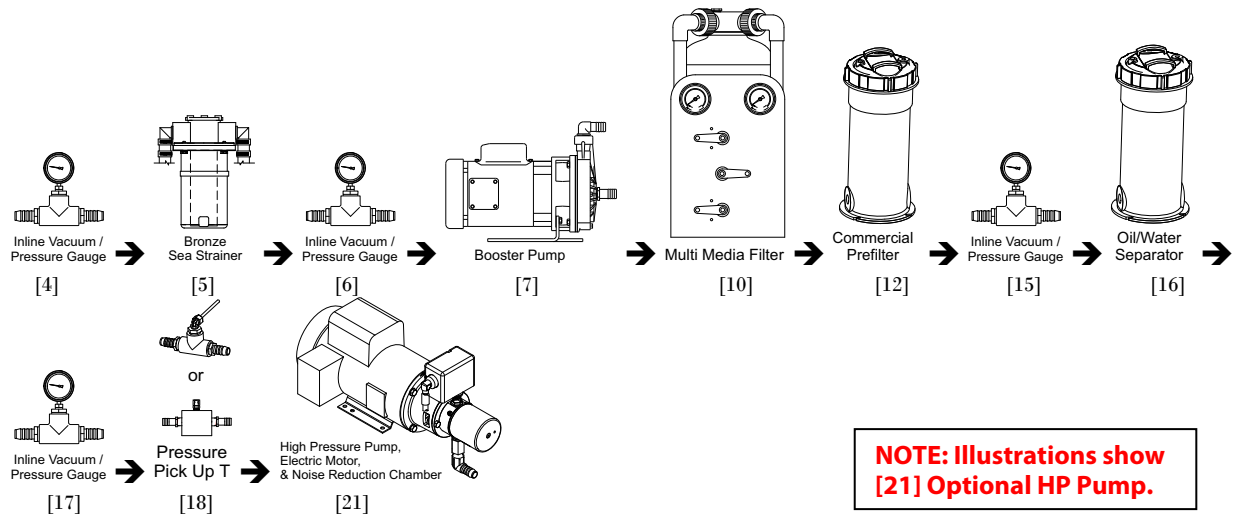
OR

With Multi Media Filter [10], Commercial Prefilter [12], and Oil/Water Separator [16] Prefiltration, and Inline Vacuum/Pressure Gauge [17]:



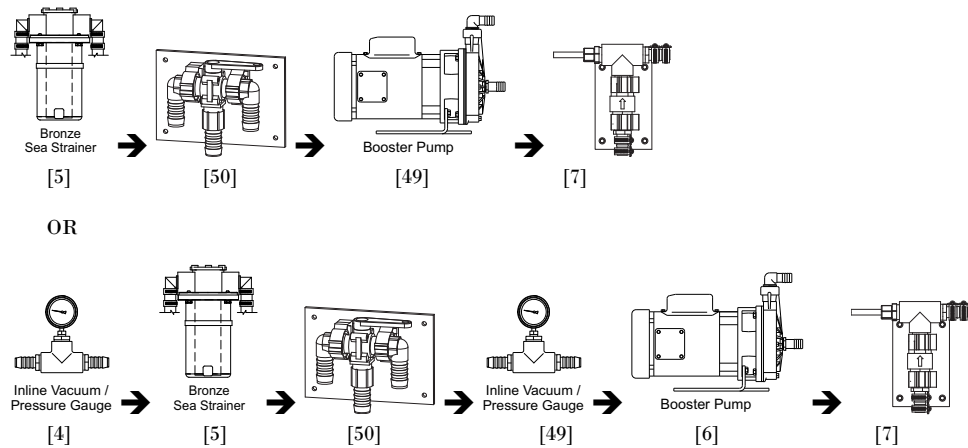
OR

With Multi Media Filter [10], Commercial Prefilter [12], and Oil/Water Separator [16] Prefiltration, and Inline Vacuum/Pressure Gauges [4], [6], [15], & [17]:



14. RINSE/CLEAN INLET VALVE and FRESH WATER FLUSH CHECK VALVE:

If the Rinse/Clean Inlet Valve [50] and/or the Fresh Water Flush Check Valve [49] are to be installed leave sufficient space for these components between the Sea Strainer [5] outlet and the Booster Pump [7] Inlet:



15. REVERSE OSMOSIS MEMBRANE ELEMENT NOTE:

CAUTION: Some systems are shipped WITHOUT the Reverse Osmosis Membrane Element. This is to accommodate, for example, Boat Builders that install the system well in advance of commissioning the boat and the Aqua Whisper II.

DOES THIS Sea Recovery Aqua Whisper II System HAVE R.O. MEMBRANE(S) INSTALLED OR NOT?

If not, is it your intention to install the R.O. Membrane(s) at this time, or do you wish to install them at a later date when the boat is commissioned?

If the Reverse Osmosis Membrane Element has been installed, there will be a Reverse Osmosis Membrane Element Serial Number tag, illustrated below, attached to the High Pressure Vessel(s). Find this Serial Number tag to ensure that the R.O. Membrane Element(s) has been installed.

If the R.O. Membrane Element Serial Number tag is missing or does not contain a serial number and date then the R.O. Membrane(s) is (are) not installed. If the R.O. Membrane Element(s) is (are) are not installed and you wish to install them at this time contact Sea Recovery and supply us with your original Purchase Order Number, Sea Recovery's Invoice Number, and this Aqua Whisper II's Serial Number.

Sea Recovery Rancho Dominguez, California 90220 U.S.A.
Tel: 1-310-637-3400 | Fax: 1-310-637-3430
Email: srcsales@searecovery.com

SERIAL NO:
FLOW: -->
DATE:

087945021505
BRINE INLET END
October 15, 2005

WARNING: IF THE REVERSE OSMOSIS MEMBRANE ELEMENT IS NOT TO BE INSTALLED AT THIS TIME ENSURE THAT YOU LEAVE A VISIBLE NOTE AT THE SYSTEM CONTROLLER AND AT THE FRONT OF THE CONTROL PANEL INFORMING THE END USER THAT: THE REVERSE OSMOSIS MEMBRANE ELEMENT(S) IS/ARE NOT INSTALLED; TO CONTACT THE FACTORY FOR THE R.O. MEMBRANE ELEMENT(S); AND DO NOT OPERATE THE SYSTEM WITHOUT THE R.O. MEMBRANE ELEMENT(S) INSTALLED.

EXTENSIVE DAMAGE WILL OCCUR IF THE AQUA WHISPER II SYSTEM IS OPERATED WITHOUT THE R.O. MEMBRANE ELEMENT(S) INSTALLED. DAMAGE TO THE SYSTEM CAUSED BY THE OPERATION OF THE SYSTEM WITHOUT R.O. MEMBRANE ELEMENT(S) INSTALLED IS: NOT COVERED BY THE SEA RECOVERY WARRANTY; IS THE LIABILITY OF THE INSTALLER IF THE INSTALLER DID NOT NOTIFY THE END USER; OR IS THE LIABILITY OF THE END USER IF THE INSTALLER NOTIFIED THE END USER THAT THE R.O. MEMBRANE(S) WERE NOT INSTALLED AND TO NOT OPERATE THE SYSTEM WITHOUT THE R.O. MEMBRANE ELEMENT(S) INSTALLED.

Installation of Aqua Whisper II COMPACT STYLE

REFER TO:

PAGES 36 - 45 SPECIFIC TO Aqua Whisper II COMPACT STYLE SYSTEM

or

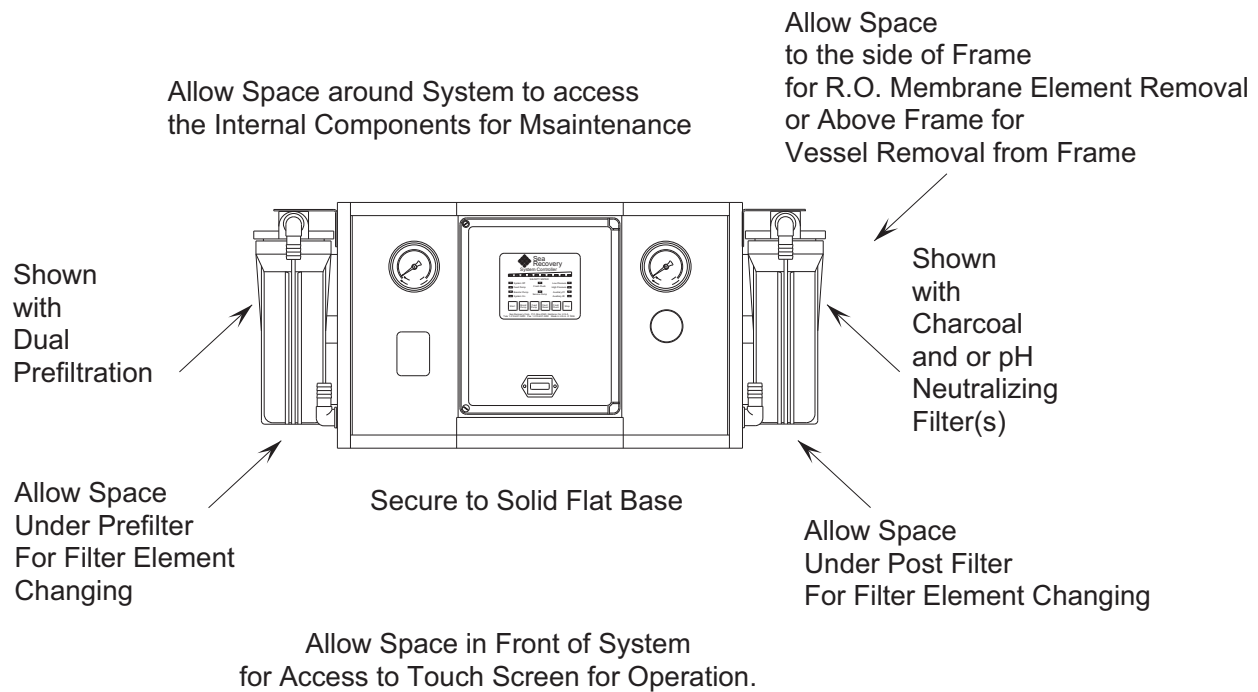
Installation of Aqua Whisper II MODULAR STYLE

REFER TO:

PAGES 46 - 63 SPECIFIC TO Aqua Whisper II MODULAR STYLE SYSTEM

SPECIFIC TO Aqua Whisper II COMPACT STYLE SYSTEM pages 36 - 45:

A. PLACEMENT AND SECURING THE MAIN SYSTEM FRAME:



The System Frame must be placed in a location that allows access for operation and maintenance. Allow sufficient room for Pre Filter and Post Filter bowl removal. Allow access to the right side of the frame for electrical wire attachment. Ensure that the Touch Pad is reachable and readable. Ensure that the Back Pressure Regulator Valve knob is reachable.

The System Frame is mounted in place with supplied hardware. 4 Threaded bolts and 4 sheet metal screws are provided for attachment. Set the System in place onto a flat surface and mark the mounting holes.

Move the System Frame out of the way and drill the appropriate hole depending on which hardware will be used, bolts or screws. Place the System Frame over the drilled holes and attach with the appropriate supplied washers, and bolts or screws.

B. COMPONENT MOUNTING:

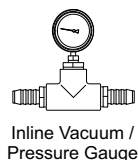
All mounting surfaces must be flat in order to avoid warping of brackets and frames. Any damage caused by attaching the system or its components to an uneven surface is attributed to improper installation, is the liability of the installer, and is not covered by the Sea Recovery warranty. Grind flat or use appropriate shims on uneven surfaces to ensure that mounting of the system components does not cause bending or warping.

Do not connect the water lines or electrical lines to the various components until each of the components are in place and secure. After all components are in place and secure visually inspect the layout to ensure that the plumbing hoses and tubes will connect kink free, in short and straight segments, and will avoid heat and abrasions from surrounding surfaces.

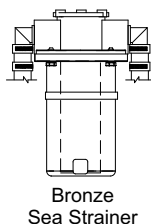
1. Attach the supplied **Inlet Connection [3]** to the Sea Cock Valve and rotate it towards the location of the Inline Vacuum/Pressure Gauge [4] if used, or Sea Strainer [5] Inlet.



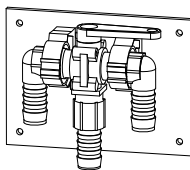
2. Allow sufficient space between the Inlet Connection [3] and Sea Strainer [5] for the **Inline Vacuum/Pressure Gauge [4]**, if used.



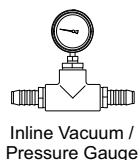
3. The **Sea Strainer [5]** is mounted to a flat vertical surface, below water level, after the Inlet Connection [3], or Inline Vacuum/Pressure Gauge [4] if used. Allow clearance above the bowl to access the mesh screen for cleaning or replacement.



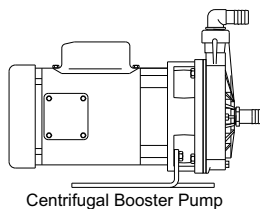
4. The **Rinse Clean Inlet Valve [50]** is mounted below water level after the Sea Strainer [5]. Allow access for the operator to reach and turn the valve handles.



5. Allow sufficient space between the Sea Strainer [5] outlet or if used the Rinse Clean Inlet Valve [50] and or Fresh Water Flush Check Valve [49] for the **Inline Vacuum/Pressure Gauge [6]**, if used.

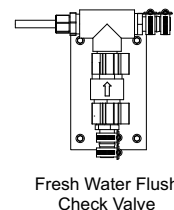


6. The **Booster Pump [7]** is mounted to a flat horizontal surface using the 4 supplied #10 x 1 1/4" long Type "A" screws. The **Booster Pump** is mounted below water level to assist priming, and in an accessible location to allow access for maintenance. Keep the **Booster Pump** close to the Inlet Thru Hull Connection [3], Sea Strainer [5], Rinse/Clean Inlet Valve [50] if used, Fresh Water Flush Check Valve [49] if used, and Inline

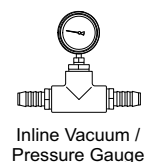


Vacuum/Pressure Gauge [6] if used. If the **Booster Pump** is mounted Vertical place the **Pump Head** at the bottom and the electric motor at the top. **WARNING:** If the pump head is above the electric motor salt water damage to the electric motor will occur when the pump seal weeps or leaks.

7. The **Automatic Fresh Water Flush Check Valve [49]** is mounted to a flat vertical surface, below water level, after the **Booster Pump [7]**. Mount the **Automatic Fresh Water Flush Check Valve** vertical with the arrow pointing UP. Mounting the valve horizontal or with arrow pointing down may cause it to not properly function.



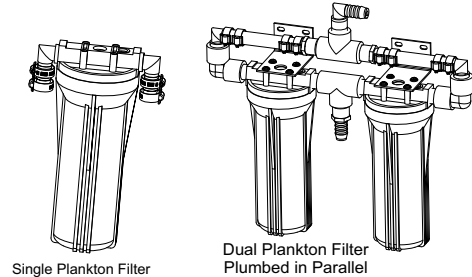
8. Allow sufficient space after the **Booster Pump [7]** Outlet for the **Inline Vacuum/Pressure Gauge [8]**, if used. If the **Multi Media Filter** is installed this **Inline Vacuum/Pressure Gauge [8]** is not required as the **Multi Media Filter** includes inlet and outlet pressure gauges.



9. If desired, install either the Multi Media Filter [10] or the Plankton Filter [9] single or dual.

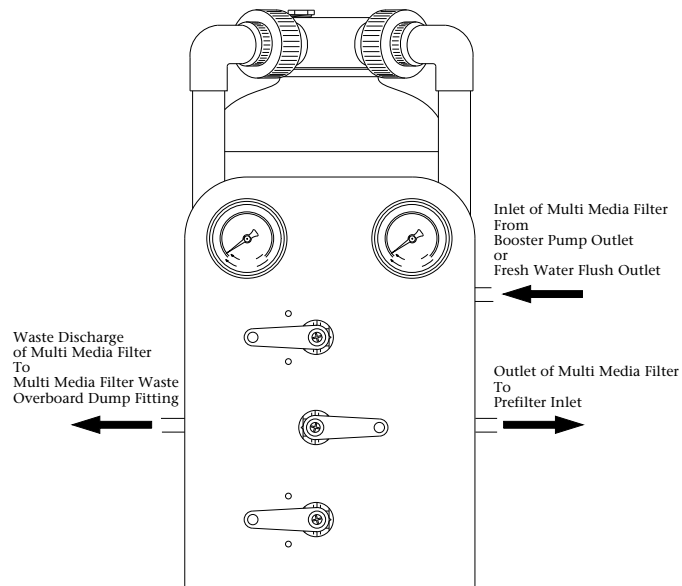
The Multi Media Filter and Plankton Filter serve the same function. The Multi Media filter has greater loading capacity but takes up more space for installation. When installing the Plankton Filter do not install a Multi Media Filter. When installing a Multi Media Filter do not install a Plankton Filter.

The **Plankton Filter [9]**, either the single or double housing version, is mounted to a flat vertical surface using the supplied screws. Allow minimum 4 inches (10 cm) below the bowl, and allow accessibility to the Plankton Filter for mesh screen removal and maintenance. Mount the Plankton Filter in close proximity to the outlet of the Booster Pump

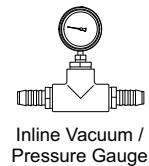


OR

The optional **Multi Media Filter [10]** is mounted to a flat horizontal surface using the supplied screws. Maintain an orientation and accessibility that allows the operator to view the pressure gauges, and adjust the valves mounted to the Multi Media Filter. Mount the Multi Media Filter in close proximity to the outlet of the Booster Pump. Refer to the illustration on the following page for Multi Media Filter Port orientation.

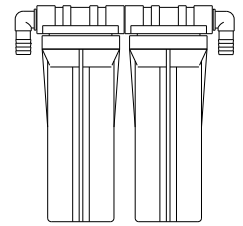


10. Allow sufficient space after the Plankton Filter [9] Outlet for the **Inline Vacuum/Pressure Gauge [11]**, if used. If the Multi Media Filter is installed this Inline Vacuum/Pressure Gauge [11] is not required as the Multi Media Filter includes inlet and outlet pressure gauges.



11. Prefilter. The **10 inch Dual Prefilters [13 & 14]** and the **Commercial Prefilter [12]** serve the same function. Use either the 10 inch Dual Prefilters or the Commercial Prefilter. Do not use both. Using both is redundant and will lead to line pressure loss.

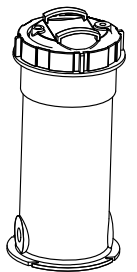
The **Dual Prefilters [13 & 14]** are mounted to the Aqua Whisper II Compact System frame. Remote mounting is permissible to a flat vertical surface. If remote mounted, allow minimum 4 inches (10 cm) below the bowl, and allow accessibility to the Filters for element removal and maintenance.



Dual 10 Inch Prefilter

or (either install the Dual Prefilters or Commercial Prefilter. Installing both is redundant and will lead to line pressure loss).

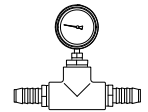
The no-charge optional **Commercial Prefilter [12]** replaces the 10 inch Dual Prefilters [13 & 14]. The Commercial Prefilter is mounted to a flat horizontal surface using the supplied screws. Maintain an orientation and accessibility that allows the operator access to remove the filter element for maintenance. Allow minimum 12 inches above the top of the housing for filter element removal. Mount the Commercial Prefilter in close proximity to the outlet of the Booster Pump and the System frame. The commercial prefilter is plumbed as per the raised arrow and Inlet & Outlet letters molded into the filter housing. The correct water flow enters the outer surface of the filter element and migrates to the center core.



Commercial Prefilter

REFER TO THE ILLUSTRATION ON THE FOLLOWING PAGE OF THIS SECTION.

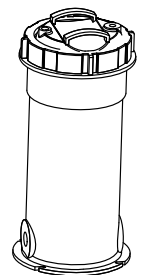
12. Allow sufficient space after the Commercial Prefilter [12] for the **Inline Vacuum/Pressure Gauge [15]**, if used.



Inline Vacuum / Pressure Gauge

13. The no-charge optional **Oil/water Separator [16]** is mounted to a flat horizontal surface using the supplied screws. Maintain an orientation and accessibility that allows the operator access to remove the filter element for maintenance. Allow minimum 12 inches above the top of the housing for filter element removal. Mount the Oil/water Separator in close proximity to the outlet of the Booster Pump and the System frame.

WARNING NOTE: The Oil/water Separator utilizes the same filter housing as the Commercial Prefilter. However, the Oil/water Separator is plumbed opposite of (backwards from) the Commercial Prefilter. **IGNORE the raised arrows molded into the housing indicating flow, and IGNORE the raised markings INLET AND OUTLET. For the Oil/water Separator these markings are INCORRECT.** The Oil/water Separator's correct water flow enters the center core of the filter element and migrates to the outer surface of the filter element (opposite that of the Commercial prefilter).

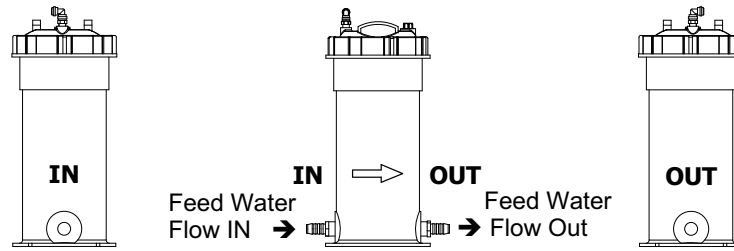


Oil/Water Separator

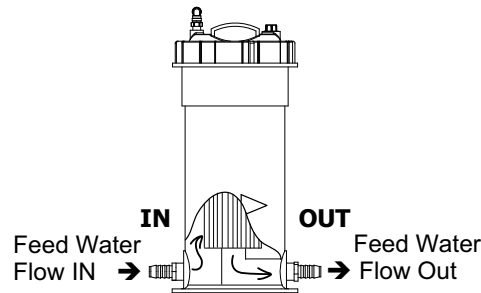
Prior to shipping Sea Recovery has placed Inlet and Outlet labels (stickers) indicating the correct plumbing. Follow the stickers, not the raised molded arrow and lettering.

REFER TO THE ILLUSTRATION ON THE FOLLOWING PAGE OF THIS SECTION.

COMMERCIAL PREFILTER CONNECTION AND WATER FLOW

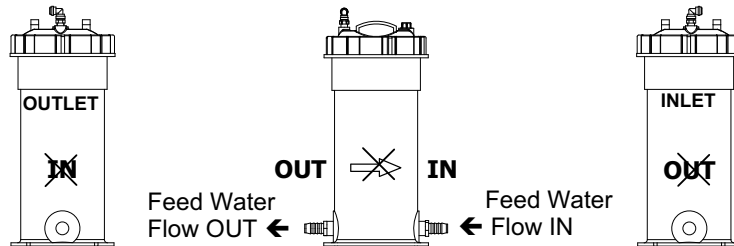


Commercial Prefilter is plumbed
as per the raised arrows and markings IN and OUT

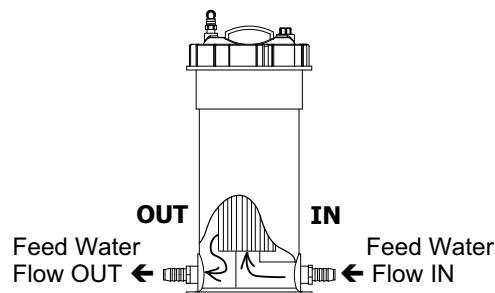


Feed Water Flow through the Commercial Prefilter Element
is from the OUTSIDE of the Element to the INSIDE CENTER of the Element

OIL/WATER SEPARATOR CONNECTION AND WATER FLOW

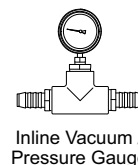


Oil/Water Separator utilizes the same housing as the Commercial Prefilter, however it is plumbed
OPPOSITE of the Commercial Prefilter and OPPOSITE of the raised arrows and markings IN and OUT
Separate Labels are placed on the Oil/Water Separator indicating correct INLET and OUTLET



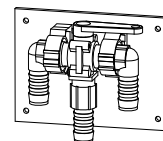
Feed Water Flow through the Oil/Water Separator Element
is from the INSIDE CENTER of the Element to the OUTSIDE of the element

14. Allow sufficient space after the Oil Water Separator Filter [16] for the **Inline Vacuum/Pressure Gauge [17]**, if used.



Inline Vacuum /
Pressure Gauge

15. The **Rinse Clean Outlet Valve [51]** is mounted after the System Brine Discharge and before the Brine Discharge Connector [32] or [33].



16. **Brine Discharge Connector [32]** or **Multi Media Filter Waste "T" [33]**

Attach the supplied **Brine Discharge Connector [32]** to the over board thru-hull connector [34].

or

if the Multi Media Filter [10] is installed then attach the supplied **Multi Media Filter Waste "T" [33]** to the over board thru-hull connector [34].

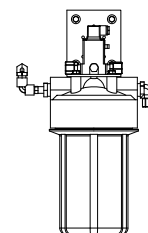


Brine Discharge
Connector



Multi Media
Filter Waste "T"

17. The **Fresh Water Flush Carbon Filter [48]**, with attached Fresh Water Flush 2-Way Solenoid Valve [46] and Fresh Water Flush Check Valve [47] is mounted to a flat vertical surface in an accessible location for filter element changing. Choose a location between the Automatic Fresh Water Flush Check Valve [49] and a pressurized line from the boat's fresh water pressure system.



Fresh Water Flush
Carbon Filter, Check Valve
& 2-Way Solenoid Valve

17. The **Charcoal Filter [39]** is pre-mounted to the Aqua Whisper II Compact System frame.
18. The **pH Neutralizer Filter [40]** is mounted by the installer to the Aqua Whisper II Compact System frame.
19. **Ultra Violet Sterilizer [41] Installation.**

The Ultra Violet Sterilizer will be mounted, by the factory, to the System Frame if ordered with the Aqua Whisper II System.

If the U.V. Sterilizer was not installed at the factory the installer may mount it to the System Compact Style frame or to a flat vertical surface. Mount Horizontal if possible. If Vertical mounting is necessary mount with inlet down and outlet up.

20. Secure the **Product Water Connector [42]** to the top of the potable water storage tank or potable water storage tank fill line.

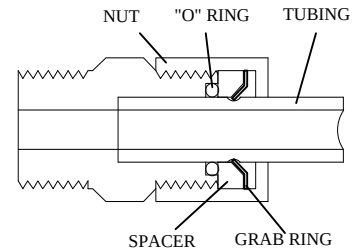


Brine Discharge
Connector

C. TUBING & HOSE NOTES AND CAUTIONS

TUBE FITTING CONNECTIONS ASSEMBLY

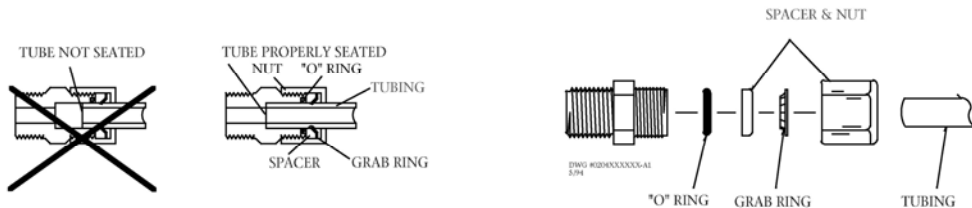
- Cut tube end square and clean.
- Loosen nut on fitting three turns.
- Insert tube into fitting until it bottoms.
- Loosen nut completely & remove tube with attached parts from body.
- Check to ensure that the O-Ring is seated onto the tube under the spacer (and not pinched into the body).
- Insert tube with attached parts into the body and tighten nut finger tight.



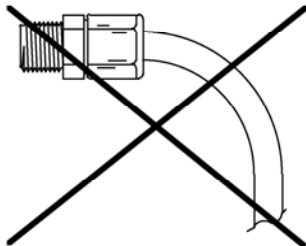
DWG #B00480XXXX-A1

CAUTION: Refer to the following illustrations. Always allow slack in all tube and hose lines. Never cause the tube or hose to immediately bend from the fitting. Allow the line to enter or leave from the fitting in a straight manner for several inches to ensure proper connection, to relieve stress to the fitting and tube or hose, and to allow ease of detachment and reattachment during maintenance or repair.

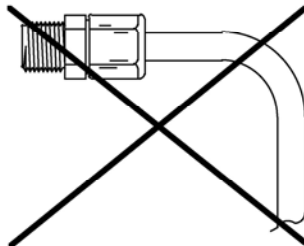
If water lines are pulled tight causing them to bend at the fitting they will leak, allow air to enter, fail prematurely, and or break the fitting that they are attached to.



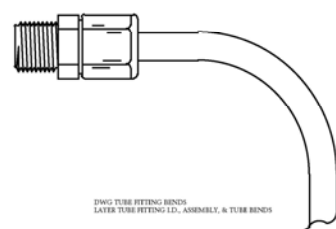
No Slack, Stress at Fitting
Tube will Leak



Bend Radius Too Small
Tube will Kink & Fail



Proper Minimum 6" Bend Radius
Slack Allowed after fitting

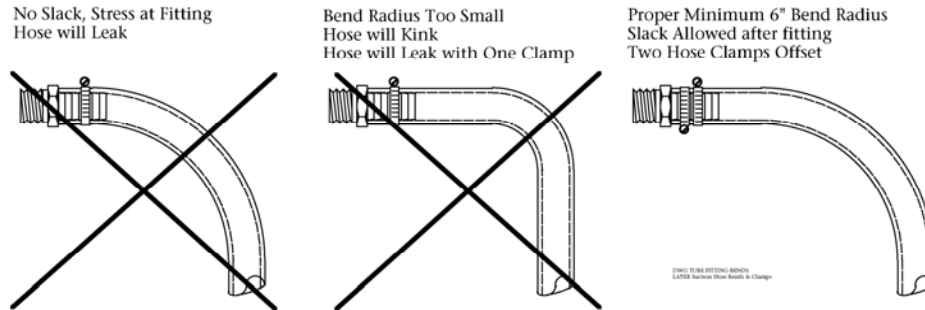


DWG TUBE FITTING BENDS
LATER TUBE FITTING I.D., ASSEMBLY, & TUBE BENDS

D. INTERCONNECTING COMPONENTS WITH SUPPLIED HOSE

- Using the 3/4" (19 mm) I.D. clear braided hose supplied connect the Suction Line components, Low Pressure line components, and Brine Discharge Line components:

Secure each connection with the supplied hose clamps. Ensure all Suction Hose connections use two hose clamps rotated 180 degrees with the screw heads facing the same direction. Remove any flash on the Hose Barb fittings using fine sandpaper.



If your Aqua Whisper II is not supplied with a mentioned optional component then skip it and connect to the next supplied component. Refer to the illustrations on pages 15 - 31 of this section.

Outlet of

Inlet Connection [3]
 Inline Vacuum/Pressure Gauge [4]
 Sea Strainer [5]
 Rinse Clean Inlet Valve [50] center port
 Rinse/Clean container [52]
 Fresh Water Flush Check Valve [49] top
 Inline Vacuum/Pressure Gauge [6]
 Booster Pump [7]
 Inline Vacuum/Pressure Gauge [8]
 Plankton Filter [9] or Multi Media Filter
 Multi Media Filter [10] Waste Connection
 Inline Vacuum/Pressure Gauge [11]
 Commercial Prefilter [12]
 or Dual 10" Prefilter [13 & 14]
 Inline Vacuum/Pressure Gauge [15]
 Oil/Water Separator [16]
 Inline Vacuum/Pressure Gauge [17]
 Pressure Pick Up T [18] (pre-connected at factory)
 Brine Discharge Tee [31]
 Rinse Clean Discharge Valve [51] left or right port
 Rinse Clean Discharge Valve [51] left or right port

to

Inlet of

Inline Vacuum/Pressure Gauge [4]
 Sea Strainer [5]
 Rinse Clean Inlet Valve [50] left or right port
 Fresh Water Flush Check Valve [49] bottom
 Rinse Clean Inlet Valve [50] left or right port
 Inline Vacuum/Pressure Gauge [6]
 Booster Pump [7]
 Inline Vacuum/Pressure Gauge [8]
 Plankton Filter [9] or Multi Media Filter [10]
 Inline Vacuum/Pressure Gauge [11]
 Multi Media Filter Waste "T" [33]
 Commercial Prefilter [12]
 or Dual 10" Prefilter [13 & 14]
 Inline Vacuum/Pressure Gauge [15]
 Oil/Water Separator [16]
 Inline Vacuum/Pressure Gauge [17]
 Pressure Pick Up T [18]
 High Pressure Pump [21] (pre-connected at factory)
 Rinse Clean Outlet Valve [51] center port
 Rinse/Clean container [52]
 Brine Discharge Connector [32]
 or Multi Media Filter Waste "T" [33]

- With the supplied 50 feet (15 meters) of 1/2" (12.7 mm) I.D. clear braided hose connect the Product Water Line components and secure each connection with the supplied hose clamps, placing 1 hose clamp onto each hose barb fitting:

Outlet of

Charcoal Filter [39]
 pH Neutralizing Filter [40]
 Ultra Violet Sterilizer [41]

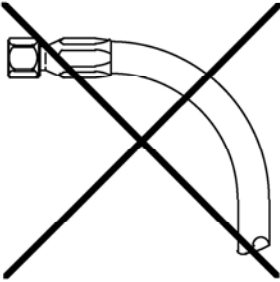
to

Inlet of

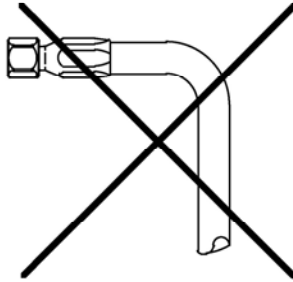
pH Neutralizer Filter [40]
 Ultra Violet Sterilizer [41]
 Potable Water Storage Tank or Cistern [42]

3. If remote mounting the Reverse Osmosis Membrane Pressure Vessel Assembly [23 & 24] ensure all High Pressure Hoses have sufficient slack. Do not pulled tight into a sharp or immediate bend.

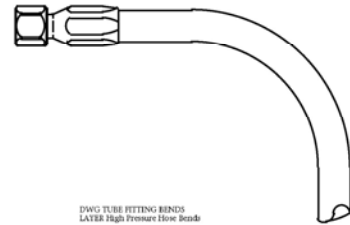
No Slack
Stress at Fitting



Bend Radius Too Small
Hose Will Kink and Burst



Proper Minimum 6" Bend Radius
Slack Allowed after fitting



4. With the supplied 20 feet (6 meters) of 3/8" (9.525 mm) O.D. tube connect the boat's pressurized potable water line to the Fresh Water Flush 2-way Solenoid Valve [46], and the outlet of the Fresh Water Flush Charcoal Filter [48] to the Fresh Water Flush Check Valve [49]

Outlet of

boat's pressurized potable water line [45]
Fresh Water Flush Charcoal Filter [48]

to

Inlet of

Fresh Water Flush 2-way Solenoid Valve [46]
Fresh Water Flush Check Valve [49]

E. Placement and securing the Remote Touch Pad Assembly

The Remote Touch Pad Assembly is supplied with a 75 foot long (22.9m) cat 5 cable for connection to the Main Control Panel.

Place and install the Remote Touch Pad in a location that is:

- Away from water lines and hoses
- Away from locations subject to water spray
- In an accessible and viewable location
- Within 75 feet of the Main Control Panel

F. CUSTOMER SUPPLIED FRESH WATER TANK [43] HIGH LEVEL SWITCH and CUSTOMER SUPPLIED ALARM

Not Numbered on the Piping and Interconnect Diagram.

The tank high level switch is not necessary for operation of the System. It does add additional features to the System. The choice of make, model, and style are left up to the Installer or Owner. They must meet the electrical requirement and operation as explained below.

The customer may also connect an external alarm to the System which will alert the operator that the system has shut down.

Fresh Water Tank High Level Switch ** owner/installer supplied provides an optional feature to the System Control Logic that allows the System to shut off automatically when the Fresh Water Tank [43] is full.

When installed and connected to the Main Printed Circuit Board, the Fresh Water Tank High Level Switch must be connected as a N.C. (Normally Closed) SPST (Single Pole Single Throw) switch.

While the System is in operation, if the high level switch trips (opens) this signals the System logic that the Fresh Water Tank [43] is Full and the System will shut down within 60 seconds.

With the High Level Switch connected, the system will not operate, and will not start if the high level switch is open at the time the Start Switch is pressed.

In order to operate the System when the Fresh Water Tank is full a jumper must be installed at the High Level Switch connection on the Main Printed Circuit Board.

Alarm ** owner/installer supplied provides an optional feature to the System Control Logic that audibly or visually signals the operator that the System has stopped operating.

The output of this alarm circuit from the Main Printed Circuit Board is 12 VDC with MAXIMUM allowable current consumption of 1 (one) Ampere.

This alarm will signal if a fault occurs. It will not signal with a normal shut down that was not associated with a fault.

G. ELECTRICAL CONNECTIONS: Refer to Section 8 of this Owner's Manual for all electrical wire routing and connection.

H. CAUTION: The Reverse Osmosis Membrane Element(s) [23 & 24] must be kept wet else severe loss of production will occur. Refer to Section 6 of this Owner's Manual for further information and instructions.

Installation of Aqua Whisper II MODULAR STYLE

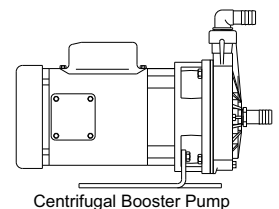
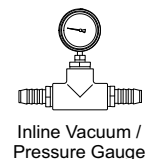
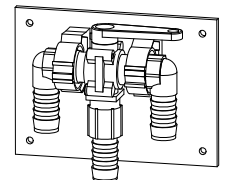
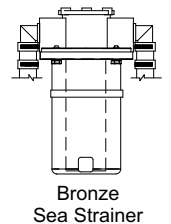
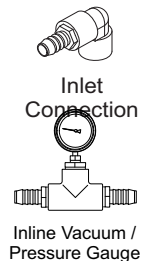
SPECIFIC TO Aqua Whisper II MODULAR STYLE SYSTEM pages 48 - 61:

I. MODULAR SYSTEM INDIVIDUAL COMPONENT MOUNTING:

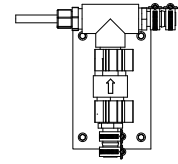
All mounting surfaces must be flat in order to avoid warping of brackets and frames. Any damage caused by attaching the system or its components to an uneven surface is attributed to improper installation, is the liability of the installer, and is not covered by the Sea Recovery warranty. Grind flat or use appropriate shims on uneven surfaces to ensure that mounting of the system components does not cause bending or warping.

Do not connect the water lines or electrical lines to the various components until each of the components are in place and secure. After all components are in place and secure visually inspect the layout to ensure that the plumbing hoses and tubes will connect kink free, in short and straight segments, and will avoid heat and abrasions from surrounding surfaces.

1. Attach the supplied **Inlet Connection [3]** to the Sea Cock Valve and rotate it towards the location of the Inline Vacuum/Pressure Gauge [4] if used, or Sea Strainer [5] Inlet.
2. Allow sufficient space between the Inlet Connection [3] and Sea Strainer [5] for the **Inline Vacuum/Pressure Gauge [4]**, if used.
3. The **Sea Strainer [5]** is mounted to a flat vertical surface, below water level, after the Inlet Connection [3], or Inline Vacuum/Pressure Gauge [4] if used. Allow clearance above the bowl to access the mesh screen for cleaning or replacement.
4. The **Rinse Clean Inlet Valve [50]** is mounted below water level after the Sea Strainer [5]. Allow access for the operator to reach and turn the valve handles.
5. Allow sufficient space between the Sea Strainer [5] outlet or if used the Rinse Clean Inlet Valve [50] and or Fresh Water Flush Check Valve [49] for the **Inline Vacuum/Pressure Gauge [6]**, if used.
6. The **Booster Pump [7]** is mounted to a flat horizontal surface using the 4 supplied #10 x 1 1/4" long Type "A" screws. The Booster Pump is mounted below water level to assist priming, and in an accessible location to allow access for maintenance. Keep the Booster Pump close to the Inlet Thru Hull Connection [3], Sea Strainer [5], Rinse/Clean Inlet Valve [50] if used, Fresh Water Flush Check Valve [49] if used, and Inline Vacuum/Pressure Gauge [6] if used. If the Booster Pump is mounted Vertical place the Pump Head at the bottom and the electric motor at the top. **WARNING:** If the pump head is above the electric motor salt water damage to the electric motor will occur when the pump seal weeps or leaks.

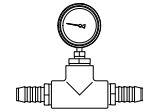


7. The **Automatic Fresh Water Flush Check Valve [49]** is mounted to a flat vertical surface, below water level, after the Booster Pump [7]. Mount the Fresh Water Flush Check Valve vertical with the arrow pointing UP. Mounting the valve horizontal or with arrow pointing down may cause it to not properly function.



Fresh Water Flush
Check Valve

8. Allow sufficient space after the Booster Pump [7] Outlet for the **Inline Vacuum/Pressure Gauge [8]**, if used. If the Multi Media Filter is installed this Inline Vacuum/Pressure Gauge [8] is not required as the Multi Media Filter includes inlet and outlet pressure gauges.

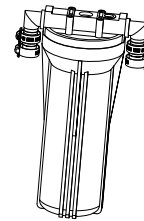


Inline Vacuum /
Pressure Gauge

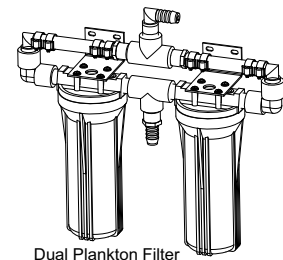
9. If desired, install either the **Multi Media Filter [10]** or the **Plankton Filter [9]** single or dual.

The Multi Media Filter and Plankton Filter serve the same function. The Multi Media filter has greater loading capacity but takes up more space for installation. When installing the Plankton Filter do not install a Multi Media Filter. When installing a Multi Media Filter do not install a Plankton Filter.

The **Plankton Filter [9]**, either the single or double housing version, is mounted to a flat vertical surface using the supplied screws. Allow minimum 4 inches (10 cm) below the bowl, and allow accessibility to the Plankton Filter for mesh screen removal and maintenance. Mount the Plankton Filter in close proximity to the outlet of the Booster Pump



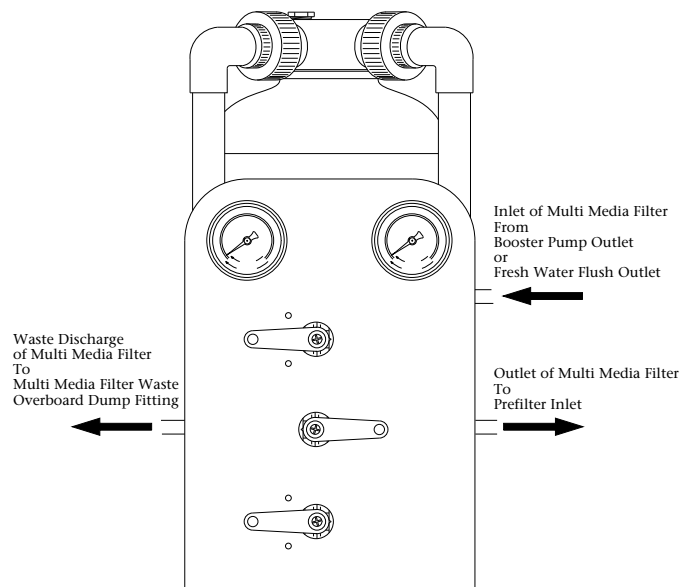
Single Plankton Filter



Dual Plankton Filter
Plumbed in Parallel

OR

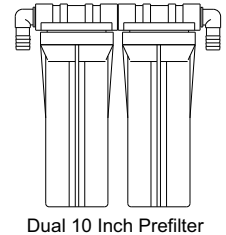
The optional **Multi Media Filter [10]** is mounted to a flat horizontal surface using the supplied screws. Maintain an orientation and accessibility that allows the operator to view the pressure gauges, and adjust the valves mounted to the Multi Media Filter. Mount the Multi Media Filter in close proximity to the outlet of the Booster Pump. Refer to the illustration on the following page for Multi Media Filter Port orientation.



10. Allow sufficient space after the Plankton Filter [9] Outlet for the Inline Vacuum/Pressure Gauge [11], if used. If the Multi Media Filter is installed this Inline Vacuum/Pressure Gauge [11] is not required as the Multi Media Filter includes inlet and outlet pressure gauges.
11. Prefilter. The **10 inch Dual Prefilters [13 & 14] and the Commercial Prefilter [12]** serve the same function. Use either the 10 inch Dual Prefilters or the Commercial Prefilter. Do not use both. Using both is redundant and will lead to line pressure loss.

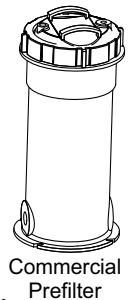


The **Dual Prefilters [13 & 14]** are mounted to a flat vertical surface. Allow minimum 4 inches (10 cm) below the bowl, and allow accessibility to the Filters for element removal and maintenance.



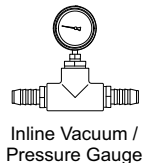
or (either install the Dual Prefilters or Commercial Prefilter. Installing both is redundant and will lead to line pressure loss).

The no-charge optional **Commercial Prefilter [12]** replaces the 10 inch Dual Prefilters [13 & 14]. The Commercial Prefilter is mounted to a flat horizontal surface using the supplied screws. Maintain an orientation and accessibility that allows the operator access to remove the filter element for maintenance. Allow minimum 12 inches above the top of the housing for filter element removal. Mount the Commercial Prefilter in close proximity to the outlet of the Booster Pump and the System frame. The commercial prefilter is plumbed as per the raised arrow and Inlet & Outlet letters molded into the filter housing. The correct water flow enters the outer surface of the filter element and migrates to the center core.



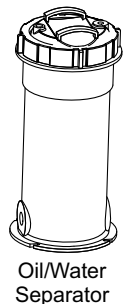
REFER TO THE ILLUSTRATION ON THE FOLLOWING PAGE OF THIS SECTION.

12. Allow sufficient space after the Commercial Prefilter [12] for the **Inline Vacuum/Pressure Gauge [15]**, if used.



13. The no-charge optional **Oil/water Separator [16]** is mounted to a flat horizontal surface using the supplied screws. Maintain an orientation and accessibility that allows the operator access to remove the filter element for maintenance. Allow minimum 12 inches above the top of the housing for filter element removal. Mount the Oil/water Separator in close proximity to the outlet of the Booster Pump and the System frame.

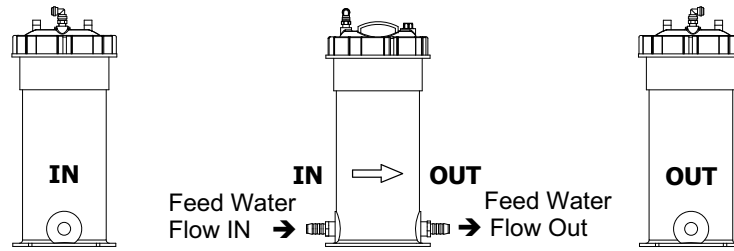
WARNING NOTE: The Oil/water Separator utilizes the same filter housing as the Commercial Prefilter. However, the Oil/water Separator is plumbed opposite of (backwards from) the Commercial Prefilter. **IGNORE the raised arrows molded into the housing indicating flow, and IGNORE the raised markings INLET AND OUTLET. For the Oil/water Separator these markings are INCORRECT.** The Oil/water Separator's correct water flow enters the center core of the filter element and migrates to the outer surface of the filter element (opposite that of the Commercial prefilter).



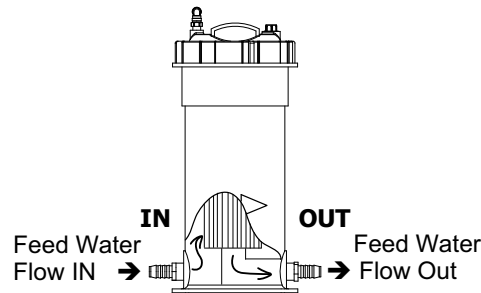
Prior to shipping Sea Recovery has placed Inlet and Outlet labels (stickers) indicating the correct plumbing. Follow the stickers, not the raised molded arrow and lettering.

REFER TO THE ILLUSTRATION ON THE FOLLOWING PAGE OF THIS SECTION.

COMMERCIAL PREFILTER CONNECTION AND WATER FLOW

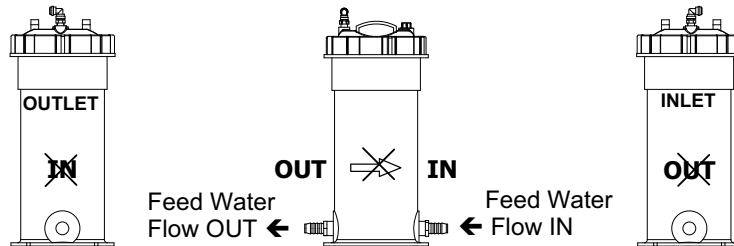


Commercial Prefilter is plumbed
as per the raised arrows and markings IN and OUT

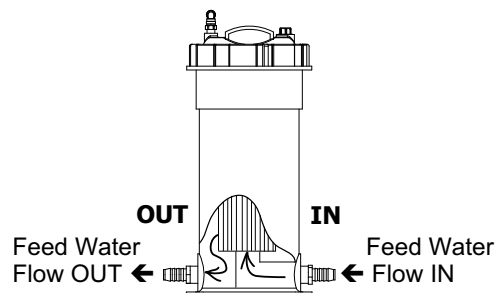


Feed Water Flow through the Commercial Prefilter Element
is from the OUTSIDE of the Element to the INSIDE CENTER of the Element

OIL/WATER SEPARATOR CONNECTION AND WATER FLOW

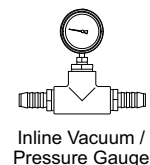


Oil/Water Separator utilizes the same housing as the Commercial Prefilter, however it is plumbed
OPPOSITE of the Commercial Prefilter and OPPOSITE of the raised arrows and markings IN and OUT
Separate Labels are placed on the Oil/Water Separator indicating correct INLET and OUTLET

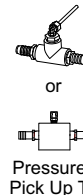


Feed Water Flow through the Oil/Water Separator Element
is from the INSIDE CENTER of the Element to the OUTSIDE of the element

14. Allow sufficient space after the Oil/water Separator [16] for the **Inline Vacuum/Pressure Gauge [17]**, if used.



15. Place the **Inline Pressure Pick Up T [18]** after the last prefiltration component and prior to the inlet of the High Pressure Pump [21].

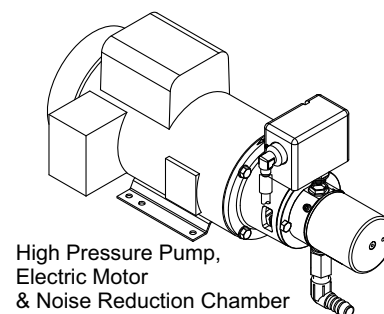


16. Placement and securing the **High Pressure Pump [21]**:

The High Pressure Pump and Motor assembly [21] must be placed inline between the last prefiltration component and the R.O. Membrane Vessel Assembly. A 6 Foot long (1829mm) High Pressure Hose [22] is supplied to attach the Outlet of the High Pressure Pump to the Inlet of the R.O. Membrane Vessel Assembly. Longer length High Pressure Hoses are available from Sea Recovery.

The High Pressure Pump and Motor is mounted in place with 4 supplied rubber isolation mounts. 4 sets of hardware are supplied for attachment. Set the High Pressure Pump and Motor in place onto a flat surface and mark the mounting holes.

Move the High Pressure Pump and Motor out of the way and drill the appropriate hole depending on which hardware will be used, bolts or screws. Place the High Pressure Pump and Motor over the drilled holes and attach the rubber isolation grommet under the motor mounting foot at each of the 4 mounting holes. Place the mating rubber isolation grommet over the top of the motor mounting foot hole and attach with the appropriate supplied washers, and bolts or screws.



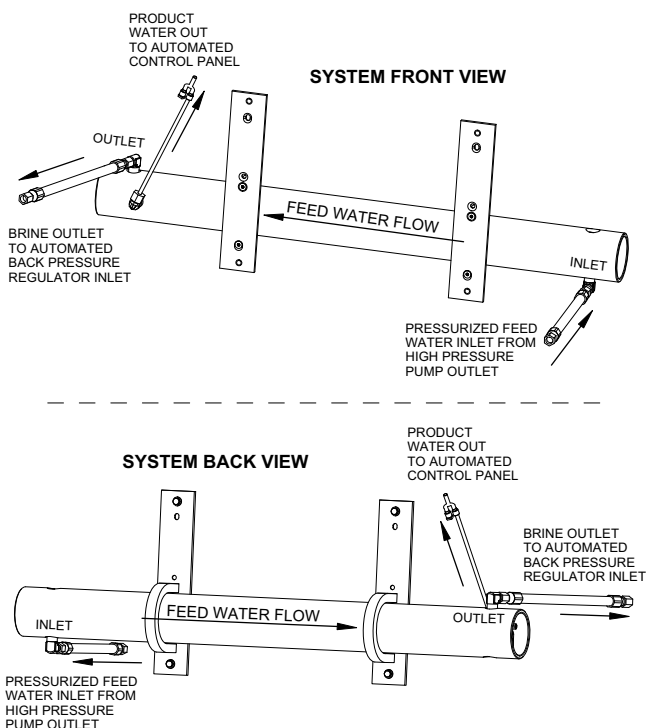
NOTE: Illustration shows the Optional HP pump.

17. Placement and securing the **R.O. Membrane and Vessel Assembly [23] or [23 & 24]**

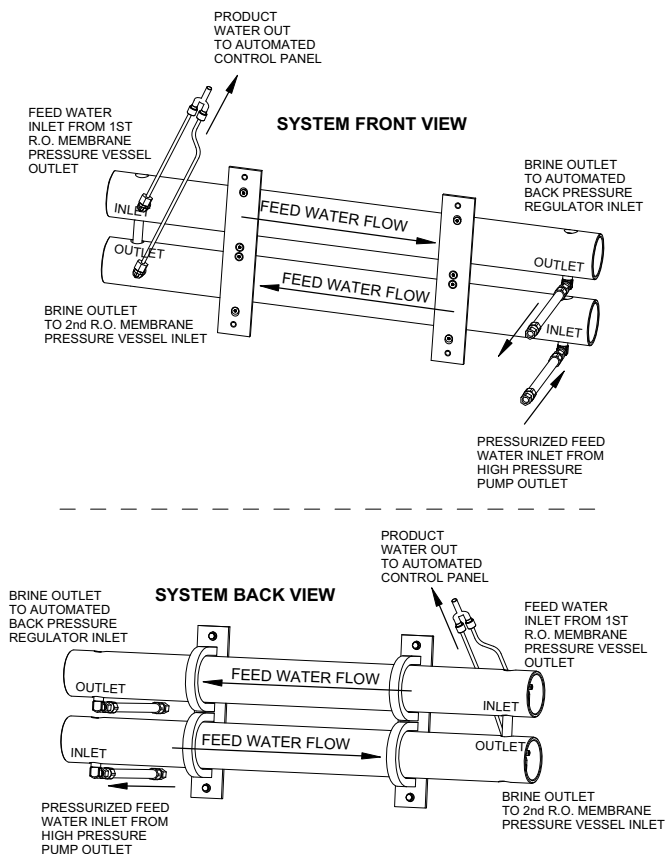
WATER FLOW OF SINGLE R.O. MEMBRANE ELEMENT PRESSURE VESSEL

Single R.O. Membrane Pressure Vessel Assembly [21]

Aqua Whisper II Modular 450-1
Aqua Whisper II Modular 700-1
Aqua Whisper II Modular 900-1



WATER FLOW OF DUAL R.O. MEMBRANE ELEMENT PRESSURE VESSEL



Double R.O. Membrane Pressure Vessel Assembly [21 & 22]

Aqua Whisper II Modular 900-2
Aqua Whisper II Modular 1400-2
Aqua Whisper II Modular 1800-2

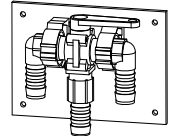
It is preferable to mount the R.O. Membrane Vessel Assembly in a horizontal position. It is mounted either to the floor, the wall, or over head. If mounting horizontally to a wall (vertical surface) The first R.O. Membrane Vessel is mounted at the bottom and the second R.O. Membrane Vessel is mounted at the top. This allows air to be displaced with feed water.

Note regarding Vertical Mounting of a Single R.O. Membrane Vessel Assembly: When Vertically mounting the single R.O. Membrane Pressure Vessel Assembly always position the Inlet at the bottom and the Outlet at the top. This allows air to be displaced with feed water.

Note regarding Vertical Mounting of a double R.O. Membrane Vessel Assembly: When Vertically Mounting the double R.O. Membrane Pressure Vessel Assembly always position the Inlet of the first R.O. Membrane Pressure Vessel at the bottom. By default, the Outlet of the second R.O. Membrane Pressure Vessel will also be at the bottom. Vertically mounting a double R.O. Membrane Pressure Vessel Assembly will cause air to become trapped in the second vessel. When the system pressurizes this air will eventually pass through the R.O. Membrane Element and into the product water. Product water flow fluctuations will occur until all of the air passes through.

With the supplied hardware attach the R.O. Membrane Vessel Assembly in line between the Outlet of the High Pressure Pump and the Control Panel. Two High Pressure Hoses are supplied for attachment of the R.O. Membrane Vessel Assembly to the High Pressure Pump and the Automation Control Panel. Each of these High Pressure Hoses are 6 Feet long (1829mm). Plan accordingly so that these supplied High Pressure Hoses will reach. Longer High Pressure Hoses can be ordered from Sea Recovery. **DO NOT USE THIRD PARTY HIGH PRESSURE HOSES.** Use of 3rd party, non Sea Recovery supplied, high pressure hoses will void warranty of those components that they connect to as well as any item damaged as a result of third party high pressure hose failure.

18. The **Rinse Clean Outlet Valve [51]** is mounted below water level after the System Brine Discharge Tee [31] located at the Automation Control Panel and before the Brine Discharge Connector [32] or [33].



19. **Brine Discharge Connector [32] or Multi Media Filter Waste "T" [33]**

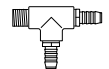
Attach the supplied **Brine Discharge Connector [32]** to the over board thru-hull connector [34].



Brine Discharge Connector

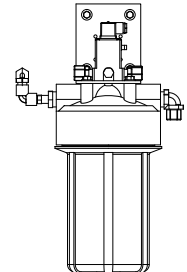
or

if the Multi Media Filter [10] is installed then attach the supplied **Multi Media Filter Waste "T" [33]** to the over board thru-hull connector [34].



Multi Media Filter Waste "T"

20. The **Fresh Water Flush Carbon Filter [48]**, with attached Fresh Water Flush 2-Way Solenoid Valve [46] and Fresh Water Flush Check Valve [47] is mounted to a flat vertical surface in an accessible location for filter element changing. Choose a location between the Automatic Fresh Water Flush Check Valve [49] and a pressurized line from the boat's fresh water pressure system [45].

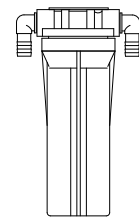


Fresh Water Flush Carbon Filter, Check Valve & 2-Way Solenoid Valve

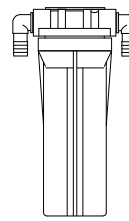
21. Placement and securing the Post Filters: **Charcoal Filter [39]** and **pH Neutralizing Filter [40]**

These two filters may be screwed together using a national pipe threaded close nipple. They may also be left as separate components and mounted separately. The Dual Post Filter Assembly [39 & 40] (screwed together) or the individual Post Filters is/are mounted to a flat vertical surface using the supplied screws. Allow minimum 4 inches (100mm) below the bowl, and allow accessibility to the Dual Post Filter Assembly for cartridge element removal and maintenance. Mount the Dual Post Filter Assembly between the Product Water Outlet port of the Automation Control Panel and the Inlet of the Ultra Violet Sterilizer if used or the potable water storage tank.

Separately Mounted

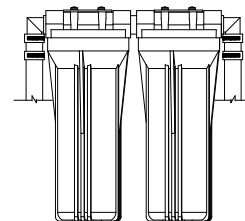


Single 10 Inch
Carbon Filter



Single 10 Inch
pH Neutralizing Filter

**Attached together
and mounted as one unit**



Dual Post Filters
Charcoal Filter
& pH Neutralizer

22. Placement and securing the **Ultra Violet Sterilizer [41]**

The Ultra Violet Sterilizer is mounted either vertically or horizontally to the floor, wall or overhead. If mounted vertically position the electronic section, where power cord is attached, at the top so that the air will be displaced with product water. If mounted horizontally position the Inlet and Outlet Ports on top so that air will be displaced with product water. Do not mount in any position that will allow air to become trapped inside the U.V. chamber. Refer to UV Sterilizer Installation details on Section 2 Page 62.



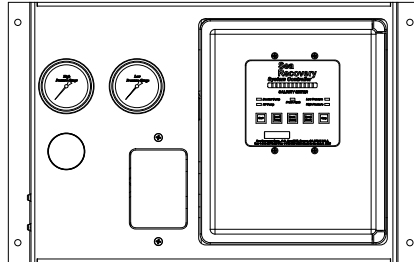
23. Secure the **Product Water Connector [42]** to the top of the potable water storage tank or potable water storage tank fill line.



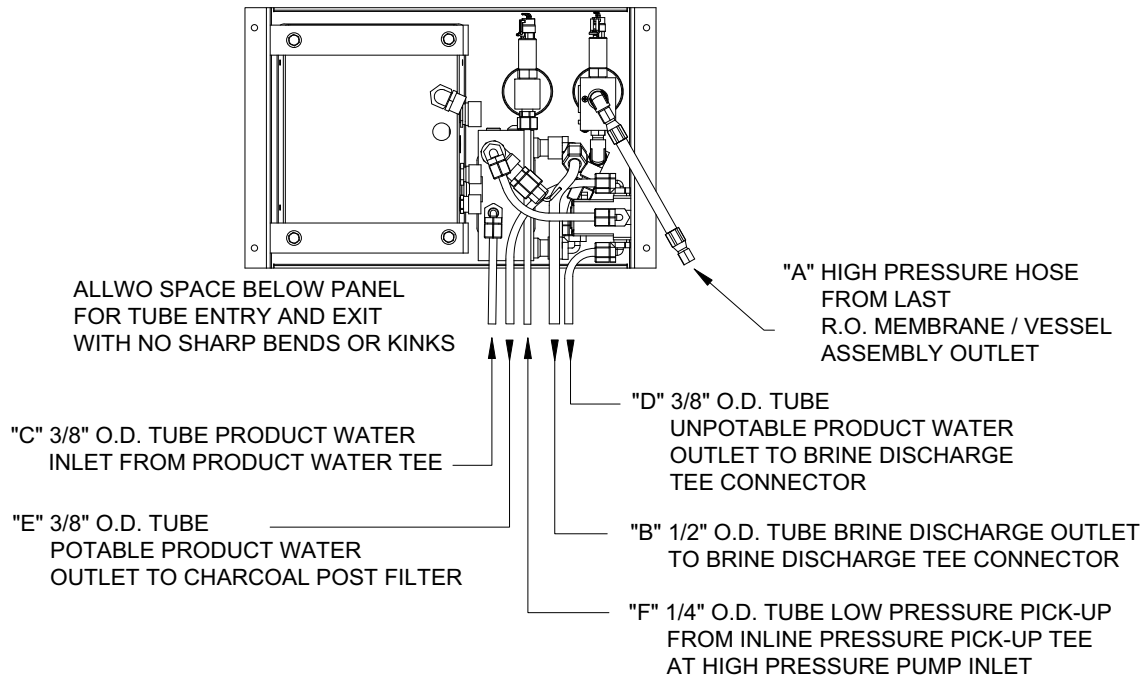
Product Water
Tank Connector

24. **Placement and securing the Control Panel Assembly** The Control Panel requires water and electrical line connections from the other components of the system. Note the required connections illustrated and described below and locate the control panel in a logical placement that allows connection of these water and electrical lines. Ensure that the electrical enclosure lid is able to fully open to allow access to the inside of it.

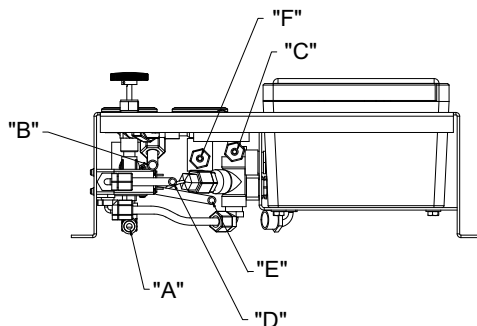
Aqua Whisper II Modular Style
Control Panel Front View

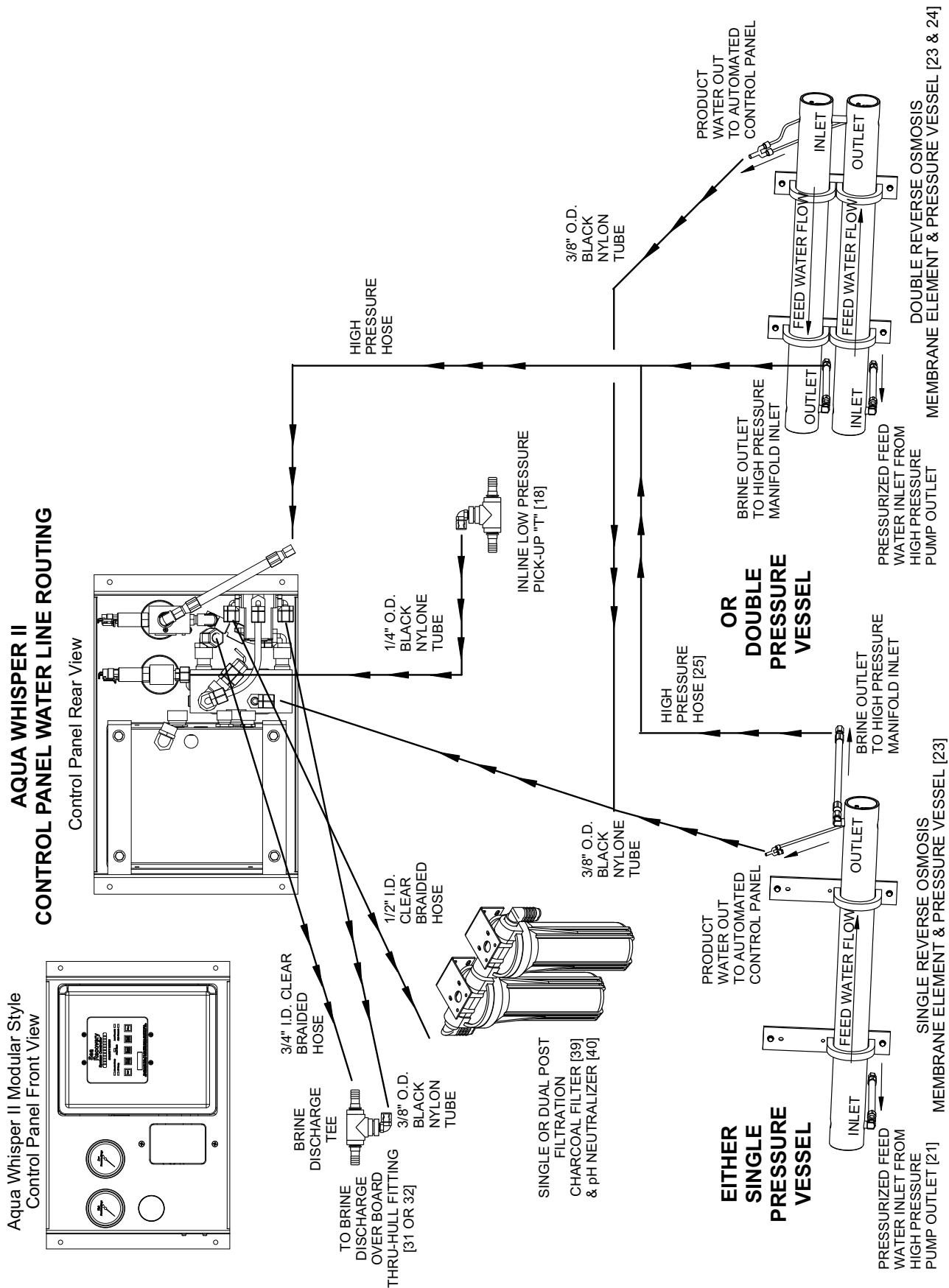


Aqua Whisper II Modular Style
Control Panel Rear View



Aqua Whisper II Modular Style
Control Panel Bottom View

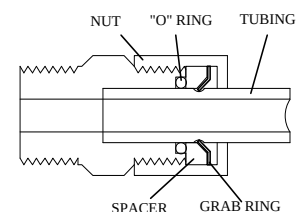




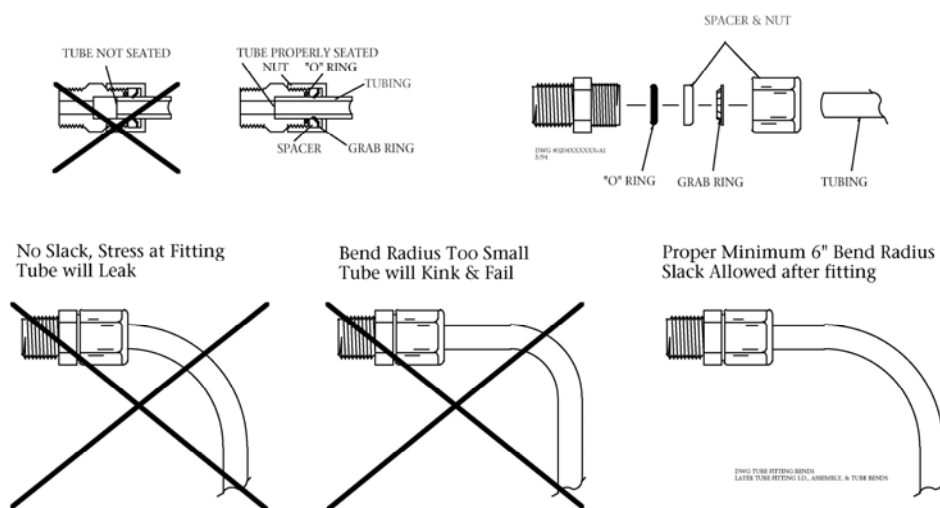
J. TUBING & HOSE PRECAUTIONS

TUBE FITTING CONNECTIONS ASSEMBLY

- Cut tube end square and clean.
- Loosen nut on fitting three turns.
- Insert tube into fitting until it bottoms.
- Loosen nut completely & remove tube with attached parts from body.
- Check to ensure that the O-Ring is seated onto the tube under the spacer (and not pinched into the body).
- Insert tube with attached parts into the body and tighten nut finger tight.



CAUTION: Refer to the following illustrations. Always allow slack in all tube and hose lines. Never cause the tube or hose to immediately bend from the fitting. Allow the line to enter or leave from the fitting in a straight manner for several inches to ensure proper connection, to relieve stress to the fitting and tube or hose, and to allow ease of detachment and reattachment during maintenance or repair.



If water lines are pulled tight causing them to bend at the fitting they will leak, allow air to enter, fail prematurely, and or break the fitting that they are attached to.

K. INTERCONNECTING COMPONENTS WITH SUPPLIED HOSE or TUBING

- With the supplied 25 feet (7.6 meters) of 3/8" (9.5 mm) O.D. black nylon tubing connect the Product Water Tee (Reducer 3/8 Tube x 1/4 Tube JQ) to the Automation Control Box Product Water Inlet Fitting. Refer to illustration on page 55 of this section. Also, using the 3/8" OD tube connect the Fresh Water Flush as listed below:

Outlet of
 R.O. Membrane/Vessel Product Water Port
 or Product Water Tee [35] if 2 Vessels are used
 Boat's Pressurized Potable Water Line [45]
 Fresh Water Flush Carbon Filter [48]

to

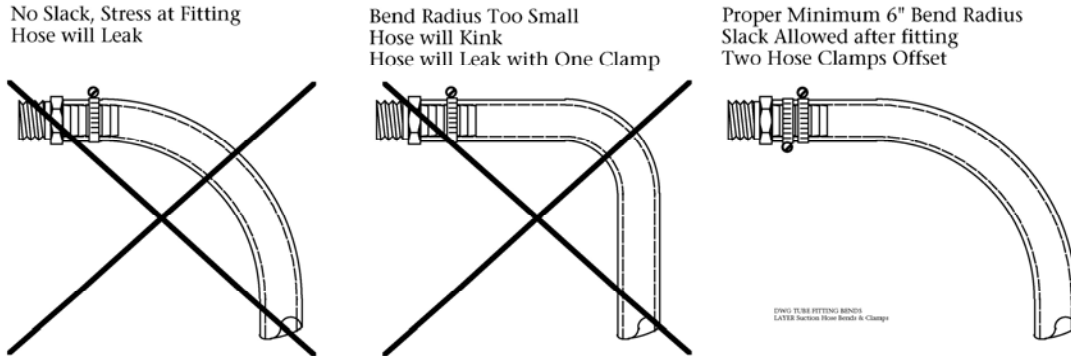
Inlet of
 Control Box Product Water Inlet

Fresh Water Flush 2-way Solenoid Valve [46]
 Fresh Water Flush Check Valve Tee [49]

- 1/4" (6.35 mm) OD nylon tubing is supplied with the Inline Pressure Pick Up "T" [18]. Connect the black tube fitting of the Inline Pressure Pick Up "T" to the Low Pressure Pick Up black tube fitting located at the bottom of the Automation Control Box. Refer to illustrations on the previous pages 55 & 56 of this section.

3. Using the 3/4" (19 mm) I.D. clear braided hose supplied connect the Suction Line components, Low Pressure line components, and Brine Discharge Line components:

Secure each connection with the supplied hose clamps. Ensure all Suction Hose connections use two hose clamps rotated 180 degrees with the screw heads facing the same direction. Remove any flash on the Hose Barb fittings using fine sandpaper.



If your Aqua Whisper II is not supplied with a mentioned optional component then skip it and connect to the next supplied component.

Outlet of

Inlet Connection [3]
 Inline Vacuum/Pressure Gauge [4]
 Sea Strainer [5]
 Rinse Clean Inlet Valve [50] center port
 Rinse/Clean container [52]
 Fresh Water Flush Check Valve [49] top
 Inline Vacuum/Pressure Gauge [6]
 Booster Pump [7]
 Inline Vacuum/Pressure Gauge [8]
 Plankton Filter [9] or Multi Media Filter
 Multi Media Filter [10] Waste Connection
 Inline Vacuum/Pressure Gauge [11]

Commercial Prefilter [12]
 or Dual 10" Prefilter [13 & 14]
 Inline Vacuum/Pressure Gauge [15]
 Oil/Water Separator [16]
 Inline Vacuum/Pressure Gauge [17]
 Pressure Pick Up T [18]
 Brine Discharge at the Control Panel
 Rinse Clean Discharge Valve [51] left or right port
 Rinse Clean Discharge Valve [51] left or right port

to

Inlet of

Inline Vacuum/Pressure Gauge [4]
 Sea Strainer [5]
 Rinse Clean Inlet Valve [50] left or right port
 Fresh Water Flush Check Valve [49] bottom
 Rinse Clean Inlet Valve [50] left or right port
 Inline Vacuum/Pressure Gauge [6]
 Booster Pump [7]
 Inline Vacuum/Pressure Gauge [8]
 Plankton Filter [9] or Multi Media Filter [10]
 Inline Vacuum/Pressure Gauge [11]
 Multi Media Filter Waste "T" [32]
 Commercial Prefilter [12]
 or Dual 10" Prefilter [13 & 14]
 Inline Vacuum/Pressure Gauge [15]

Oil/Water Separator [16]
 Inline Vacuum/Pressure Gauge [17]
 Pressure Pick Up T [18]
 High Pressure Pump [21]
 Rinse Clean Outlet Valve [51] center port
 Rinse/Clean container [52]
 Brine Discharge Connector [32]
 or Multi Media Filter Waste "T" [33]

4. With the supplied 50 feet (15 meters) of 1/2" (12.7 mm) I.D. clear braided hose connect the Product Water Line components and secure each connection with the supplied hose clamps, placing 1 hose clamp onto each hose barb fitting:

Outlet of

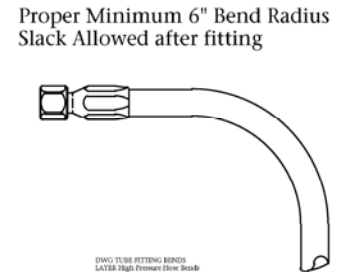
Control Panel Product Water Out
 Charcoal Filter [39]
 pH Neutralizing Filter [40]
 Ultra Violet Sterilizer [41]

to

Inlet of

Charcoal Filter [39]
 pH Neutralizing Filter [40]
 Ultra Violet Sterilizer [41]
 Potable Water Storage Tank or Cistern [42]

5. Ensure **High Pressure Hoses** [22 & 25] have sufficient slack and are not pulled tight into a sharp or immediate bend. Ensure all High Pressure Hoses are not rubbing on abrasive surfaces. Ensure that all High Pressure Hoses are not directly attached to the hull or other surfaces in the boat that would amplify or enhance any noise or vibrations from the High Pressure Pump through the High Pressure Hose.



Locate one of the supplied High Pressure Hoses. Connect one end to the High Pressure Outlet fitting at the High Pressure Pump [21] and connect the other end to the Inlet of the first R.O. Membrane Vessel [23]. Secure finger tight. Using two wrenches, hold in place the high pressure fitting at the High Pressure Pump and rotate the High Pressure Hose swivel fitting 1/4 turn to tighten. Again, using two wrenches, hold in place the high pressure fitting at the first R.O. Membrane Vessel Inlet and rotate the High Pressure Hose swivel fitting 1/4 turn to tighten.

Locate the other supplied High Pressure Hose. Connect one end to the High Pressure Outlet fitting at the last R.O. Membrane Vessel and connect the other end to the Inlet of the Back Pressure Regulator high pressure fitting located at the bottom of the Automation Control Box. Secure finger tight. Using two wrenches, hold in place the high pressure fitting at the last R.O. Membrane Vessel Outlet and rotate the High Pressure Hose swivel fitting 1/4 turn to tighten. Again, using two wrenches, hold in place the high pressure fitting at the Back Pressure Regulator high pressure fitting and rotate the High Pressure Hose swivel fitting 1/4 turn to tighten.

L. Placement and securing the Remote Touch Screen Enclosure Assembly

The Remote Touch Pad Assembly is supplied with a 75 foot long (22.9m) cat 5 cable for connection to the Main Control Panel.

Place and install the Remote Touch Pad in a location that is:

Away from water lines and hoses; Away from locations subject to water spray; In an accessible and viewable location; Within 75 feet of the Main Control Panel

M. CUSTOMER SUPPLIED FRESH WATER TANK [43] HIGH LEVEL SWITCH and CUSTOMER SUPPLIED ALARM

Not Numbered on the Piping and Interconnect Diagram.

The tank high level switch is not necessary for operation of the System. It does add additional features to the System. The choice of make, model, and style are left up to the Installer or Owner. They must meet the electrical requirement and operation as explained below.

The customer may also connect an external alarm to the System which will alert the operator that the system has shut down.

Fresh Water Tank High Level Switch ** owner/installer supplied provides an optional feature to the System Control Logic that allows the System to shut off automatically when the Fresh Water Tank [43] is full.

When installed and connected to the Main Printed Circuit Board, the Fresh Water Tank High Level Switch must be connected as a N.C. (Normally Closed) SPST (Single Pole Single Throw) switch.

While the System is in operation, if the high level switch trips (opens) this signals the System logic that the Fresh Water Tank [43] is Full and the System will shut down within 60 seconds.

With the High Level Switch connected, the system will not operate, and will not start if the high level switch is open at the time the Start Switch is pressed.

In order to operate the System when the Fresh Water Tank is full a jumper must be installed at the High Level Switch connection on the Main Printed Circuit Board.

Alarm ** owner/installer supplied provides an optional feature to the System Control Logic that audibly or visually signals the operator that the System has stopped operating.

The output of this alarm circuit from the Main Printed Circuit Board is 12 VDC with MAXIMUM allowable current consumption of 1 (one) Ampere.

This alarm will signal if a fault occurs. It will not signal with a normal shut down that was not associated with a fault.

N. ELECTRICAL CONNECTIONS: Refer to Section 8 of this Owner's Manual for all electrical wire routing and connection.

O. CAUTION: The Reverse Osmosis Membrane Element(s) [23 & 24] must be kept wet else severe loss of production will occur. Refer to Section 6 of this Owner's Manual for further information and instructions.

UV STERILIZER INSTALLATION

The SP Series UV unit is shipped with the UV lamp, quartz sleeve, fittings, and O-rings and need to be assembled before the UV unit can be used.

1. Install the UV unit in a sheltered, well ventilated area.
2. Install the UV unit as close as possible to the point-of-use to avoid potential contamination discharge from pipes, fittings, etc.
3. The UV unit should be mounted on stable support to avoid straining or warping. Allow sufficient clearance around the unit for servicing.
4. Verify the location is free from vibration.
5. All UV units are rated for maximum operating pressure at 50psig (8.24 bar).
6. The UV unit must be properly grounded for safe and proper operation. Failure to properly ground the UV unit automatically voids all unit warranty.
7. Line voltage must be within 10.56V to 16.50V. Voltage outside the range will compromise the performance of the UV unit.

Plumbing Requirements

All piping, tubes and hoses leading to the UV unit connection points must be leak-free before the UV unit can be installed.

NOTE! The UV unit may be installed horizontally or vertically. For vertical installation, make sure the inlet port is positioned at the bottom.

Installation Procedure

NOTE! Do not assemble or install damaged parts. Quartz sleeve and UV lamp are fragile and must be handled with care.

Install Fittings

Perform this procedure to prepare the UV unit for installation.

1. Inspect each port and fitting to ensure threads are free of dirt, burrs, and excessive nicks. If threads are badly nicked, replace the fitting.
2. Wrap ¼" wide PTFE tape 2 to 3 turns counter-clockwise around the male threads of the ¼" fitting. Do not wrap tape around the first thread.
3. Screw the fitting into cylinder ports to finger tight position to achieve desired alignment.
4. Do not back-off fitting. Do not over-tighten fitting. Over-tightening could strip the fitting threads and cause leak.

Install Quartz Sleeve

Perform this procedure only when water piping for UV unit is in place and ready for service.

1. Visually inspect quartz sleeve for cracks and damages.
2. Remove the four screws holding the ballast box cover and remove the cover.
3. Remove the rubber boot and pull out the 4-point lamp connector.
4. Remove the compression nuts.
5. Insert the close-end of the quartz sleeve into the cylinder through the ballast box pass-thru.

6. Allowing ½" of the quartz sleeve to expose on the viewport pass-thru.
7. Lubricate the tips of the quartz sleeve with clean water and insert new O-ring. Ensure the O-ring has all-round contact with the cylinder pass-thru.
8. Tighten the compression nut while making sure the nut does not contact the quartz sleeve. Adjust O-ring position as necessary. The compression nut should be snug and tight, not over-torque.
9. Repeat Step 7 & 8 on the ballast box compression nut.

Connect Plumbing

Tube or hose ends must be cut squared and clean; must have no rough edges. The quick fit elbow fitting has a C-clamp that will lock the tube in place once inserted.

1. Insert the supply pipe into one cylinder port and label the port "Inlet".
2. Insert the temporary pipe into the other cylinder port to direct water into a container.
3. Slowly fill the cylinder with water and flush cylinder for 1 minute.
4. Remove temporary pipe and insert the return pipe into the cylinder port and label the port "Outlet".
5. Slowly pressurize the UV unit by filling the cylinder with water while checking for leaks.
6. If leaks are found on the compression nuts, depressurize the unit and slightly tighten the leaking compression nut.
7. Retest until a leak-free installation is verified.
8. Once UV unit is leak-free, the quartz sleeve installation is complete and the UV lamp can be installed.

NOTE! To remove tube from fitting, first remove the C-clamp then push fitting sleeve down. Once the fitting sleeve is down, pull the tube out of the fitting.

Install Ultraviolet Lamp

Perform this procedure only after the quartz sleeve installation and leak-tests are completed successfully

1. Connect the UV lamp to the 4-point receptacle. If the lamp is not installed properly, lamp breakage will occur.
2. Insert lamp into quartz sleeve through compression nut pass-thru.
3. Install rubber boot over compression nut.
4. Connect unit power cable to power source.
5. Tighten the 4 screws to secure ballast box cover.
6. Turn ON the power to the unit.
7. Verify UV lamp operation from the viewport.
8. Allow one minute for the UV lamp to warm up prior to flowing water through the UV unit.

CAUTION! Use the viewport to verify the proper operation of the UV lamp.

CAUTION! Rapid successive cycling of the power to the ballast can cause premature failure of the unit.

CAUTION! Prior to energizing the lamp, make sure there is no water leaking from the quartz sleeve compression nuts.

Mounting the Unit

Once the UV unit is assembled and tested successfully, it can be mounted onto its permanent operational location. The unit must be mounted in a manner that will prevent excessive vibration and warping which will damage the quartz sleeve.

Operational Guidelines

- a) Release the pressure in the UV treatment chamber before breaking the compression nut seals.
- b) Disconnect all power to the UV unit before servicing.
- c) Do not allow the inlet water temperature to drop below 35°F (2°C).
- d) Do not allow the flow rate to exceed 2 GPM.
- e) Do not cycle the UV unit more than 3 "ON/OFF" cycles in a 24-hour period.
- f) Ensure all plumbing connections are tightly sealed before applying pressure.
- g) Before connecting the return tube, flush the unit to rinse out any debris left from the installation process.

WARNING! UV LIGHT EXPOSURE CAN SEVERELY BURN AND DAMAGE EYES AND SKIN.

WARNING! DO NOT look at the blue UV light. DO NOT operate the UV lamp outside of the UV treatment chamber.

CAUTION! The unit operates on high voltage and must be serviced by qualified personnel only.

CAUTION! Standard flow rate are based on water temperature 35°F to 100°F. If the inlet water temperature exceeds 100°F (38°C), please contact your local CSR.

CAUTION! Cycling more than 3 cycles will reduce the end-of-life (EOL) output and/or cause premature lamp failure.

[illegible]

Section 3

New System Commissioning (First Time Start Up of a New System)

[illegible]

1. SYSTEM COMMISSIONING NOTES:

Throughout this Manual, Numbers in [brackets] refer to the I.D. numbers Illustrated in the various Piping and Interconnect Diagrams illustrated within.

These Commissioning instructions must be carried out for initial start-up of a NEW system. For every day use starting procedures, refer to Section 3 Operation.

Failure to follow these instructions exactly leads to system failure and causes damage to components within the System. Read this section and other appropriate sections of the manual in order to gain familiarity with the requirements of the system and functions of each component.

2. CHECK THE INSTALLATION TO ENSURE CONFORMANCE TO INSTRUCTIONS IN SECTION 2 OF THIS MANUAL. Refer to Piping and Interconnect Diagrams illustrated in Section 2 of this manual:

1. Ensure that the installation has been properly performed as per the instructions in Section 2 of this Owner's Manual. Do not rely on the installer's word, do not assume the Aqua Whisper II has been installed correctly.

WARNING: Damage caused to the system due to operation of an improperly installed system is attributed to improper installation and subsequent operation, is the liability of the installer and the operator, and is not covered by the Sea Recovery warranty.

Check each water connection to the system to ensure that the installer has properly connected and properly routed each tube. Improper routing and any blockage in any line causes damage to the system. Improperly connected or loose connected lines resulting in leaks causing damage is the liability of the installer and the operator, and is not covered by the Sea Recovery warranty.

Do not assume and do not rely on the installer's word; check it yourself.

Make sure that the Electrical Power Source, boat's circuit breaker to the system, is switched "OFF".

Open the Electrical Control Box and check all electrical and electronic connections for proper wiring and attachment. Check all Electric Motor connections at the motor and within the controller. Refer to the wiring diagrams in Section 8 of this Owner's Manual.

After checking all wiring for correct and tight connection, close the Electrical Control Box.

Switch the Electrical Power Source, boat's circuit breaker to the system, to the "ON" position.

3. REVERSE OSMOSIS MEMBRANE ELEMENT:

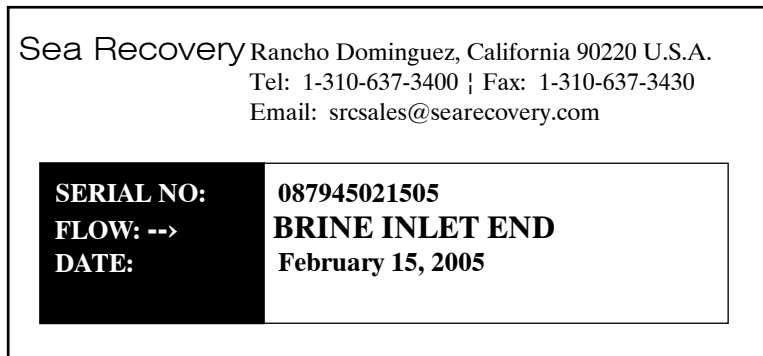
Check to ensure that the Reverse Osmosis Membrane Element(s) is (are) installed within the Pressure Vessel(s) [23 & 24].

CAUTION: Some systems are shipped WITHOUT the Reverse Osmosis Membrane Element. This is to accommodate, for example, Boat Builders that install the system well in advance of commissioning the boat and the Aqua Whisper II.

If the Reverse Osmosis Membrane Element has been installed, there will be a Reverse Osmosis Membrane Element Serial Number tag, illustrated below, attached to the High Pressure Vessel. Find this Serial Number tag to ensure that the R.O. Membrane Element has been installed.

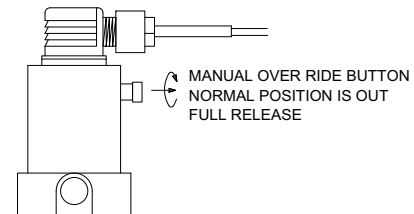
If the R.O. Membrane Element Serial Number tag is missing or does not contain a serial number and date, then immediately contact the company that sold the system to you, the installer, or Sea Recovery.

WARNING: DO NOT attempt to operate the system without a Reverse Osmosis Membrane Element installed in the system otherwise extensive damage will result. Damage caused to the system due to operation of the System without an R.O. Membrane Element correctly installed in each Pressure Vessel is attributed to improper installation and subsequent operation, is the liability of the installer and the operator, and is not covered by the Sea Recovery warranty.



4. INITIAL COMMISSIONING & START-UP PROCEDURE OF A NEW Aqua Whisper II:

1. Ensure that the manual By-Pass lever on the 3-Way Product Water Diversion Valve [38] is positioned outward (away from the coil body).



2. Open any auxiliary valve within the incoming Feed Line, Outgoing Brine Discharge Line, and Outgoing Product Water Line.

WARNING: If any auxiliary valve is installed in these lines, it will damage the Aqua Whisper II if left closed during starting and/or operation of the system. The resulting damage to the system is attributed to improper installation, is the liability of the operator, and is not covered by the Sea Recovery warranty.

3. Position Rinse Clean Inlet Valve [50] to normal operation towards the Sea Strainer [5]
4. Position Rinse Clean Outlet Valve [51] to normal operation towards the Thru Hull Discharge [34]
5. Check all filter housings to ensure that they contain the proper filter element:
 - a. Sea Strainer [5] check for monel screen
 - b. Plankton Filter [9] if installed check for monel fine mesh screen filter element
 - c. Multi Media Filter [10] if installed check for media (#20 silica sand).
 - d. Dual Prefilter [13 & 14] or Commercial Prefilter [12] check for pleated cartridge filter elements
 - e. Oil/water Separator [16] check for Oil/water Separator filter element
 - f. R.O. Membrane(s) [23 & 24] check for Sea Recovery Serial Number and Date on the label attached to each pressure vessel.
 - g. Charcoal Filter [39] check for charcoal filter element
 - h. pH Neutralizer [40] check for pH Neutralizer cartridge

2	xxx	BOOSTER PUMP VOLUTE N200 modified
3	xxx	BRACKET BOOSTER PUMP N200
4	xxx	GASKET BOOSTER PUMP N200
5	xxx	IMPELLER 4.80" N200
	XXXX	SEAL KIT

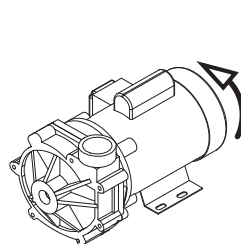
- i. Fresh Water Flush Carbon Filter [48] check for Carbon element.

NOTE: Illustration shows the Optional HP Pump.

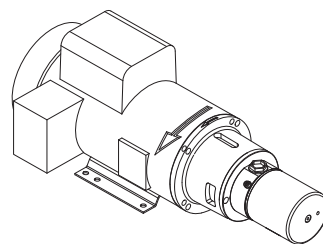
6. Function and Rotation Tests of Electric Motors:

a. ELECTRIC MOTOR ROTATIONAL CHECK:

Ask an assistant to view the fan section of the Booster Pump Motor [7] and High Pressure Pump Motor.[21] while you “Jog” each of these electric motors. These Illustrations show the proper rotation of each electric motor. Rotation is clockwise when viewing the back of the electric motor (fan), counter clock wise when viewing the front of the pump



**BOOSTER PUMP
Rotation Direction**



**HIGH PRESSURE PUMP
Rotation Direction**

- b. Correct any rotation abnormalities by wiring as per the wiring diagrams located in Section 8 of this Owner Manual.

7. **Prime the System.** The Aqua Whisper II requires proper Feed Water Pressure signal from the Low Pressure Transducer [20]. If the Low Pressure Transducer [20] does not receive pressure indicating that the Booster Pump [7] is not delivering feed water the System will shut down within 10 seconds. The LOW PRESSURE fault lamp at the Touch Pad will illuminate indicating that feed water is not being delivered to the system.

In order to save time and make the initial start easy, when starting the Aqua Whisper II for the first time during the commissioning process, the feed water lines and each component in the prefiltration section should be filled with either feed water or fresh water. This will prime the feed water section including the Booster Pump [7] so that it will be able to pick up and continue delivering feed water.

8. Operational Information and Notes. Read BEFORE starting the System:

NOTES REGARDING THE OPERATIONAL SEQUENCE. THIS IS INFORMATION ONLY AT THIS TIME. DO NOT YET OPERATE THE SYSTEM. READ ON:

Be prepared for the following Automatic sequence. After the System has been started the following will occur:

- a. Booster Pump [7] electric motor will start.
- b. Low Pressure Transducer [20] will sense feed water pressure from the Booster Pump and signal the System Control Logic.
- c. High Pressure Pump [21] electric motor will start.
- d. Brine Water Flow will register thought the Brine Discharge Flow Meter [30].
- e. The operator will then increase operating pressure by adjusting the Back Pressure Regulator Valve[29] handle.
- f. Product Water Flow Meter [37] will register product water flow, as operating pressure exceeds the osmotic pressure of the feed water. Product Water Flow must take priority to inform the operator if the operating pressure should be increased or decreased in order to maintain the product water flow specification.
- g. Salinity Probe [36] will register the quality of the Product Water. When the salinity of the Product Water lowers to the set point the U.V. Sterilizer [41] will energize if this option is installed.

- h. The 3-Way Product Water Diversion Valve [38] will energize sending the Product Water to the Post Filtration section. This may take up to 30 minutes as the Product Water channel flushes storage chemical from the R.O. Membrane Element(s). A Screen will appear stating that the System is OK.
- i. Feed Pressure, Operating Pressure, and Product Salinity are all being monitored by the System Control Logic.
- j. Prior to pressing STOP the operator should reduce system pressure by rotating the Back Pressure Regulator Valve [28] handle counter-clockwise full open.
- k. If the STOP is touched the following sequence will occur:
 - The 3-Way Product Water Diversion Valve [38] will revert to unpotable water.
 - The U.V. Sterilizer [41] will stop.
 - The High Pressure Pump [21] will stop.
 - The Booster Pump [7] will stop.
- l. If the System does not include the Automatic Fresh Water Flush option this ends the stop sequence.

or

If the System includes the Automatic Fresh Water Flush the Automatic Fresh Water Flush Valve [46] will energize and allow Fresh Water to flush the system.
- m. After 5 to 20 minutes the Fresh Water Flush cycle will stop.
- n. The Stop sequence is complete.
- o. If the System is equipped with the Fresh Water Flush the System will go to a Fresh Water Flush Stand-by mode and count down the days and minutes that the next automatic Fresh Water Flush Cycle will begin. The Fresh Water Flush Cycle will automatically initiate every 7 days until canceled or power is disconnected from the System.

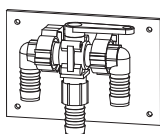
9. MULTI MEDIA FILTER BACK WASH AND RINSE:

If the System is equipped with a Multi Media Filter [10] it must be back washed and rinsed. New gravel and sand contain fines that must be backwashed from the multi media filter prior to operating the System.

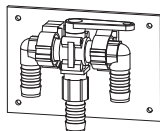
Instructions for Backwashing of the Multi Media Filter:

a. Open the Inlet Sea Cock Valve [2].

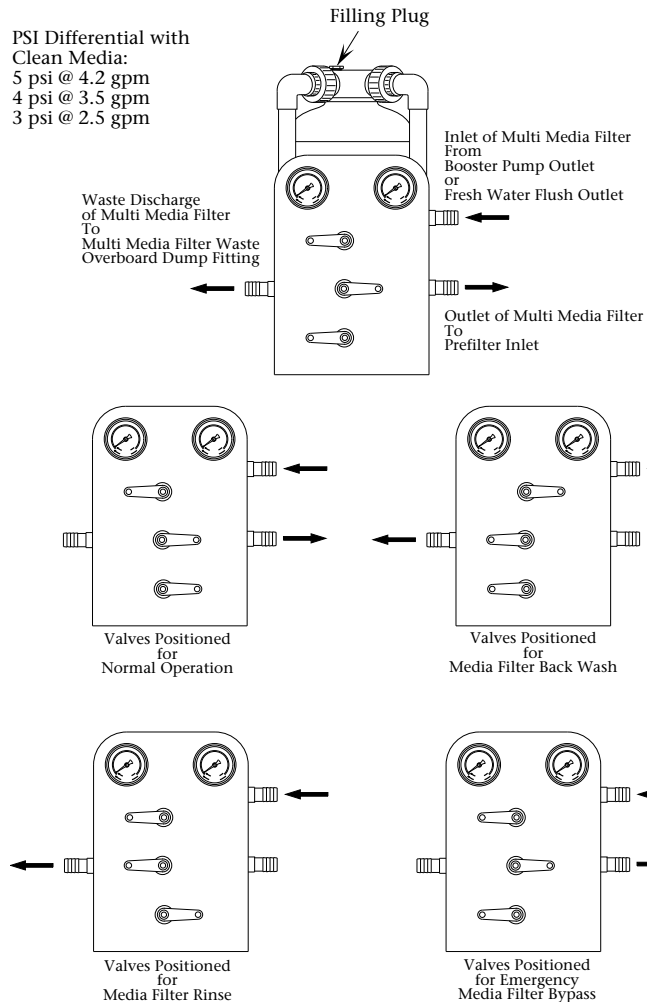
b. Position the Rinse Clean Inlet Valve [50], if installed, to the normal operating position towards the Sea Strainer [5].



c. Position the Rinse Clean Outlet Valve [51], if installed, to the normal operating position towards the Brine Discharge Thru-Hull Fitting [34].



VALVE POSITIONING OF THE MULTI MEDIA FILTER DURING 4 SEPARATE MODES OF OPERATION



d. Position the Multi Media Filter valves to Backwash.

e. Operate only the Booster Pump by pressing the Boost Pump Start switch.

f. After 10 minutes of back washing Stop the Booster Pump by pressing the Stop switch.

g. Position the Multi Media Filter Valves to Rinse.

h. Operate only the Booster Pump by pressing the Boost Pump Start switch.

i. After 5 minutes of Rinsing Stop the Booster Pump by pressing the Stop switch.

j. Position the Multi Media Filter Valves to Normal Operation.

10. READY FOR FIRST TIME COMMISSIONING START UP. Position Valves:

VALVE	POSITION
a. Inlet Sea Cock Valve [2]	FULL OPEN
b. Rinse Clean Inlet Valve [50]	FROM Sea Strainer Outlet TO Fresh Water Flush Check Valve [49] bottom; or Inline Vacuum/Pressure Gauge [6]; or Booster Pump Inlet [7]
c. Rinse Clean Outlet Valve [51]	FROM Brine Discharge Tee [31] TO Thru-Hull Discharge Fitting [34]
d. Multi Media Filter [10] Valves	NORMAL OPERATION (Refer to previous Page)
e. ANY auxiliary valve in the Feed Line, Brine Discharge Line, or Product Water Line	FULL OPEN

WARNING: If any auxiliary valve is installed in these lines, it will damage the Aqua Whisper II if left closed during starting and/or operation of the system. The resulting damage to the system is attributed to improper installation, is the liability of the operator, and is not covered by the Sea Recovery warranty.

f. Rotate the Back Pressure Regulator Valve [29] handle counter-clockwise full open.

11. START the System by pressing the Start switch.

12. ADJUST THE BACK PRESSURE REGULATOR: Rotate Clock Wise the Back Pressure Regulator [29] valve handle, located on the Control Panel. While slowly rotating the Back Pressure Regulator Valve handle Clock Wise, observe the High Pressure Gauge and Product Water Flow Meter. Continue rotating the Back pressure Regulator until the Product Water GPH or LPH output is within specifications of the System's rated production.

Temperature and Salinity Note: If operating in typical sea water, 35,000 PPM TDS with a temperature of 77 Degrees F. / 25 Degrees C. the operating pressure required to meet product water production specifications is approximately 800 PSI. If the feed water temperature is higher or lower the operating pressure required will be lower or higher accordingly. If the feed water salinity is higher or lower the operating pressure will be higher or lower accordingly.

If the Feed Water Temperature is lower than full production operating range the operator may increase the operating pressure up to 900 PSI in order to produce the maximum amount of product water given the low temperature of the feed water.

If the Feed Water Salinity is higher than full production operating range the operator may increase the operating pressure up to 900 PSI in order to produce the maximum amount of product water given the high salinity of the feed water.

Product Water Gallon or Liter Per Hour Flow Specifications for each system are as follows:

Model	Gallon Per Hour Product Water Flow	Liter Per Hour Product Water Flow
Aqua Whisper II 450	18.75 U.S. Gallons Per Hour	71 Liters Per Hour
Aqua Whisper II 700	29.2 U.S. Gallons Per Hour	110.4 Liters Per Hour
Aqua Whisper II 900	37.5 U.S. Gallons Per Hour	142 Liters Per Hour
Aqua Whisper II 1400	58.3 U.S. Gallons Per Hour	220.8 Liters Per Hour
Aqua Whisper II 1800	75 U.S. Gallons Per Hour	283.9 Liters Per Hour

13. When the proper pressure has been applied to create the specified amount of product water flow the Product Water Salinity Meter located on the Touch Pad will indicate the quality of the Product Water.

It may take up to 30 minutes to purge the R.O. Membrane Element. Although the system is producing “Product Water”, the Product Water may not be “Potable” for up to 30 minutes. The salinity of the Product Water diminishes gradually, until it reaches the factory setting at which time the Touch Pad Salinity Meter indication will display the quality of the product water.

14. Fill in the Sea Recovery Aqua Whisper II NEW SYSTEM INITIAL READINGS form on page 11 of this section. This will allow the owner to compare new readings with subsequent operation readings and aid in diagnosing maintenance requirements.
15. If any abnormality develops press STOP and correct the problem. Refer to Section 6 of this Owner’s Manual for troubleshooting instructions.
16. Check for:
 - a. A constant feed water flow.
 - b. A consistent system pressure.
 - c. Leaks in the system.
 - d. Abnormal noises or other occurrences.

17. REVERSE OSMOSIS MEMBRANE ELEMENT(S) WARNING NOTES:

PRIOR TO STOPPING THE SYSTEM REVIEW AND ADHERE TO THE FOLLOWING WARNINGS AND RESPECTIVE ACTIONS.

WARNING: The R.O. Membrane Element(s) must be kept wet at all times.

WARNING: The System must be protected from biological fouling if it will not be operated within the next 2 weeks.

FREEZING TEMPERATURE WARNING: The System must be protected from freezing if it will be exposed to temperatures below 32° Fahrenheit / 0° Celsius. Freezing temperatures, temperatures below 32° Fahrenheit / 0° Celsius, **will cause extensive damage** to the Aqua Whisper II as the water expands within the System during the freezing process. Resulting damage to the Aqua Whisper II System caused by freezing temperatures is attributed to improper operator care and protection, is the liability of the operator, and is not covered by the Sea Recovery warranty.

DO NOT subject the Aqua Whisper II to temperatures below 32° Fahrenheit / 0° Celsius unless the Aqua Whisper II has been rinsed with a solution of product water with twenty percent food grade glycerin (propylene glycol) as described in Section 5 of this Owner’s Manual.

LONG TERM STORAGE CAUTION: If the System will not be operated for an extended period of time, 3 months or longer, refer to Section 5 of this Owner’s Manual for Long Term Storage Procedures.

If the Automatic Fresh Water Flush option is not installed pressing Stop will place the System into the Shut Down mode. The Product Water Diversion Solenoid Valve [38] will de-energize, the U.V. Sterilizer [41] will de-energize, the High Pressure Pump [21] will stop, and the Booster Pump [7] will stop.

If the Automatic Fresh Water Flush option is installed, after the Booster Pump stops the Fresh Water Flush Solenoid Valve [46] will activate and allow fresh water from the boat’s pressurized fresh water piping to enter the Aqua Whisper II System. The time duration of the Fresh Water Flush cycle is factory set for 10 to 12 minutes. After the Fresh Water Flush cycle has finished the System will go into a stand by mode for 7 days. At the end of 7 days the Fresh Water Flush cycle will repeat and do so every 7 days.

This automatic 7 day cycle will stop if the power has been interrupted or if **CANCEL** has been Touched

Refer to Section 5 of this Owner's Manual for proper Storage of the System and protection of the R.O. Membrane Element(s).

18. Check UV unit for proper operation:
 - a. Place a white piece of paper in front of the UV unit viewport.
 - b. Ensure a reflection of blue light appears on the piece of paper.
 - c. If not blue light reflection appears, the UV unit is not operating properly.

Refer to Section 6 for troubleshooting.

19. Stop the System.

- a. Rotate the Back Pressure Regulator Valve [29] handle counter-clockwise full open.
- b. Press Stop at the Touch Pad.

20. R.O. MEMBRANE ELEMENT PROTECTION CAUTION:

SHORT STORAGE: If the System is not equipped with the Automatic Fresh Water Flush option perform a manual fresh water flush. Refer to Section 5 of this Owner's Manual for Short Term Storage Procedures.

LONG TERM STORAGE: If the System will not be operated for an extended period of time, 3 months or longer, refer to Section 5 of this Owner's Manual for Long Term Storage Procedures.

FREEZING TEMPERATURE WARNING: Freezing temperatures, temperatures below 32° Fahrenheit / 0° Celsius, **will cause extensive damage** to the Aqua Whisper II as the water expands within the System during the freezing process. Resulting damage to the Aqua Whisper II System caused by freezing temperatures is attributed to improper operator care and protection, is the liability of the operator, and is not covered by the Sea Recovery warranty.

DO NOT subject the Aqua Whisper II to temperatures below 32° Fahrenheit / 0° Celsius unless the Aqua Whisper II has been rinsed with a solution of product water with twenty percent food grade glycerin (propylene glycol). Refer to Section 5 of this Owner's Manual for proper care and protection against freezing.

21. **BOAT SAFETY WARNING:** The Inlet Thru-Hull Sea Cock Valve [2] is in the Open position. It is recommended for the safety of the boat to close the Sea Cock Valve when ever the System is not in use. This will protect the boat from water flooding should a hose or component fail.

Sea Recovery Aqua Whisper II NEW SYSTEM INITIAL READINGS

At the time of commissioning the NEW system, record the following information after one hour of continuous proper operation of the system.

Retain this form in this Owner's Manual for the owner and operator's future reference. This information is valuable to the servicing technicians in providing technical support to the owner and future operators of the Aqua Whisper II. Provide this information to service technicians when requesting technical assistance.

Date Installed: _____ Date Commissioned: _____
 Model Information: _____
 System Serial Number: _____
 Style: _____ Compact _____ Modular
 R.O. Membrane/Vessel Assy Quantity: _____ 1 (one) _____ 2 (two)
 System Capacity: _____ 450 GPD _____ 700 GPD _____ 900 GPD _____ 1400 GPD _____ 1800 GPD

Who Installed the System:

Company _____
 Street Address _____
 City, State _____
 Country, postal code _____ Telephone _____
 Name of Installer _____

Who Commissioned the System:

Company _____
 Street Address _____
 City, State _____
 Country, postal code _____ Telephone _____
 Name of Installer _____

System Power: _____ Volts AC _____ Hz _____ Phase
 Operation Time: _____ Hours
 Sea Strainer Inlet [4] _____ Vacuum or _____ Pressure
 Booster Pump Inlet [6] _____ Vacuum or _____ Pressure
 Plankton Filter or Multi Media Filter Inlet [8] _____ Vacuum or _____ Pressure
 Dual Prefilter or Commercial Prefilter Inlet [11] _____ Vacuum or _____ Pressure
 Oil Water Separator Filter Inlet [15] _____ Vacuum or _____ Pressure
 High Pressure Pump Inlet [17] _____ Vacuum or _____ Pressure
 Hi Pressure Gauge [28] _____ Vacuum or _____ Pressure
 Product Flow [37]: _____ gph or _____ L/h
 Brine Flow [30]: _____ gph or _____ L/h
 Salinity LED Indication: _____ LEDs Illuminated
 Feed Water Salinity: _____ ppm or Location of use: _____
 Feed Water Temperature: _____ ° Fahrenheit or _____ ° Celsius

Notes: _____

Notes:

[illegible]

Section 4

System Operation

Notes:

[illegible]

Operational Information and Notes. Read BEFORE starting the System:

Refer to Piping and Interconnect Diagrams illustrated in Section 2 pages 13 through 19 of this manual:

NOTES REGARDING THE OPERATIONAL SEQUENCE. THIS IS INFORMATION ONLY AT THIS TIME. DO NOT YET OPERATE THE SYSTEM. READ ON:

Be prepared for the following Automatic sequence. After starting the System the following will occur:

Be prepared for the following Automatic sequence. After the System has been started the following will occur:

- a. Booster Pump [7] electric motor will start.
- b. Low Pressure Transducer [20] will sense feed water pressure from the Booster Pump and signal the System Control Logic.
- c. High Pressure Pump [21] electric motor will start.
- d. Brine Water Flow will register through the Brine Discharge Flow Meter [30].
- e. The operator will then increase operating pressure by adjusting the Back Pressure Regulator Valve[29] handle.
- f. Product Water Flow Meter [37] will register product water flow, as operating pressure exceeds the osmotic pressure of the feed water. Product Water Flow must take priority to inform the operator if the operating pressure should be increased or decreased in order to maintain the product water flow specification.
- g. Salinity Probe [36] will register the quality of the Product Water. When the salinity of the Product Water lowers to the set point the U.V. Sterilizer [41] will energize if this option is installed.
- h. The 3-Way Product Water Diversion Valve [38] will energize sending the Product Water to the Post Filtration section. This may take up to 30 minutes as the Product Water channel flushes storage chemical from the R.O. Membrane Element(s). A Screen will appear stating that the System is OK.
- i. Feed Pressure, Operating Pressure, and Product Salinity are all being monitored by the System Control Logic.
- j. Prior to pressing STOP the operator should reduce system pressure by rotating the Back Pressure Regulator Valve [29] handle counter-clockwise full open.
- k. If the STOP is touched the following sequence will occur:
 The 3-Way Product Water Diversion Valve [38] will revert to unpotable water.
 The U.V. Sterilizer [41] will stop.
 The High Pressure Pump [21] will stop.
 The Booster Pump [7] will stop.
- l. If the System does not include the Automatic Fresh Water Flush option this ends the stop sequence.

or

If the System includes the Automatic Fresh Water Flush the Automatic Fresh Water Flush Valve [46] will energize and allow Fresh Water to flush the system.

- m. After 5 to 20 minutes the Fresh Water Flush cycle will stop.
- n. The Stop sequence is complete.
- o. If the System is equipped with the Fresh Water Flush the System will go to a Fresh Water Flush Stand-by mode and count down the days and minutes that the next automatic Fresh Water Flush Cycle will begin. The Fresh Water Flush Cycle will automatically initiate every 7 days until canceled or power is disconnected from the System.

REVERSE OSMOSIS MEMBRANE ELEMENT(S) WARNING:

PRIOR TO OPERATION AND DURING NON-OPERATION OF THE SYSTEM REVIEW AND ADHERE TO THE FOLLOWING WARNINGS AND RESPECTIVE ACTIONS.

WARNING: The R.O. Membrane Element(s) must be kept wet at all times.

WARNING: The System must be protected from biological fouling if it will not be operated within the next 2 weeks.

FREEZING TEMPERATURE WARNING: The System must be protected from freezing if it will be exposed to temperatures below 32° Fahrenheit / 0° Celsius. Freezing temperatures, temperatures below 32° Fahrenheit / 0° Celsius, **will cause extensive damage** to the Aqua Touch as the water expands within the System during the freezing process. Resulting damage to the Aqua Touch System caused by freezing temperatures is attributed to improper operator care and protection, is the liability of the operator, and is not covered by the Sea Recovery warranty.

DO NOT subject the Aqua Touch to temperatures below 32° Fahrenheit / 0° Celsius unless the Aqua Touch has been rinsed with a solution of product water with twenty percent food grade glycerin (propylene glycol) as described in Section 5 of this Owner's Manual.

LONG TERM STORAGE CAUTION: If the System will not be operated for an extended period of time, 3 months or longer, refer to Section 5 of this Owner's Manual for Long Term Storage Procedures.

If the Automatic Fresh Water Flush option is not installed and is not selected in the System Control Logic pressing Stop will place the System into the Shut Down mode. The Product Water Diversion Valve [38] will de-energize, the U.V. Sterilizer [41] will de-energize, the High Pressure Pump [21] will stop, and the Booster Pump [7] will stop.

If the Automatic Fresh Water Flush option is installed, after the Booster Pump stops the Fresh Water Flush Solenoid Valve [46] will activate and allow fresh water from the boat's pressurized fresh water piping to enter the Aqua Touch System. The time duration of the Fresh Water Flush cycle is factory set for 10 to 12 minutes. After the Fresh Water Flush cycle has finished the System will go into a stand by mode for 7 days. At the end of 7 days the Fresh Water Flush cycle will repeat and do so every 7 days.

This automatic 7 day cycle will stop if the power has been interrupted or if **CANCEL** has been Touched

Refer to Section 5 of this Owner's Manual for proper Storage of the System and protection of the R.O. Membrane Element(s).

Operation of the System:

1. Switch the Electrical Power Source to the System “ON”, boat’s circuit breaker.
2. Position Valves:

VALVE	POSITION
a. Inlet Sea Cock Valve [2]	FULL OPEN
b. Rinse Clean Inlet Valve [50]	FROM Sea Strainer Outlet TO Fresh Water Flush Check Valve [49] bottom; or Inline Vacuum/Pressure Gauge [6]; or Booster Pump Inlet [7]
c. Rinse Clean Outlet Valve [51]	FROM Brine Discharge Tee [31] TO Thru-Hull Discharge Fitting [34]
d. Multi Media Filter [10] Valves	NORMAL OPERATION (Refer to previous Page)
e. ANY auxiliary valve in the Feed Line, Brine Discharge Line, or Product Water Line	FULL OPEN

WARNING: If any auxiliary valve is installed in these lines, it will damage the Aqua Whisper II if left closed during starting and/or operation of the system. The resulting damage to the system is attributed to improper installation, is the liability of the operator, and is not covered by the Sea Recovery warranty.

- f. Rotate the Back Pressure Regulator Valve [29] handle counter-clockwise full open.
3. **START the System by pressing the Start switch.**
4. **ADJUST THE BACK PRESSURE REGULATOR:** Rotate Clock Wise the Back Pressure Regulator [29] valve handle, located on the Control Panel. While rotating the Back Pressure Regulator Valve handle Clock Wise, observe the High Pressure Gauge and Product Water Flow Meter. Continue rotating the Back pressure Regulator until the Product Water GPH or LPH output is within specifications of the System’s rated production. However, Do Not exceed 900 PSI operating pressure.

Temperature and Salinity Note: If operating in typical sea water, 35,000 PPM TDS with a temperature of 77 Degrees F. / 25 Degrees C. the operating pressure required to meet product water production specifications is approximately 800 PSI. If the feed water temperature is higher or lower the operating pressure required will be lower or higher accordingly. If the feed water salinity is higher or lower the operating pressure will be higher or lower accordingly.

If the Feed Water Temperature is lower than full production operating range the operator may increase the operating pressure up to 900 PSI in order to produce the maximum amount of product water given the low temperature of the feed water.

If the Feed Water Salinity is higher than full production operating range the operator may increase the operating pressure up to 900 PSI in order to produce the maximum amount of product water given the high salinity of the feed water.

Product Water Gallon or Liter Per Hour Flow Specifications for each system are as follows:

Model	Gallon Per Hour	Liter Per Hour
	Product Water Flow	Product Water Flow
Aqua Whisper II 450	18.75 U.S. Gallons Per Hour	71 Liters Per Hour
Aqua Whisper II 700	29.2 U.S. Gallons Per Hour	110.4 Liters Per Hour
Aqua Whisper II 900	37.5 U.S. Gallons Per Hour	142 Liters Per Hour
Aqua Whisper II 1400	58.3 U.S. Gallons Per Hour	220.8 Liters Per Hour
Aqua Whisper II 1800	75 U.S. Gallons Per Hour	283.9 Liters Per Hour

5. When the proper pressure has been applied to create the specified amount of product water flow the Product Water Salinity Meter located on the Touch Pad will indicate the quality of the Product Water.

It may take up to 30 minutes to purge the R.O. Membrane Element. Although the system is producing “Product Water”, the Product Water may not be “Potable” for up to 30 minutes. The salinity of the Product Water diminishes gradually, until it reaches the factory setting at which time the Touch Pad Salinity Meter indication will display the quality of the product water.

6. Make a copy of and fill in a Sea Recovery Aqua Whisper II Daily Operational Log Readings form that can be found on page 9 or 11 of this section. This will allow the owner to compare new system readings from Section 3 with subsequent operation readings and aid in diagnosing maintenance requirements.
7. If any abnormality develops press STOP and correct the problem. Refer to Section 6 of this Owner’s Manual for troubleshooting instructions.
8. Check for:
 - a. A constant feed water flow.
 - b. A consistent system pressure.
 - c. Leaks in the system.
 - d. Abnormal noises or other occurrences.

9. REVERSE OSMOSIS MEMBRANE ELEMENT(S) WARNING NOTES:

PRIOR TO STOPPING THE SYSTEM REVIEW AND ADHERE TO THE FOLLOWING WARNINGS AND RESPECTIVE ACTIONS.

WARNING: The R.O. Membrane Element(s) must be kept wet at all times.

WARNING: The System must be protected from biological fouling if it will not be operated within the next 2 weeks.

FREEZING TEMPERATURE WARNING: The System must be protected from freezing if it will be exposed to temperatures below 32° Fahrenheit / 0° Celsius. Freezing temperatures, temperatures below 32° Fahrenheit / 0° Celsius, **will cause extensive damage** to the Aqua Whisper II as the water expands within the System during the freezing process. Resulting damage to the Aqua Whisper II System caused by freezing temperatures is attributed to improper operator care and protection, is the liability of the operator, and is not covered by the Sea Recovery warranty.

DO NOT subject the Aqua Whisper II to temperatures below 32° Fahrenheit / 0° Celsius unless the Aqua Whisper II has been rinsed with a solution of product water with twenty percent food grade glycerin (propylene glycol) as described in Section 5 of this Owner’s Manual.

LONG TERM STORAGE CAUTION: If the System will not be operated for an extended period of time, 3 months or longer, refer to Section 5 of this Owner’s Manual for Long Term Storage Procedures.

If the Automatic Fresh Water Flush option is not installed pressing Stop will place the System into the

Shut Down mode. The Product Water Diversion Valve [38] will de-energize, the U.V. Sterilizer [41] will de-energize, the High Pressure Pump [21] will stop, and the Booster Pump [7] will stop.

If the Automatic Fresh Water Flush option is installed, after the Booster Pump stops the Fresh Water Flush Solenoid Valve [46] will activate and allow fresh water from the boat's pressurized fresh water piping to enter the Aqua Whisper II System. The time duration of the Fresh Water Flush cycle is factory set for 10 to 12 minutes. After the Fresh Water Flush cycle has finished the System will go into a stand by mode for 7 days. At the end of 7 days the Fresh Water Flush cycle will repeat and do so every 7 days.

This automatic 7 day cycle will stop if the power has been interrupted or if the Stop Switch is pressed.

Refer to Section 5 of this Owner's Manual for proper Storage of the System and protection of the R.O. Membrane Element(s).

10. Stop the System.

- a. Rotate the Back Pressure Regulator Valve [29] handle counter-clockwise full open.
- b. Press Stop at the Touch Pad.

11. R.O. MEMBRANE ELEMENT PROTECTION CAUTION:

SHORT STORAGE: If the System is not equipped with the Automatic Fresh Water Flush option perform a manual fresh water flush. Refer to Section 5 of this Owner's Manual for Short Term Storage Procedures.

LONG TERM STORAGE: If the System will not be operated for an extended period of time, 3 months or longer, refer to Section 6 of this Owner's Manual for Long Term Storage Procedures.

FREEZING TEMPERATURE WARNING: Freezing temperatures, temperatures below 32° Fahrenheit / 0° Celsius, **will cause extensive damage** to the Aqua Whisper II as the water expands within the System during the freezing process. Resulting damage to the Aqua Whisper II System caused by freezing temperatures is attributed to improper operator care and protection, is the liability of the operator, and is not covered by the Sea Recovery warranty.

DO NOT subject the Aqua Whisper II to temperatures below 32° Fahrenheit / 0° Celsius unless the Aqua Whisper II has been rinsed with a solution of product water with twenty percent food grade glycerin (propylene glycol). Refer to Section 5 of this Owner's Manual for proper care and protection against freezing.

WARNING: The R.O. Membrane Element(s) must be kept wet at all times.

12. **BOAT SAFETY WARNING:** The Inlet Thru-Hull Sea Cock Valve [2] is in the Open position. It is recommended for the safety of the boat to close the Sea Cock Valve when ever the System is not in use. This will protect the boat from water flooding should a hose or component fail.

Notes: _____

[illegible]

Sea Recovery Aqua Whisper II DAILY OPERATIONAL LOG READINGS

Record the System readings Daily during use. By Daily readings, when compared to new system readings, will assist in diagnosing required maintenance.

Retain this form in this Owner's Manual for the owner and operator's future reference. This information is valuable to the servicing technicians in providing technical support to the owner and future operators of the Aqua Whisper II. Provide this information to service technicians when requesting technical assistance.

Date Installed: _____

Date Commissioned: _____

Model Information:

System Serial Number: _____

Style: _____ Compact _____ Vertical _____ Modular

R.O. Membrane/Vessel Assy Quantity: _____ 1 (one) _____ 2 (two)

System Capacity: _____ 450 GPD _____ 700 GPD _____ 900 GPD _____ 1400 GPD _____ 1800 GPD

System Power: _____ Volts AC _____ Hz _____ Phase

Operation Readings:

Operation Time: _____ Hours

Sea Strainer Inlet [4] _____ Vacuum or _____ Pressure

Booster Pump Inlet [6] _____ Vacuum or _____ Pressure

Plankton Filter or Multi Media Filter Inlet [8] _____ Vacuum or _____ Pressure

Dual Prefilter or Commercial Prefilter Inlet [11] _____ Vacuum or _____ Pressure

Oil Water Separator Filter Inlet [15] _____ Vacuum or _____ Pressure

High Pressure Pump Inlet [17] _____ Vacuum or _____ Pressure

Hi Pressure Gauge [28] _____ Vacuum or _____ Pressure

Product Flow [37]: _____ gph or _____ L/h

Brine Flow [30]: _____ gph or _____ L/h

Feed Flow: _____ gph or _____ L/h

Salinity LED Indication: _____ LEDs Illuminated

Feed Water Salinity: _____ ppm or Location of use: _____

Feed Water Temperature: _____ ° Fahrenheit or _____ ° Celsius

Notes: _____

Notes: _____

[illegible]

Section 5

System Storage & R.O. Membrane Element Cleaning

Notes:

[illegible]

SYSTEM STORAGE AND CLEANING

1. R.O. MEMBRANE ELEMENT HANDLING & SYSTEM STORAGE CAUTIONS:

1. **TEMPERATURE:** Never store the R.O. Membrane Element or Membrane/Vessel Assembly in direct sunlight. Never expose the R.O. Membrane Element or Membrane/Vessel Assembly to storage temperatures above 120° F / 50 C or below 32° F / 0 C. High temperatures cause up to 40% loss of production from the R.O. membrane element. This damage is irreversible. Freezing temperatures cause mechanical damage to the system and irreversible damage to the R.O. membrane element.
2. **DRYING OUT:** Never allow the R.O. membrane element to dry out, as 40% production loss occurs. This membrane damage may be irreversible. Some, but not all, production may be restored by saturating the R.O. Membrane Element in product water for several days and then operating the system using product water feed into the system for a continuous 48 hour period. The R.O. membrane element must remain wet at all times.
3. **BIOLOGICAL FOULING:** Protect the R.O. membrane element from biological fouling. Production loss occurs if the element becomes fouled by biological slimes. Some, but not all, production may be restored after cleaning.
4. **CHEMICAL FOULING:** Never expose the R.O. Membrane Element to chemicals other than those supplied by SRC. Use caution when operating the system in harbors that may be polluted with chemicals, oil, or fuel. Chemicals may damage the R.O. Membrane Element beyond repair.

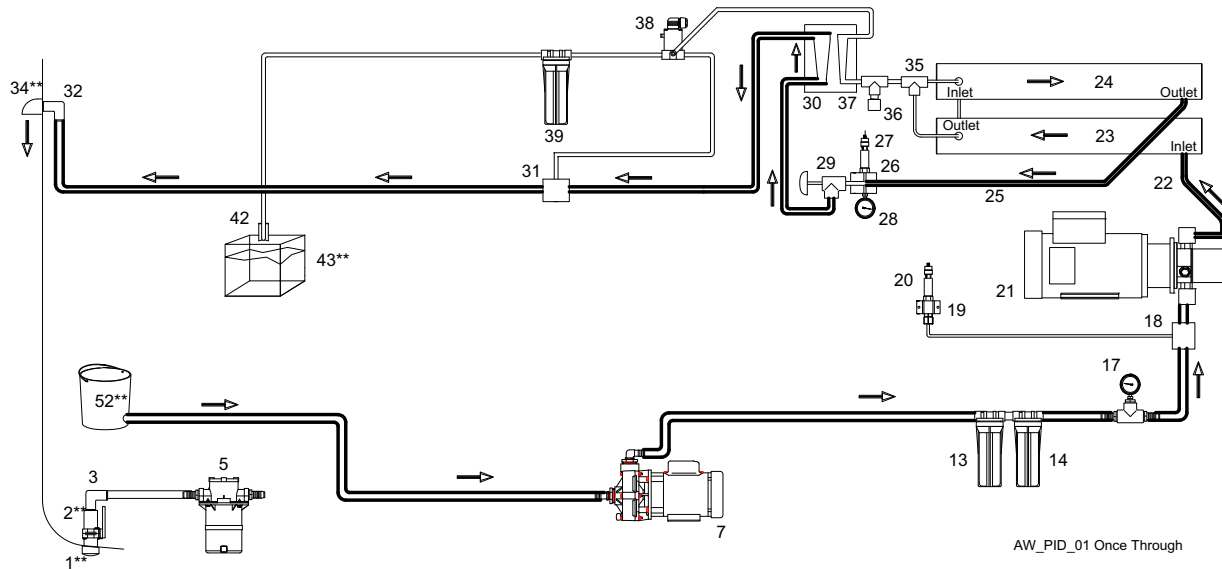
WARNING: NEVER USE THIRD PARTY CHEMICALS, ONLY USE SEA RECOVERY SUPPLIED CHEMICALS. Third party chemicals are not compatible with various materials used in the Sea Recovery System. Copolymer parts within the Sea Recovery System will be dissolved by third party chemicals. Third party chemicals will destroy the Sea Recovery R.O. Membrane Element. Damage to the Sea Recovery System or components within the System resulting from non-compatible chemicals are the liability of the operator or maintenance personnel and are not covered by the Sea Recovery Warranty.

5. **STORAGE:** The dark and moist interior of a membrane element is an excellent breeding ground for microorganisms. Simply operating the system does not protect the R.O. Membrane Element from production loss due to biological fouling. During short-term shutdowns, the system must be rinsed as explained in the following pages. During long-term shutdowns, the system must be rinsed as well as chemically treated as explained later in this chapter.
6. **NEW SYSTEM STORAGE:** If the R.O. Membrane Element(s) is (are) installed in the System and if the System will not be installed and commissioned within 3 months from receipt refer to the procedures for either Short Term or Long Term storage within this Section.

On the following two pages are four illustrations that show the flow of water in a Once-Through-Rinse operation and in a Closed Loop operation. Page 4 illustrates the actual Piping and Interconnect Diagram with all options in the Once Through Rinse and Closed Loop operation. Page 5 illustrates a simplified flow diagram of the Once Through Rinse and Closed Loop operation.

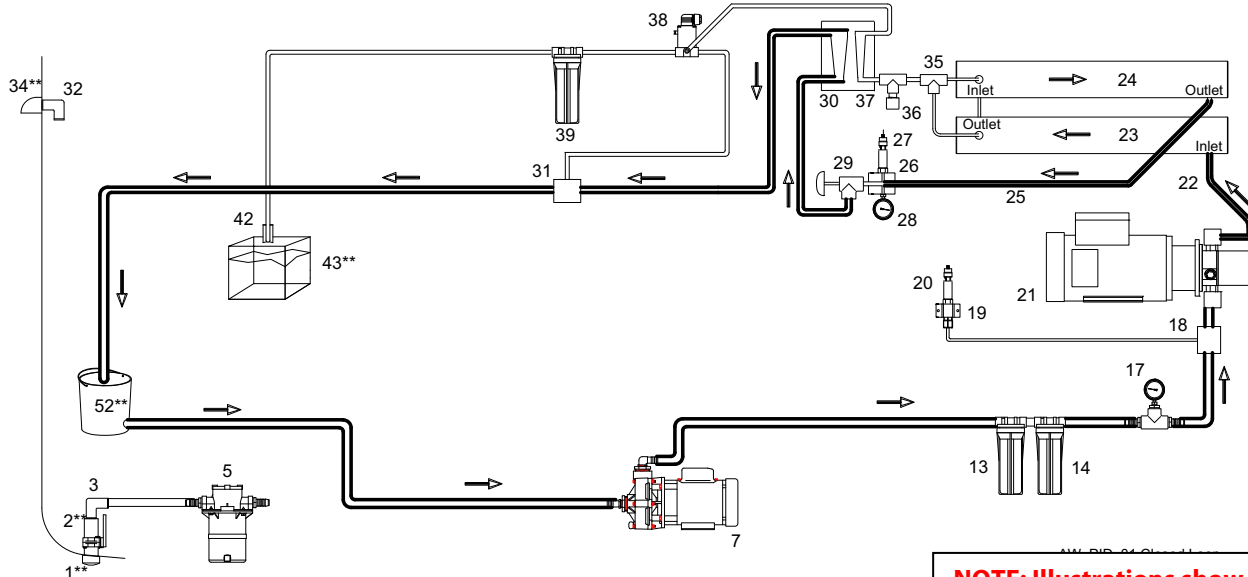
These illustrations may be referred to during the Rinse, Clean, and Storage procedures.

Aqua Whisper II Illustrated in a Once Through Configuration
for Flushing the System with Fresh Water, and for discharging Cleaning or Storage Chemical



Illustrated above is the Aqua Whisper II Water Flow in a Once Through Configuration without the Inlet Rinse/Clean Valve [50] or the Outlet Rinse/Clean Valve [51]. Disconnection of the suction hose is required. This configuration is used to Rinse the System with Fresh Water, and also to Discharge the contents of the cleaning solution bucket.

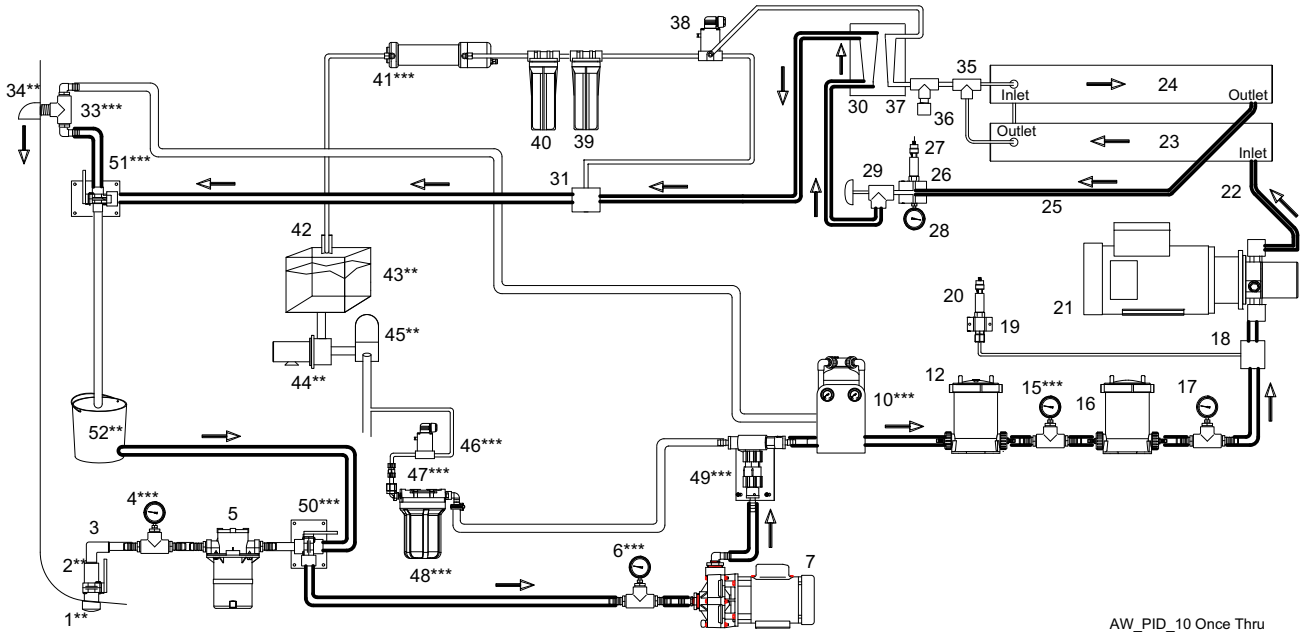
Aqua Whisper II Illustrated in a Closed Loop Configuration
for R.O. Membrane Element Cleaning, Rinse Water Circulation, or Storage Solution Circulation



**NOTE: Illustrations show
[21] Optional HP Pump.**

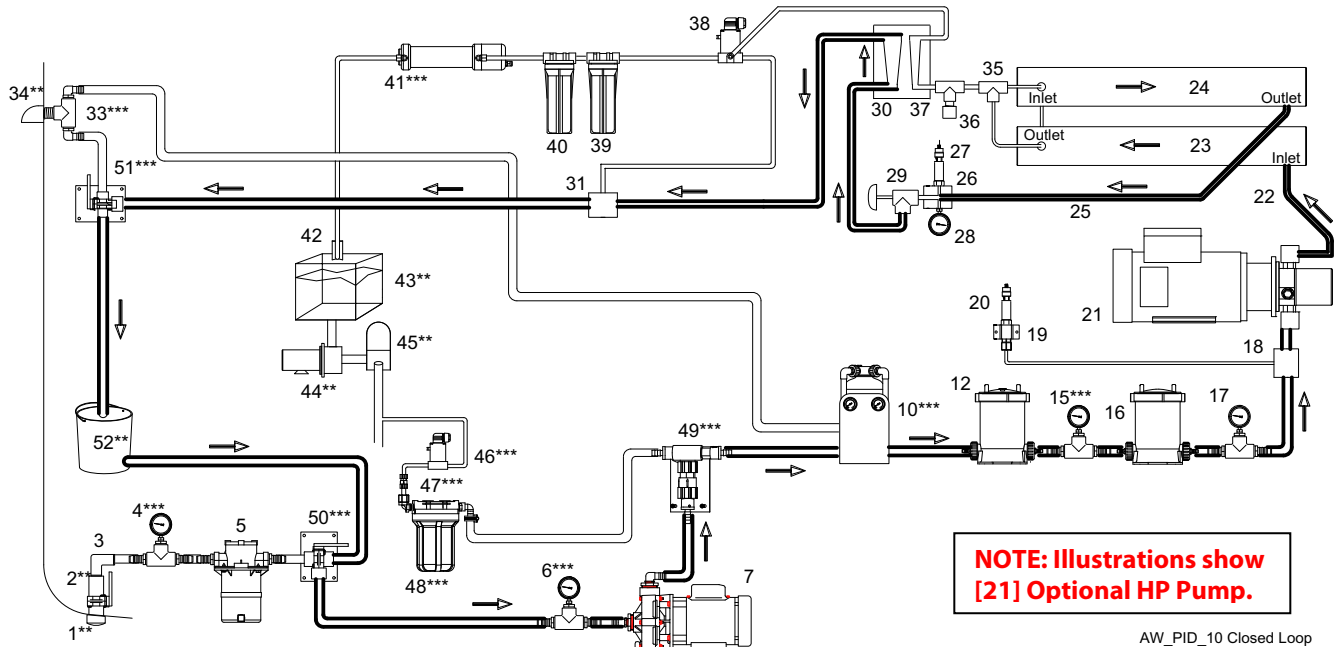
Illustrated above is the Aqua Whisper II Water Flow in a Closed Loop Configuration without the Inlet Rinse/Clean Valve [50] or the Outlet Rinse/Clean Valve [51]. Disconnection of the Suction hose and Discharge hose is required. This configuration is used to Circulate Storage Chemical, Winterizing Chemical, Fresh Water, or R.O. Membrane Cleaning Chemical through the System.

Aqua Whisper II Illustrated in a Once Through Configuration
for Flushing the System with Fresh Water, and for discharging Cleaning or Storage Chemical



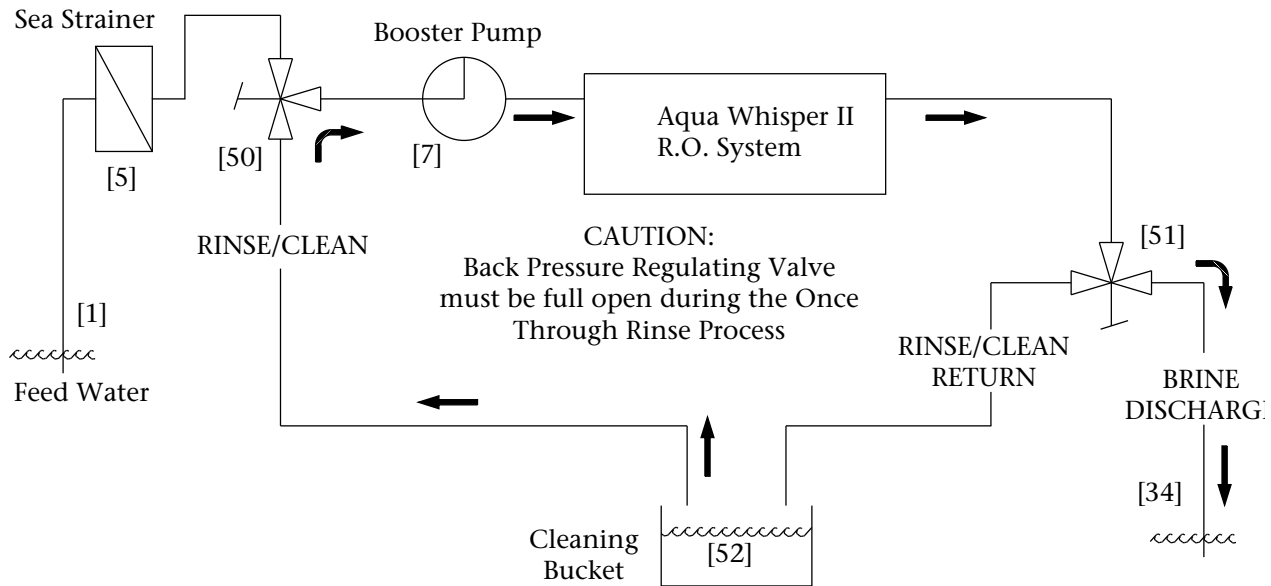
Illustrated above is the Aqua Whisper II Water Flow in a Once Through Configuration utilizing the Inlet Rinse/Clean Valve [50] and the Outlet Rinse/Clean Valve [51]. This configuration is used to Rinse the System with Fresh Water, and also to Discharge the contents of the cleaning solution bucket.

Aqua Whisper II Illustrated in a Closed Loop Configuration
for R.O. Membrane Element Cleaning, Rinse Water Circulation, or Storage Solution Circulation



Illustrated above is the Aqua Whisper II Water Flow in a Closed Loop Configuration utilizing the Inlet Rinse/Clean Valve [50] and the Outlet Rinse/Clean Valve [51]. This configuration is used to Circulate Storage Chemical, Winterizing Chemical, Fresh Water, or R.O. Membrane Cleaning Chemical through the System.

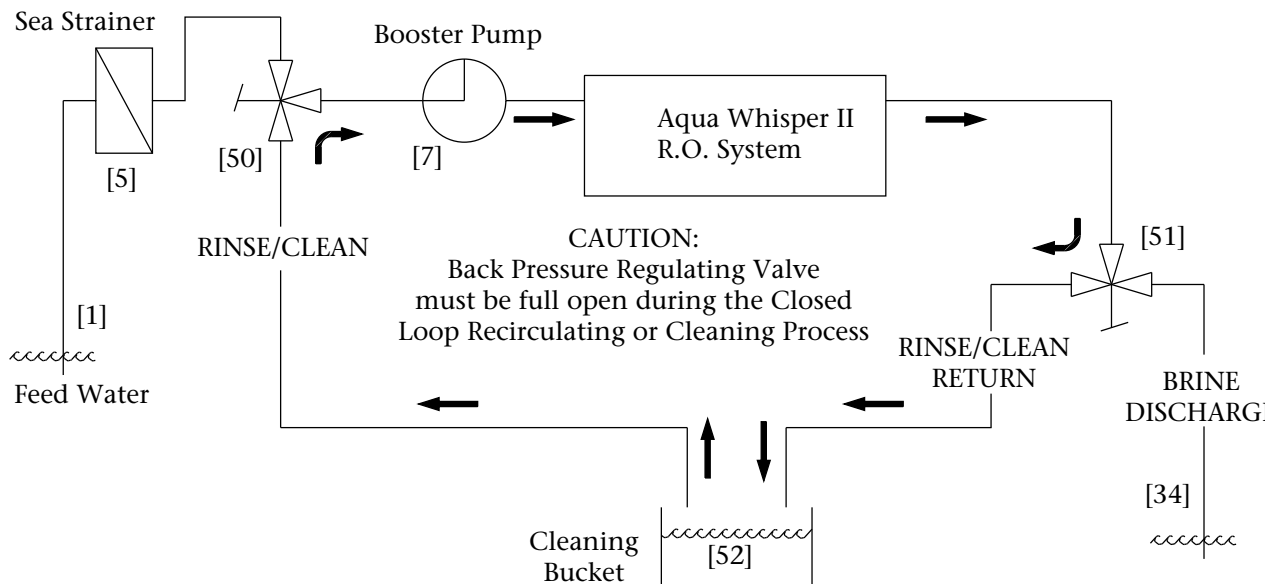
SIMPLIFIED AQUA WHISPER II ONCE THROUGH RINSE



Illustrated above is a simplified flow diagram with Water Flow in a Once Through Configuration utilizing the Inlet Rinse/Clean Valve [50] and the Outlet Rinse/Clean Valve [51]. This configuration is used to Rinse the System with Fresh Water, and also to Discharge the contents of the cleaning solution bucket

Illustrated below is a simplified flow diagram with water flow in a Closed Loop Configuration utilizing the Inlet Rinse/Clean Valve [50] and the Outlet Rinse/Clean Valve [51]. This configuration is used to Circulate Storage Chemical, Winterizing Chemical, Fresh Water, or R.O. Membrane Cleaning Chemical through the System.

SIMPLIFIED AQUA WHISPER II RECIRCULATING LOOP



When the instructions within this section state “configure for Once Through Rinse” proceed as follows:

- a. Configure the Suction line for a Once Through Configuration as illustrated in the drawings at the TOP of pages 4, 5, and 6 of this section. Disconnect the outlet line from the Sea Strainer [5] and place it in the container or bucket. Or if the system is equipped with the optional Rinse/Clean Inlet Valve [51] then position this valve to draw from the bucket [52].
- b. The Brine Discharge line for a Once Through Configuration, as illustrated in the drawings at the TOP of pages 4, 5, and 6 of this section, is left connected to the Thru Hull Over Board Discharge Thru Hull Fitting [34] which is the normal operating configuration. Or if the system is equipped with the optional Rinse/Clean Outlet Valve [51] then position this valve to the Thru Hull Over Board Discharge Fitting [34] which is the normal operating configuration.

When the instructions within this section state “configure for Closed Loop” proceed as follows:

- a. Configure the Suction line for a Closed Loop Configuration as illustrated in the drawings at the BOTTOM of pages 4, 5, and 6 of this section. Disconnect the outlet line from the Sea Strainer [5] and place it in the container or bucket. Or if the system is equipped with the optional Rinse/Clean Inlet Valve [51] then position this valve to draw from the bucket [52].
- b. Configure the Brine Discharge line for a Closed Loop Configuration as illustrated in the drawings at the BOTTOM of pages 4, 5, and 6 of this section. Disconnect the Brine Discharge Line from the Thru-Hull over board discharge fitting [34] and place it in the container or bucket. Or if the system is equipped with the optional Rinse Clean Outlet Valve [51] then position this valve to return to the container or bucket [52].

A. SHORT-TERM SHUTDOWN:

A short-term shutdown is defined as a period of time in which the system is not utilized for up to four weeks. An effective short-term protection for the system and R.O. membrane element is a Fresh Water Rinse of the entire system with fresh water (product water from the system). This prolongs the system life by minimizing electrolysis and retarding biological growth.

NOTE: If the system is equipped with the Automatic Fresh Water Flush option then it is not necessary to read this “SHORT TERM SHUTDOWN”. The Automatic Fresh Water Flush option rinses the system every 7 days automatically as described in the previous Section 4. However, see “Winterizing and Freezing” note below.

WARNING: WINTERIZING AND FREEZING TEMPERATURE STORAGE NOTE: If the system is exposed to freezing temperatures, DO NOT activate the Automatic Fresh Water Flush. Instead, perform a Manual Fresh Water Rinse as described below.

MANUAL FRESH WATER RINSE PROCEDURE: Follow the directions below if the system is not equipped with an Automatic Fresh Water Flush option [46-49], or if the Aqua Whisper II System is to be Winterized against freezing temperatures. This procedure displaces the system feed water with fresh water and allows a short-term shutdown for up to four weeks, and adds propylene glycol if Winterizing. Ten (10) gallons (38 liters) of fresh product or potable water is required for the fresh water rinse, and 2 gallons / 7.5 liters food grade glycerin (propylene glycol) is required for Winterizing.

1. CLOSE the Inlet Sea Cock Valve [2].
2. Fill a container [52] with 10 Gallons / 38 Liters of clean, fresh water.
3. **WARNING: IF THE SYSTEM WILL BE EXPOSED TO FREEZING TEMPERATURES** add twenty percent (2 gallons / 7.5 liters) food grade glycerin (propylene glycol) to the fresh water in the Bucket [52]. This prevents the water in the system from freezing.
4. Configure the system for a **Once Through Rinse** as illustrated at the TOP of pages 4, 5, and 6 of this Section.
5. Open the Back Pressure Regulator Valve [29] counter clockwise full open.
6. Start the System.
7. **DO NOT ADJUST THE BACK PRESSURE REGULATOR [29]:** Leave the Back Pressure Regulator [29] in the full OPEN position counter clock wise.
8. Operation of the System will deplete the Fresh Water or Water and Propylene Glycol mixture in the bucket [52].
 - a. If the system will not be exposed to freezing temperatures, just prior to depleting the Water in the Bucket [52] Stop the System by pressing the Stop switch ONCE in order to activate the Automatic Fresh Water Flush Cycle.

or

 - b. If the system will be exposed to freezing temperatures and if propylene glycol has been added to the rinse water, just prior to depleting the mixture in the Bucket [52] Stop the System by pressing the Stop switch TWICE in order to cancel and deactivate the Automatic Fresh Water Flush Cycle.

9. **FREEZING TEMPERATURE WARNING:** The Product Water Post Filtration Section of the System must be drained of all Product Water if the System will be exposed to freezing temperatures.
- a. Charcoal Filter [39] Remove the Charcoal Filter bowl. Empty the water from the bowl. Replace the Charcoal Filter Element with a New Charcoal Filter Element. Replace the bowl back onto the lid.
 - b. pH Neutralizing Filter [40] Remove the pH Neutralizing bowl. Remove the water from the bowl. Replace the bowl and pH element back onto the lid.
 - c. U.V. Sterilizer [41] Disconnect the product water line from the U.V. Sterilizer filter and drain the product water from it.
10. Should the power remain On or Off?:
- a. If the system will not be exposed to freezing temperatures, and if it is desirable to leave the Automatic Fresh Water Flush activated then do not disrupt or remove power, leave the circuit breaker in the On position.
- or
- b. If the system will be exposed to freezing temperatures and if propylene glycol has been added to the rinse water, then remove power, turn the circuit breaker Off, in order to deactivate the Automatic Fresh Water Flush cycle. Lock and Tag the Power Breaker to ensure that no one will accidentally operate the System and displace the Winterizing Mixture with Feed or Fresh Water.

B. LONG TERM SHUTDOWN:

A Long Term or Prolonged Shutdown is a period in which the system goes un-used for longer than three months, depending on conditions. For this interval, the system should first be rinsed with fresh water then stored with system and Membrane Element Storage Chemical (SRC SC). This chemical inhibits bacterial growth while maintaining the high flux and salt rejection of the R.O. Membrane Element. The Long Term Shutdown procedure requires 20 gallons (76 liters) of potable water.

Items Required:

Sea Recovery Storage Chemical SRC SC

2 Gallons / 7.5 liters of food grade glycerin (propylene glycol) if the System will be Winterized

NOTE: If the system is equipped with an automatic Fresh Water Flush Accessory then it is not necessary to read this Chapter A as long as the Automatic 7 day Fresh Water Flush cycle remains active. The Automatic Fresh Water Flush option rinses the system every 7 days automatically as described in the previous Section 5. However, see “Winterizing and Freezing” note below.

WINTERIZING AND FREEZING TEMPERATURE STORAGE NOTE: If the system is exposed to freezing temperatures, DO NOT activate the Automatic Fresh Water Flush. Instead, perform a Long Term Shutdown as described below.

Follow the directions below if the system will not be used for several months or if the system is not equipped with an Automatic Fresh Water Flush option [46 - 49], or if the Aqua Whisper II System is to be Winterized against freezing temperatures. This procedure displaces the system feed water with Storage Chemical or Storage Chemical and propylene glycol.

1. Close the Inlet Sea Cock Valve [2].
2. Fill a container [52] with 10 Gallons / 38 liters of clean, fresh water.
3. Configure the system for a **Once Through Rinse** as illustrated at the TOP of pages 4, 5, and 6 of this Section.
4. Open the Back Pressure Regulator Valve [29] counter clockwise full open.
5. Start the System.
6. **DO NOT ADJUST THE BACK PRESSURE REGULATOR [29]:** Leave the Back Pressure Regulator [29] in the full OPEN position counter clock wise.
7. Operation of the System will deplete the Fresh Water in the bucket [52]. Just prior to depleting the Water or mixture in the Bucket [52] Stop the System by pressing the Stop switch twice to deactivate the automatic Fresh Water Flush cycle.
8. Once again, fill a container [52] with 10 gallons (38 liters) clean, fresh water.
9. Add to the 10 gallons of fresh water 4 ounces of Sea Recovery Storage Chemical SRC SC.
10. **WARNING: IF THE SYSTEM WILL BE EXPOSED TO FREEZING TEMPERATURES** add twenty percent (2 gallons / 7.6 liters) food grade glycerin (propylene glycol) to the fresh water in the Bucket [52]. This prevents the water in the system from freezing.
11. Configure the system for a **Recirculation Closed Loop** configuration as illustrated at the BOTTOM of pages 4, 5, and 6 of this Section.
12. Start the System.

13. **DO NOT ADJUST THE BACK PRESSURE REGULATOR [29]:** Leave the Back Pressure Regulator [29] in the full OPEN position counter clock wise.
14. Operate the System in the Recirculating Closed Loop configuration for 10 minutes. After 10 minutes stop the system by pressing the Stop Switch TWICE in order to cancel the Automatic Fresh Water Flush Cycle.
15. In order to discharge the storage chemical, configure the system for a **Once Through Rinse** as illustrated at the TOP of pages 4, 5, and 6 of this Section.
16. Open the Back Pressure Regulator Valve [29] counter clockwise full open.
17. Start the System.
18. **DO NOT ADJUST THE BACK PRESSURE REGULATOR [29]:** Leave the Back Pressure Regulator [29] in the full OPEN position counter clock wise.
19. Operation of the System will deplete the Fresh Water in the bucket [52]. Just prior to depleting the Water or mixture in the Bucket [52] Stop the System.
20. **FREEZING TEMPERATURE WARNING:** If the System will be exposed to freezing temperatures the Post Filtration Section of the System must be drained of all Product Water.
 - a. Charcoal Filter [39]
Remove the Charcoal Filter bowl.
Remove the water from the bowl.
Replace the Charcoal Filter Element with a New Charcoal Filter Element.
Replace the bowl back onto the lid.
 - b. pH Neutralizing Filter [40]
Remove the pH Neutralizing bowl.
Remove the water from the bowl.
Replace the bowl and pH element back onto the lid.
 - c. U.V. Sterilizer [41]
Disconnect the product water line from the U.V. Sterilizer filter and drain the product water from it.
21. Switch the Power to the System OFF.
22. Lock and Tag the Power Breaker to ensure that no one will accidentally operate the System and displace the Winterizing Mixture with Feed or Fresh Water.

C. R.O. MEMBRANE ELEMENT CLEANING PROCEDURES

Do not arbitrarily clean the R.O. Membrane in a NEW system. The R.O. Membrane Element(s) in a NEW System will not be fouled with any substance that is cleanable. Low production or high salinity of the Product water from a NEW System will be attributed to factors other than fouling. If a NEW system experiences low production this would indicate that there is a blockage in the Product Water Line, the feed water temperature is low, the feed water salinity is high, the operating pressure is low, or the R.O. Membrane Element has dried out prior to use. If a NEW System is experiencing low production due to R.O. Membrane drying out, the System should be operated for up to 48 hours **continuously** to clear and saturate the R.O. Membrane Element and product water channel. Correlate and compensate operating pressure, feed water temperature, and feed water salinity as charted in the last section of this Owner's Manual. If a NEW System still experiences low production after 48 hours of **continual operation**, then contact the factory. If a NEW System experiences poor quality Product Water, high in salinity, this would be attributed to a mechanical failure such as a broken or missing O-ring and will be accompanied with high production at low operating pressure. For problems with a NEW System refer to the Troubleshooting Section 7 of this Owner's Manual.

The membrane element requires cleaning from time to time. Biological growth and salt accumulation eventually make replacement necessary. The frequency of required cleaning depends on the amount of production loss and salt rejection loss resulting from normal use. In order to properly assess performance changes, it is important to maintain daily log readings for comparison.

During performance comparisons, Feed Water Temp, Feed Water Salinity, and System Operating Pressure must be taken into consideration (See Section 10 of this Owner's Manual) and compensated for. After compensations, a 10% decline in productivity (GPH Flow) and/or a 10% increase in salt passage indicate that the R.O. Membrane Element may require cleaning.

If production rate has dropped dramatically since the last time the system was used, this may be due to drying out of the R.O. Membrane Element and/or fouling during non use. If the system has not been used for several months and the production rate has dropped dramatically since the last time used, try operating the system for 48 or more continuous hours to saturate the Product Water Channel within the R.O. Membrane Element.

If production rate drops dramatically from one day to another, this may be due to chemical attack which is not cleanable. Sewage chemicals or petroleum products cause irreparable damage to the R.O. Membrane Element. Suspended solids fouling resulting from silt, coral dust, iron (rust), river or inland waterway debris, or other small solid matter may not be cleanable.

1. R.O. MEMBRANE ELEMENT CLEANING WATER AND CHEMICAL REQUIREMENTS:

- a. The system must be rinsed with fresh water before any cleaning procedure, cleaned, and then rinsed again.
- b. The process of rinsing and cleaning the R.O. Membrane Elements with just one cleaning compound requires 30 gallons / 114 liters of fresh non- chlorinated product water. If a second cleaning is performed using a different cleaning compound an additional 20 gallons / 76 liters will be required per additional cleaning.
- c. The Sea Recovery Reverse Osmosis cleaning compounds are designed to clean in a closed loop configuration moderate fouling from the R.O. membrane element. If the R.O. Membrane Element is excessively fouled and in-field cleaning is not successful, the R.O. Membrane Element may be returned to Sea Recovery or to one of Sea Recovery's many Service Dealers for professional chemical cleaning. If your membrane requires professional cleaning, please contact Sea Recovery for a Return Authorization Number, price quotation, and return instructions. Due to the complexity of and time involvement in professionally cleaning the R.O. Membrane Element it can be more cost effective to replace a heavily fouled R.O. Membrane Element. Always compare the cost of cleaning vs the cost of replacement in order to make the proper decision to clean or replace.

- d. **SRC MCC-1**, Membrane Cleaning Compound "# 1" is an alkaline cleaner designed to clean biological fouling and slight oil fouling from the R.O. Membrane Element. Biological fouling is usually the first cause of the R.O. Membrane Element fouling. The system is constantly exposed to seawater and biological growth which occurs from the first day forward. If exposed to seawater and left to sit, the R.O. Membrane Element becomes fouled even with no actual system use. This fouling is minimized with fresh water rinsing whenever the system is not in use.
- e. **SRC MCC-2**, Membrane Cleaning Compound "# 2" is an acid cleaner designed to clean calcium carbonate and other mineral deposits from the R.O. Membrane Element. Mineral fouling is a slow process which takes place during use of the system. Therefore, if the system is more than one year old and has relatively few hours of use yet shows signs of R.O. Membrane Element fouling then that fouling is likely biological fouling. If the system has several thousand hours of use then there may be some mineral fouling combined with biological fouling.
- f. **SRC MCC-3**, Membrane Cleaning Compound "# 3" is used for iron fouling. It is not included in the SRC Membrane Cleaning Chemical kit. If the system's R.O. membrane element is fouled with rust from iron piping, then SRC CC-3 may be used for effective removal of light or moderate rust fouling. Heavily rust fouled RO Membranes may not be recoverable as rust not only fouls the Membrane Element but also damages the membrane surface.

WARNING: DO NOT MIX DIFFERENT CLEANING CHEMICALS TOGETHER. DO NOT USE DIFFERENT CLEANING CHEMICALS TOGETHER AT THE SAME TIME. MIX THE CLEANING CHEMICALS SEPARATELY AND USE THEM SEPARATELY. USE ONLY SEA RECOVERY SUPPLIED CHEMICALS. NEVER USE THIRD PARTY, NON SEA RECOVERY, CHEMICALS.

2. R.O. MEMBRANE ELEMENT CLEANING INSTRUCTIONS:

Product Water Required, in U.S. Gallons for Cleaning of the R.O. Membrane Element:

Chemical water required	Rinse water required	Cleaning water required	Second rinse water required	Total water required
CC-1	10	10	10	30
CC-2		10	10	20
CC-3		10	10	20

1. CLOSE the Inlet Sea Cock Valve [2].
2. Fill a container [52] with 10 Gallons / 38 Liters of clean, fresh water.
3. Configure the system for a **Once Through Rinse** as illustrated at the TOP of pages 4, 5, and 6 of this Section.
4. Open the Back Pressure Regulator Valve [29] counter clockwise full open.
5. Start the System.
6. **DO NOT ADJUST THE BACK PRESSURE REGULATOR [29]:** Leave the Back Pressure Regulator [29] in the full OPEN position counter clock wise.
7. Operation of the System will deplete the Fresh Water in the bucket [52]. Just prior to depleting the Water or mixture in the Bucket [52] Stop the System by pressing the Stop Switch TWICE in order to deactivate the Automatic Fresh Water Flush cycle.
8. Once again, fill a container [52] with 10 gallons (38 liters) clean, fresh water.
9. Add to the 10 gallons of fresh water one container, 1.5 lbs, of Sea Recovery Membrane Cleaning Chemical MCC-1, MCC-2, or MCC-3 as appropriate and previously explained depending upon the cause of fouling.
10. Thoroughly mix the power chemical into the water.
11. Configure the system for a **Recirculating Closed Loop** configuration as illustrated at the BOTTOM of pages 4, 5, and 6 of this Section.
12. Start the System.
13. **DO NOT ADJUST THE BACK PRESSURE REGULATOR [29]:** Leave the Back Pressure Regulator [29] in the full OPEN position counter clock wise.
14. Operate the System in the Recirculating Closed Loop configuration for 60 minutes. After 60 minutes stop the system by pressing the Stop Switch TWICE in order to deactivate the Automatic Fresh Water Flush cycle.
15. Configure the system for a **Once Through Rinse** as illustrated at the TOP of pages 4, 5, and 6 of this Section.
16. Start the System.
17. **DO NOT ADJUST THE BACK PRESSURE REGULATOR [29]:** Leave the Back Pressure Regulator [29] in the full OPEN position counter clock wise.
18. Operation of the System will deplete the membrane cleaning chemical mixture in the bucket [52].

Just prior to depleting the Water or mixture in the Bucket [52] Stop the System by pressing the Stop Switch TWICE in order to deactivate the Automatic Fresh Water Flush cycle.

19. For a final rinse, fill the container once again with 10 gallons / 38 liters of fresh water.
20. Configure the system for a **Recirculating Closed Loop** configuration as illustrated at the BOTTOM of pages 4, 5, and 6 of this Section.
21. Start the System.
22. **DO NOT ADJUST THE BACK PRESSURE REGULATOR [29]:** Leave the Back Pressure Regulator [29] in the full OPEN position counter clock wise.
23. Operate the System in the Recirculating Closed Loop configuration for 10 minutes. After 10 minutes stop the system by pressing the Stop Switch TWICE in order to deactivate the Automatic Fresh Water Flush cycle.
24. Configure the system for a **Once Through Rinse** as illustrated at the TOP of pages 4, 5, and 6 of this Section.
25. Start the System.
26. **DO NOT ADJUST THE BACK PRESSURE REGULATOR [29]:** Leave the Back Pressure Regulator [29] in the full OPEN position counter clock wise.
27. Operation of the System will deplete the rinse water in the bucket [52]. Just prior to depleting the Water or mixture in the Bucket [52] Stop the System by pressing the Stop Switch TWICE in order to deactivate the Automatic Fresh Water Flush cycle.
28. If additional membrane cleaning will be done repeat steps 8 through 27 above.
29. If no further membrane cleaning will be done the system may now be operated, or left unattended for up to 4 weeks. If the System will be left unattended and not operated for several months refer to Long Term Shut Down on pages 9 through 10 of this section.

WARNING: FREEZING TEMPERATURES. If the system will be exposed to Freezing Temperatures refer to Short Term Shut Down on pages 8 of this section or Long Term Shut Down on pages 9 and 10 of this section.

Notes:

[illegible]

Section 6

Troubleshooting of Abnormalities

Notes:

[illegible]

Troubleshooting

This section deals with abnormal occurrences of the Aqua Whisper II system. Some occurrences may have many different causes. For each symptom, one or more causes are given. In turn, each cause has one or more corresponding tests to help identify whether the cause of the occurrence is the correct one. When the test(s) has confirmed the source of the problem, the appropriate remedy is given to correct it.

In the following guide, when there is more than one cause of a problem, the causes are listed in the most likely to occur order. The tests given are designed to determine whether the cause of the problem is the correct one. When diagnosing the causes of a problem in this case, eliminate the listed causes one by one until the correct cause is found. Then the appropriate remedy is performed. Diagnosing and correcting the various occurrences in this manner makes troubleshooting easier and less time consuming.

Troubleshooting and subsequent correction or repair will require understanding of:

- Electrical Circuits
- Electronic Circuits
- Electric Motors
- Hydraulic Systems
- Liquid Pressures and Flows
- Electro Mechanical Systems
- Mechanical knowledge and skills

Do not attempt troubleshooting and/or subsequent correction or repair if you are not familiar with or are not proficient in the above fields of expertise.

USE CAUTION WHEN TROUBLESHOOTING.

DO NOT PERFORM MAINTENANCE UNLESS:

1. The System Feed Water Sea Cock Valve [2] is closed.
2. The electrical power to the system is switched **"OFF"**, **LOCKED**, and **TAGGED**.
3. Chapter 9, "EXPLODED PARTS VIEWS" of this Owners Manual is available.

WARNING: ELECTRICAL SHOCK HAZARD. A Volt / Ohm Meter will be necessary. The following procedures expose the technician to High Voltage and electrical shock hazard. Only attempt this if you are a qualified electrician and only if surrounding conditions are safe.

From time to time, Sea Recovery may make programming changes to the Control Logic (CONTROL VER).

Other physical production changes may also be made from time to time and are tracked by Sea Recovery through the System Serial Number.

Troubleshooting and repair methods and results can vary depending on the System Serial Number and the specific pre or post filtration options installed in the System.

When requesting assistance from Sea Recovery or one of Sea Recovery's service dealers, you must inform us of your specific System Model Number and Serial Number. This allows us to look up your particular System's test records and expedites our ability to assist you. If we are given a wrong model number or wrong serial number this will lead to frustration for you, wrong troubleshooting information from us, and failure to diagnose or correct the problem. Additionally, in order for us to expedite troubleshooting and assist you accurately, we must know all optional equipment installed in the System.

ALWAYS PROVIDE THE FOLLOWING INFORMATION:

SYSTEM MODEL: AQUA WHISPER II

SERIES: **COMPACT FRAME** **OR** **MODULAR**

SPECIFIC CAPACITY: SINGLE R.O. MEMBRANE VESSEL: __450 GPD; __700 GPD; __900 GPD

GPD **DOUBLE R.O. MEMBRANE VESSEL:** __900 GPD; __1400 GPD; __1800

OPERATING VOLTAGE CYCLES AND PHASE: _____ VAC, _____ HZ, _____ SINGLE OR THREE PHASE

LIST OF INSTALLED PREFILTRATION AND POST FILTRATION OPTIONS:

INLINE VACUUM/PRESSURE GAUGE [4]:	___ YES	___ NO
INLINE VACUUM/PRESSURE GAUGE [6]:	___ YES	___ NO
INLINE VACUUM/PRESSURE GAUGE [8]:	___ YES	___ NO
INLINE VACUUM/PRESSURE GAUGE [11]:	___ YES	___ NO
INLINE VACUUM/PRESSURE GAUGE [15]:	___ YES	___ NO

SINGLE PLANKTON FILTER [9]:	___ YES	___ NO
DOUBLE PLANKTON FILTER [9]:	___ YES	___ NO
MULTI MEDIA FILTER [10]:	___ YES	___ NO
COMMERCIAL PREFILTER [12]:	___ YES	___ NO
OIL WATER SEPARATOR [16]:	___ YES	___ NO
DUAL 10 INCH PREFILTER [13 & 14]:	___ YES	___ NO

pH NEUTRALIZING FILTER [40]: — YES — NO
ULTRA VIOLET STERILIZER [41]: — YES — NO

REMOTE CONTROL [55]: ___ YES ___ NO
SOFT MOTOR STARTER [56]: ___ YES ___ NO

SRC SYSTEM TROUBLESHOOTING GUIDE

THE NUMBER ONE REPORTED PROBLEM IS “THE SYSTEM DOESN’T WORK”! We can’t help with this one unless you give us more information, or allow us to ask an unlimited number of questions. Please! Be specific when reporting problems with the System.

Some system problems have possible causes located in more than one subsystem, and are categorized here according to the subsystem in which they are indicated or most likely to be located. Where two or more possible causes are listed for a problem, it is advised that they be checked in the order listed. This Troubleshooting Guide lists the abnormal symptom and its possible cause. In order to correct the problem or repair the part, refer to the Maintenance and Repair Section 7 of this manual.

A. SYSTEM SHUTS DOWN BY ITSELF AND A FAULT LAMP IS ILLUMINATED:

1. INLET THRU-HULL FITTING [1]

Blockage at the Inlet Thru-Hull Fitting causes the System to shut off due to lack of Feed Water Flow. Unfortunately, since it is under water operators are reluctant to thoroughly inspect the Inlet Thru-Hull Fitting for problems. This can cause time consuming frustrations in attempting to gain feed water flow by trouble shooting other components in the System.

The Inlet Thru-Hull Fitting must be free and clear allowing the System to draw 4.5 U.S. Gallons Per Minute / 17 Liters Per Minute through it with minimal resistance. Any blockage at the Inlet Thru-Hull Fitting will cause low pressure and low flow problems at the System. This Inlet Thru-Hull Fitting must be a Forward Facing Scoop so that the System receives a positive flow of water as the boat is under way. It must be minimum 3/4” inside diameter. It must be installed in a position on the bottom of the Hull so as to allow free flowing Feed Water without air.

CAUTION: A flat profile, flush mount, inlet thru-hull fitting will cause a vacuum as the boat is under way, and this will cause loss of feed water flow and cavitation of the Booster Pump and High Pressure Pump resulting in continual system shut down due to low feed water flow and pressure. The resulting failure of the system to remain in operation is attributed to improper installation, is the liability of the installer, and is not covered by the Sea Recovery warranty.

CAUTION: If the thru-hull fitting has been placed in a position on the underside of the hull that allows air to continually enter the thru-hull fitting, this will cause the system to continually shut down due to loss of feed water. The resulting failure of the system to remain in operation is attributed to improper installation, is the liability of the installer, and is not covered by the Sea Recovery warranty.

CAUTION: The Sea Recovery System must not be tied into another existing auxiliary water line already supplying another accessory on the boat. Using one Thru Hull fitting for other equipment will cause the Sea Recovery System to draw air or cavitate leading to continual system shut down. The resulting failure of the system to remain in operation is attributed to improper installation, is the liability of the installer, and is not covered by the Sea Recovery warranty.

CAUTION: If the Sea Recovery System is connected to a Sea Chest or Stand Up Pipe, **do not plumb the Sea Recovery System feed line to the “top” of the Sea Chest or Stand Up Pipe.** If plumbed into the top of these feed water arrangements, the Sea Recovery System will experience continual shut down due to inducement into the system. The resulting failure of the system to remain in operation is attributed to improper installation, is the liability of the installer, and is not covered by the Sea Recovery warranty. **Plumb the Sea Recovery System to the “bottom” of such feed water arrangements to ensure a continual air free supply of feed water to the system.**

Problems & Symptoms appearing and caused by the THRU-HULL INLET FITTING [1]:

a. Flat profile Inlet Thru Hull Fitting:

- System runs fine when at anchor. However, when under way the System shuts off due to low pressure or low feed water flow.

A flat profile Inlet Thru Hull Fitting will cause a vacuum at the System's feed line cavitating the Booster Pump and reducing the efficiency of the Booster Pump resulting in low feed water pressure and low feed water flow.

Solution: Change the flat profile Thru Hull Fitting to a forward facing scoop.

b. Debris is blocking the Inlet Thru Hull Fitting:

- System feed water pressure is low and insufficient to keep the System in operation.

Marine growth or debris such as a plastic bag or rag covering the Inlet Thru-Hull Fitting will cause a vacuum at the System's feed line cavitating the Booster Pump and reducing the efficiency of the Booster Pump resulting in low feed water pressure and low feed water flow. If the optional inline Vacuum / Pressure gauges 4 and 6 are installed they will be reading increased vacuum if the Inlet Thru Hull Fitting [1] is blocked.

Solution: Clean all marine growth and debris from the Inlet Thru-Hull Fitting.

- System is newly installed and operation is being performed for the first time. The feed water pressure is low and insufficient to keep the System in operation.

A NEW boat, or newly installed System, may have protective shipping tape covering the Inlet Thru-Hull Fitting. A New boat, or newly installed System, may have manufacturing debris such as caulking slopped over the Inlet Thru Hull or a rag may be stuffed into the Inlet Thru-Hull fitting. A NEW Inlet Thru-Hull Fitting may have casting slag, that has not been machined off, partially covering the "fingers" or the inside of the fitting.

Solution: Inspect the Inlet Thru-Hull Fitting and clean all manufacturing debris and casting slag from the fitting.

2. SEA COCK VALVE [2]

The Sea Cock Valve is usually a 1/4 turn Ball Valve although any positive closing and opening valve is acceptable.

Problems & Symptoms appearing and caused by the SEA COCK VALVE [2]:

a. The Sea Cock Valve is closed when attempting to Start the System.

System does not register feed water flow and feed water pressure when attempting to start. The System shuts down and the Fault Lamp is Illuminated.

When the System is not in use it is good practice, for the safety of the Boat, to close the Sea Cock Valve. Don't forget to open it prior to starting the System.

Solution: Open the Sea Cock Valve.

b. The Sea Cock Valve seal is worn or the seal adjustment is loose causing air to enter the System Feed Line.

- System feed water pressure is low and insufficient to keep the System in operation. This section of the Feed Line is under a vacuum condition when the System is in operation. If the valve's seal is worn or if the seal adjustment is loose air can enter the feed line causing the System to lose pressure.

Look for air bubbles moving through the Sea Strainer, or feed line. If the Vacuum/Pressure Gauge [17] does not register either vacuum or pressure during operation this would indicate that the feed line is drawing air.

Solution: Change the valve seals, tighten them, or if necessary replace the valve.

3. INLET CONNECTOR [3] AS WELL AS ALL FITTINGS AND CONNECTIONS PRIOR TO THE INLET OF THE BOOSTER PUMP [7]:

Problems & Symptoms appearing and caused by any fitting or connection in the Suction portion of the Feed Line:

- a. One or more fittings or connections in the Suction portion of the Feed Line is causing air to enter the Feed Line.
- System feed water pressure is low and insufficient to keep the System in operation. This section of the Feed Line is under a vacuum condition when the System is in operation.

Look for air bubbles moving through the Sea Strainer, or feed line.

Solution: Tighten any loose fitting or connection at the Inlet of the Booster Pump or prior to it that is allowing air to enter the feed line.

Replace worn or broken seal or O-ring at the Sea Strainer.

Replace worn or broken seal or O-ring at the Inlet of the Booster Pump or prior to it that is allowing air to enter the feed line.

Check positioning of all valves at or prior to the Inlet of the Booster Pump that may be allowing air to enter the feed line.

4. INLINE VACUUM / PRESSURE GAUGES [4, 6, 8, 11, 15, & 17]:

Problems & Symptoms appearing and caused by the Inline Vacuum/Pressure Gauges:

- a. A Vacuum/Pressure gauge needle does not move; or does not register proper vacuum or pressure.
- The Vacuum/Pressure Gauges have a very small orifice at the bottom of the pipe fitting end. This orifice can become plugged with debris or corrosion.

Solution: Using a small diameter wire clean the debris from the orifice.

- The Vacuum/Pressure Gauges will not register off of the zero mark if the feed line prior to the Booster Pump is drawing air.

Solution: Look for and eliminate air suction leaks.

- b. A Vacuum/Pressure gauge needle registers -10 or greater into the vacuum range.

- Any blockage prior to the High Pressure Pump will cause a gauge to register a vacuum.

Solution: Clean the filter prior to the first gauge that is registering a vacuum.

Solution: Ensure that the Inlet Sea Cock is full open.

Solution: Ensure that there is no blockage at the inlet thru-hull fitting.

5. SEA STRAINER [5]:

Problems & Symptoms appearing and caused by the Sea Strainer:

- a. The Sea Strainer O-Ring seal is not properly seated, is worn, or is not properly compressed allowing air to enter the Feed Line.
 - System feed water pressure is low and insufficient to keep the System in operation. This section of the Feed Line is under a vacuum condition when the System is in operation. If the Sea Strainer O-Ring is not properly seated air will enter the feed line causing the System to lose pressure.

Look for air bubbles moving through the Sea Strainer and into the Feed Line.

Solution: Properly seat or replace the Sea Strainer O-Ring.

- b. The Sea Strainer mesh screen element is the first line of defense to trap large suspended solids entering the Feed Line. Depending on Feed Water conditions the screen may plug up rapidly. Marine growth, plastic bags, jelly fish, and other debris can easily enter the feed line and plug up the Sea Strainer mesh screen.
 - System feed water pressure is low and insufficient to keep the System in operation because the Sea Strainer mesh screen is blocking feed water flow.

Solution: Regularly check and clean the Sea Strainer mesh screen. Keep it clear and free of debris.

6. BOOSTER PUMP [7]:

The Booster Pump is a centrifugal type pump. When mounted at or below feed water level it is able to draw feed water and deliver it with pressure into the prefiltration components and High Pressure Pump. If mounted above feed water level the Booster Pump may have trouble priming if air enters the feed line.

Prior to assuming that the Booster Pump's Electric Motor has failed, perform a Function Test as described in Section 3 of this Owner's Manual.

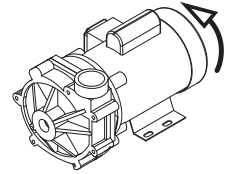
Problems & Symptoms appearing and caused by the Booster Pump:

- a. The Booster Pump leaks feed water between the pump and motor.
 - The Booster Pump has a ceramic and carbon seal. Ceramic and carbon seals will weep if the pump is not operated for extended periods of time. When used regularly the seal will give approximately 2000 hours of use. The seal continually wears during use and must be replaced approximately every 2000 hours of use. If left unused for extended periods of time seal replacement may be required sooner.

Solution: Replace seal.

- The Booster Pump is connected to a three phase electric motor. When switching from generator power to shore power the system shuts down due to low feed pressure.

Solution: Check Rotation of the Booster Pump to ensure that the phases have not been crossed.



7. PLANKTON FILTER [9]:

This optional filter assembly contains a cleanable ultra fine monel mesh screen. The mesh screen traps suspended solids or biological growth such as plankton. It also provides longer life to the Pre-filter Elements and in turn provides lower system maintenance costs. As with all prefiltration components the Plankton Filter mesh screen must be free of debris in order for the Feed Water to flow through it.

Problems & Symptoms appearing and caused by the Plankton Filter:

- The Feed Water Pressure, at Inline Vacuum/Pressure Gauge [8] into the Plankton Filter is higher than normal, and all subsequent Vacuum/Pressure Gauges [8, 11, 15, & 17] read lower than normal.
- The pressure differential readings across the Plankton Filter indicate that the element is filled with debris blocking the feed water.

Solution: Clean the Plankton Filter Element.

8. MULTI MEDIA FILTER [10]

This optional filter assembly contains a back-washable bed of sand and gravel. The sand traps suspended solids larger than 30 microns which provides longer life to the pleated cartridge prefilter elements minimizing maintenance intervals, maintenance labor, and filter element cost. Pressure and flow will be restricted as the sand bed becomes clogged with debris and marine growth. The sand bed is washable by reversing the feed water flow across it. This process is referred to as Back Washing.

Problems & Symptoms appearing and caused by the Multi Media Filter:

- The Feed Water Pressure into the Multi Media Filter is higher than normal, and the Feed Water Pressure out of the Multi Media Filter is lower than normal.
- The pressure differential readings across the Multi Media Filter indicate that the Multi Media Filter requires back washing.

Solution: Back wash the Multi Media Filter.

9. COMMERCIAL PRE-FILTER [12]

The Commercial Prefilter housing contains a 5 micron cartridge filter element that has 38 square feet of filtering surface area. This over size cartridge provides extended life that greatly reduces maintenance and prefilter element replacement cost. As the cartridge filter element becomes plugged up with debris, pressure and flow drop resulting in System shut down due to low pressure into the High Pressure Pump [21]. The cartridge filter element may be cleaned once to gain approximately 50% of the original life. After the first cleaning it must be discarded and replaced with a new element.

PREFILTER ELEMENT WARNING: Do not use third party prefilter elements, use only Sea Recovery prefilter elements. Third party prefilter elements do not properly fit and the seams fall apart. They also allow by-pass resulting in premature fouling of the R.O. Membrane Element and extensive damage to the High Pressure Pump. Damage to the Sea Recovery System caused by the use of third party, non Sea Recovery, Prefilter Elements is the responsibility and liability of the operator and not covered by the Sea Recovery Warranty.

CAUTION: Finger tighten the lid locking ring onto the base. **DO NOT** over tighten. **DO NOT** use any wrench or device to tighten the lid locking ring. The lid is O-ring sealed, two finger tightening is adequate. Over tightening will stress the threads on the base and the lid locking ring causing them to crack.

Problems & Symptoms appearing and caused by the Prefilter:

- a. The Feed Water Pressure into the Prefilter at Inline Vacuum/Pressure Gauge [11] is higher than normal, and the Feed Water Pressure registered on all subsequent Vacuum/Pressure Gauges [15 & 17] register lower than normal.
- The pressure differential readings across the Prefilter indicate that the element is filled with debris blocking the feed water.

Solution: Replace the Prefilter Element.

10. DUAL PRE-FILTER [13 & 14]

This two stage filter removes suspended solids first through a 20 micron cartridge filter element then through a 5 micron cartridge filter element. By stepping the filtration both prefilter elements gain longer life and require less maintenance labor and prefilter element replacement cost. As the cartridge filter elements become plugged up with debris pressure and flow drop resulting in System shut down due to low pressure into the High Pressure Pump [21]. The cartridge filter elements may be cleaned once to gain approximately 50% of the original life. After the first cleaning they must be discarded and replaced with new elements.

PREFILTER ELEMENT WARNING: Do not use third party prefilter elements, use only Sea Recovery prefilter elements. Third party prefilter elements do not properly fit and the seams fall apart. They also allow by-pass resulting in premature fouling of the R.O. Membrane Element and extensive damage to the High Pressure Pump. Damage to the R.O. Membrane Element or High Pressure Pump caused by the use of third party, non Sea Recovery, Prefilter Elements is the responsibility and liability of the operator and not covered by the Sea Recovery Warranty.

PREFILTER ELEMENT CAUTION: Do not use “string wound” or “fiber” prefilter elements. These types of elements are designed for the Photographic Film Developing Industry. When used in sea water, they will plug up rapidly in 1/10th or less the time. This will cause frequent shut downs of the system and very frequent changing which will result in very high cost of maintenance and user frustration.

CAUTION: Hand tighten the bowl onto the filter top housing. **DO NOT** over tighten. **DO NOT** use any wrench or device to tighten the bowl. It is O-ring sealed, hand tightening is adequate. Over tightening will stress the bowl and top causing it to crack.

Problems & Symptoms appearing and caused by the Prefilter:

- a. The Feed Water Pressure into the Prefilter is higher than normal, and the Feed Water Pressure into the High Pressure Pump is lower than normal.

- The pressure differential readings across the Prefilter indicate that the elements are filled with debris blocking the feed water.

Solution: Replace the Prefilter Elements.

11. OIL/WATER SEPARATOR[16]

The Oil/Water Separator housing contains a 10 micron coalescing filter element. This Oil/Water Separator is positioned after the Prefilter in the Feed Water Line. Unlike a conventional cartridge filter element, the water flow is into the center and out ward. The purpose of this filter is to coalesce and trap oil so that it doesn't reach the R.O. Membrane Element. Oil will permanently foul the R.O. Membrane Element. The Oil/Water Separator Element is not cleanable, replace it when it becomes fouled.

OIL/WATER SEPARATOR ELEMENT WARNING: Do not use third party Oil/Water Separator elements, use only Sea Recovery supplied elements. Third party elements do not properly fit and will not adequately coalesce the oil from the feed water...They also allow by-pass resulting in premature fouling of the R.O. Membrane Element and extensive damage to the High Pressure Pump. Damage to the Sea Recovery System caused by the use of third party, non Sea Recovery, Oil/Water Separator Elements is the responsibility and liability of the operator and not covered by the Sea Recovery Warranty.

CAUTION: Finger tighten the lid locking ring onto the base. **DO NOT** over tighten. **DO NOT** use any wrench or device to tighten the lid locking ring. The lid is O-ring sealed, two finger tightening is adequate. Over tightening will stress the threads on the base and the lid locking ring causing them to crack.

Problems & Symptoms appearing and caused by the Oil/Water Separator:

- a. The Feed Water Pressure into the Oil/Water Separator is higher than normal, and the Feed Water Pressure into the High Pressure Pump is lower than normal.
- The pressure differential readings across the Oil/Water Separator indicate that the element is filled with debris blocking the feed water.

Solution: Replace the Oil/Water Separator Element.

12. T-CONNECTOR PRESSURE PICK-UP [18] Outlet of Last Prefiltration component - Inlet of High Pressure Pump

This T Connector is for line pressure pick up to Low Pressure Transducer [20] between the outlet of the last prefiltration component and the inlet of the High Pressure pump.

Problems & Symptoms appearing and caused by the T-Connector Pressure Pick-Up:

- a. The Low Pressure Transducer [20] does not register pressure.
- The 1/4 inch O.D. tube connecting the T-Connector to the Low Pressure Transducer Manifold may be kinked or debris may be blocking the tube.

Solution: Replace any hose or tube that is kinked.

Disconnect each end of the tube and blow air through the tube to ensure that it is not blocked.

13. LOW PRESSURE TRANSDUCER [20] last prefiltration component Outlet / High Pressure Pump Inlet

The Low Pressure Transducer is for line pressure pick up at the Inlet of the High Pressure Pump.

The Low Pressure Transducer sends a DC voltage signal to the System Control Logic. The minimum value is .5 VDC when no pressure is applied to it, and the maximum value that the System will accept is 4.5 VDC. The variation of voltage output from the Transducer is converted to pressure value by the System Control Logic.

Problems & Symptoms appearing and caused by the Low Pressure Transducer [20]:

- a. The Low Pressure Transducer [20] does not register pressure or the pressure displayed is inaccurate..
 - The 1/4 inch O.D. tube connecting the T-Connector to the Low Pressure Transducer Manifold may become kinked or debris may block the tube.

Solution: Replace any hose or tube that is kinked. Disconnect each end of the tube and blow air through the tube to ensure that it is not blocked.

- The minimum voltage output is below .5VDC and or the maximum voltage output is above 5 VDC.

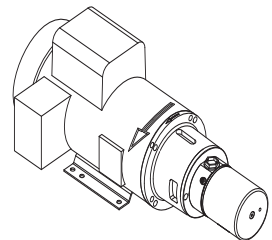
Solution: Check wiring and connections to and from the Transducer.
Calibrate the Transducer.
Replace the Transducer.

14. HIGH PRESSURE PUMP & MOTOR ASSEMBLY [21]:

The Electric Motor is 3 horse power, Totally Enclosed Fan Cooled, 2 pole, dual Cycle, and dual Voltage.

WARNING: The High Pressure Pump MUST rotate in the COUNTER CLOCKWISE DIRECTION ONLY (when viewing the front of the pump)
Rotating the High Pressure Pump in the clockwise direction will cause extensive damage to it and the System. Never operate the High Pressure Pump in the clockwise direction.

WARNING: When switching from Three Phase Generator power to Three Phase Shore power ALWAYS check phases prior to operating the Aqua Whisper II System else Reverse Rotation at the pump will occur if phases are crossed causing extensive damage to the High Pressure Pump and System.



NOTE: Illustration shows the Optional HP Pump.

This High Pressure Pump is a Quintiplex Radial Axial Positive Displacement Plunger Pump made of high grade Duplex material specifically designed for sea water Reverse Osmosis applications. The Pump is connected to the attached electric motor with a flex coupler and safety bell housing.

As with all Positive Displacement pumps it must receive a specified minimum amount of water at a positive pressure. A vacuum at the inlet of the pump will cause cavitation and damage. This pump does not use oil, it is self lubricated with the feed water. Internal components are designed for 8,000 hours of continual service in sea water. As with any component exposed to sea water, use is best.

Problems & Symptoms appearing and caused by the High Pressure Pump or its Electric Motor:

Prior to assuming that the High Pressure Pump's Electric Motor has failed, perform a Function Test as described in Section 3 of this Owner's Manual.

- a. The **Single Phase** (115 or 230 VAC) Electric Motor “hums”, pulls starting current (locked rotor) amperage, does not rotate, and trips the supply power circuit breaker when attempting to operate the System.

The **Single Phase** (110 // 230 VAC) Electric Motor is a capacitor start motor. If the motor was started with low voltage or low cycles, and left operating in this condition, or if repeatedly started several times in rapid succession with low voltage or low cycles the capacitor will short out. Without the aid of a working capacitor the motor will “hum”, pull starting current (locked rotor) amperage, not rotate, and trip the supply power circuit breaker when attempting to operate the System.

Low voltage or low cycles will also cause the same symptom. Low voltage or low cycles is caused by an undersized power supply or generator, undersized power lead wires to the System or motor, loose power wire, or connection at the motor or within the power supply line, and “burnt” contacts on the motor starter relay (contactor).

Solutions:

Replace the Starting Capacitor at the Single Phase Electric Motor if it has shorted out..

Check wiring size and connections to, from, and in between the Power Supply and the electric motor. Correct wire size or any loose wires.

Measure voltage at the motor during attempt to start it. If voltage drops more than 10% locate and correct the cause.

Check the motor starter relay, contactor, for “burnt” contacts.

- b. The **Three Phase** (230 // 380 // 460 VAC) Electric Motor “hums”, pulls starting current (locked rotor) amperage, does not rotate, and trips the supply power circuit breaker when attempting to operate the System.

The **Three Phase** Electric Motor requires all three power lines (all three phases) to be operative else it will “single phase” causing extensive damage to the motor's internal windings.

Low voltage or low cycles will also cause the same symptom. Low voltage or low cycles is caused by an undersized power supply or generator, undersized power lead wires to the System or motor, loose power wire, or connection at the motor or within the power supply line, and “burnt” contacts on the motor starter relay (contactor).

Solutions:

Check wiring size and connections to, from, and in between the Power Supply and the electric motor. Correct wire size or any loose wires.

Measure voltage at the motor during attempt to start it. If voltage drops more than 10% locate and correct the reason.

Check the motor starter relay, contactor, for “burnt” contacts.

Ensure all three phases have power.

- c. The Electric Motor makes an unusual “grinding” sound when operated.

Solutions: Check and replace as necessary the front and rear bearings.

Check to see if the fan is rubbing against the fan guard.

- d. The **High Pressure Pump** makes an unusual “grinding” noise.

The pump will make a grinding noise if its drive shaft has been forced into the pump body. The Electric Motor and Pump are coupled with a “Flex Coupler” specially designed for use with this specialized pump. Never replace the Flex Coupler with another make or style. ALWAYS leave 3/32 inch (2mm) spacing between the two mating Flex Couplers. ALWAYS ensure that the Safety Bell Housing attached to the electric motor and the pump seats evenly on both ends.

Internal spacing of moving components within the High Pressure Pump hold to very tight tolerance. Any debris larger than 10 micron entering the High Pressure Pump will cause abrasion to the pump’s internal parts, and will cause an audible grinding noise. Hard debris, such as sand or metal, will cause the pump to “lock up” and will cause extensive damage to the internal parts of the pump.

If the System incorporates a Multi Media Filter use caution to not allow sand to enter the High Pressure Pump. When changing Prefilter Elements use caution to not allow debris to enter the High Pressure Pump.

Damage to the High pressure Pump caused by debris is the responsibility of the person performing maintenance to the System, is the liability of the person performing maintenance to the System, and is not covered by the Sea Recovery warranty.

Solutions:

Check spacing between the motor’s and pump’s flex coupler. Spacing must be minimum 3/32 inch (2mm) and maximum 1/8 inch (3mm).

Check Safety Bell Housing to ensure it is flush and secured to both the motor and pump.

Check Pump for signs of foreign debris entering the inlet.

e. The **High Pressure Pump** flow and or pressure have decreased from normal.

As with all High Pressure Pumps, over time of operation flow and pressure will decline due to internal wear. Under normal use and care no significant pressure or flow loss will occur for 8,000 hours of operation or longer.

Do not confuse low feed water flow and low feed water pressure with a High Pressure Pump problem. All positive displacement pumps must receive a specific flow at a minimum pressure else cavitation will occur. Check to ensure that the Booster Pump is delivering at least 4.5 U.S. Gallons Per Minute (17 Liters Per Minute) of feed water at 10 to 40 PSI at the Inlet of the High Pressure Pump. Note: Systems operating on 50 Hz power will deliver 3.75 U.S. Gallons Per Minute (14.2 Liters Per Minute) of feed water.

Solutions: If Feed Water Flow and Pressure into the High Pressure Pump are within minimum specifications, and if the electric motor is rotating in the proper direction and at the proper RPM yet the High Pressure Pump has lost Flow and or Pressure then return the High Pressure Pump to Sea Recovery for servicing.

f. The **High Pressure Pump** leaks water between the pump and motor.

- The High Pressure Pump has a seal to stop leakage. Seals may weep if the pump is not operated for extended periods of time. When used regularly the seal will give approximately 8000 hours of use. The seal continually wears during use and must be replaced approximately every 8000 hours or at the sign of leakage.

Solution: Return the High Pressure Pump to Sea Recovery for service and Seal replacement.

- g. The **High Pressure Pump** makes an unusual “very loud knocking” noise.

All positive displacement pumps will make a very loud knocking noise if they do not receive sufficient flow at a positive pressure. This knocking noise results from cavitation which is caused by insufficient feed water flow at an insufficient pressure.

Cavitation will quickly destroy any Positive Displacement Pump.

Solutions: Service the Prefiltration Section (Low Pressure Section) of the System. Check all components between the Inlet Thru-Hull Fitting and the Inlet of the High Pressure Pump to determine what is causing the loss in feed water flow and pressure to the High Pressure Pump.

15. **HIGH PRESSURE HOSE [22 & 25]:**

The High Pressure Hose has been assembled with crimp fittings by Sea Recovery. The High Pressure Hose is NOT repairable. Should a leak, damage, or failure develop replace the High Pressure Hose.

Solutions: Replace a damaged High Pressure Hose

16. **REVERSE OSMOSIS MEMBRANE AND VESSEL ASSEMBLY [23 & 24]:**

The Reverse Osmosis Membrane Element allows potable water molecules to pass through while rejecting the salt ions. Only a small percentage of the Seawater Feed becomes fresh Product Water. The remainder carries the rejected salt ions out of the R.O. Membrane Element in a concentrated brine stream. The R.O. System may have one or two R.O. Membrane Elements & Vessel in series depending on the specific model and system capacity.

Problems & Symptoms appearing and caused by the Reverse Osmosis Membrane and Vessel Assembly:

- a. Prior to assuming that there is a problem with the R.O. Membrane Element(s) due to your observance that:

The System does not produce the correct amount of Product Water (too much or too little)
 The System produces poor quality Product Water, high in Salinity
 The System Operating Pressure is excessively higher than 800 PSI when operating in normal Sea Water at moderate temperatures (77 degrees F / 25 degrees Celsius)
 The System Operating Pressure is excessively lower than 800 PSI when operating in normal Sea Water at moderate temperatures (77 degrees F / 25 degrees Celsius)

Go to Section 3 of this Owner’s Manual to ensure that the Model Set-Up has been properly performed.

- b. Product Water Flow suddenly & dramatically increases and Product Water Salinity increases making the Product Water unpotable:
- The Pressurized Feed Water and the Un-pressurized Product Water are separated by a “product water O-Ring” which seals on the Product Water Tube at each end of the R.O. Membrane Element and the End Plug at each end of the Pressure Vessel. Should this O-Ring fail Feed Water will mix with Product Water. If this happens the Product Water will be very salty, the Product Water Flow will increase dramatically, and the Brine Flow will decrease appropriately (by the increase in Product Water).

Solution: Replace the O-Rings if wear or damage is present.

- Should the End Plug develop a crack, between the product water port and the pressurized feed water, similar increase in Product Water flow and high Product Water salinity will occur.

Solution: Replace the End Plug if it is damaged or cracked.

- At ONE end only of the R.O. Membrane Element there is a “U” cup seal referred to as the “brine seal”. NEVER use two Brine Seals. NEVER place a Brine Seal on both ends of the R.O. Membrane Element. This will cause an air pocket between the outer surface of the R.O. Membrane Element and the inner wall of the Pressure Vessel. The air pocket would allow the R.O. Membrane Element to expand outward during operation causing irreversible mechanical damage to the R.O. Membrane Element resulting in higher than normal Product Water Flow and High Product Water Salinity.

Solution: If the use of two Brine Seals on one R.O. Membrane Element has caused mechanical failure of the membrane then replace the R.O. Membrane Element. NEVER place two Brine Seals on one R.O. Membrane Element.

- NEVER Block the Product Water Line. NEVER place a valve in the Product Water Line that can close and block the Product Water Line. Blockage of the Product Water line will result in high pressure build up of 950 PSI (6550 kPa) within the line and within the product water tube and product water channel of the R.O. Membrane Element. If the System is shut down while the Product Water Line is blocked irreversible damage to the R.O. Membrane Element will occur.

Solution: Determine what blocked the Product Water Line and correct the condition.
Replace the R.O. Membrane Element.

- Chemical attack, one that will dissolve the membrane surface such as an oxidant like Chlorine, has destroyed the R.O. Membrane Element surface.

Solution: Determine the source and correct the situation.
Replace the R.O. Membrane Element.

- c. Product Water Flow over months has slowly decreased and Product Water Salinity has increased resulting in low quantity and low quality product water:

- As the Reverse Osmosis Membrane Element is exposed, operated or not, to Sea Water eventually biological matter will coat the membrane surface causing a drop in production, loss of product water flow accompanied by an increase in salt passage in the product water. Fresh Water Rinsing every 7 days will minimize and slow down the biological fouling that naturally occurs. Chemical Cleaning at appropriate intervals will remove the biological fouling and extend the life of the R.O. Membrane Element.

Solution: Refer to Section 5 of this Owner’s Manual for R.O. Membrane Element Cleaning procedures or replace the R.O. Membrane Element(s).

- As the Reverse Osmosis Membrane Element is operated eventually dissolved solids, salts or minerals, will build up on the membrane surface causing a drop in production, loss of product water flow accompanied by an increased percentage of dissolved solids, salt, in the product water. Chemical Cleaning at appropriate intervals will dissolve the salt and mineral fouling and extend the life of the R.O. Membrane Element.

Solution: Refer to Section 5 of this Owner’s Manual for R.O. Membrane Element Cleaning procedures or replace the R.O. Membrane Element(s).

- d. Product Water Flow suddenly decreases and Product Water Salinity, suddenly increases, quality decreases:

- Chemical, one that will foul or plug up the membrane surface, or Oil attack to the R.O. Membrane Element will cause the production to suddenly decrease and the product water quality will suddenly worsen.

Solution: Replace the R.O. Membrane Element(s) if they have been attacked by Chemicals or Oil.

- e. Feed Water leaks from the Pressure Vessel:

- The High Pressure fittings entering the Pressure Vessel are O-Ring sealed at the End Plug that they attach to. Should a leak develop at a High Pressure Fitting inspect the respective O-Ring for signs of wear or damage.

Solution: Replace the O-Rings if wear or damage is present.

- The End Plugs seal against the inner surface of the High Pressure Vessel. The O-Ring that creates this seal is the “Brine O-Ring”. Should a leak develop between the End Plug and the inside wall of the Pressure Vessel remove the end plug and inspect the Brine O-Rings for wear or damage. Replace them if wear or damage is present.

Solution: Replace the O-Rings if wear or damage is present.

17. HIGH PRESSURE MANIFOLD [26].

There are no parts within the High Pressure Manifold that would require troubleshooting. Replace it if a crack develops.

18. HIGH PRESSURE TRANSDUCER [27]:

The High Pressure Transducer attached to the High Pressure Manifold [26] measures the System Operating Pressure from the Outlet of the High Pressure Pump [21] through the R.O. Membrane & Vessel(s) [23 & 24] and into the Back Pressure Regulator [29].

The High Pressure Transducer sends a DC voltage signal to the System Control Logic. The minimum value is .5 VDC when no pressure is applied to it, and the maximum value that the System will accept is 4.5 VDC. The variation of voltage output from the Transducer is converted to pressure value by the System Control Logic.

Problems & Symptoms appearing and caused by the High Pressure Transducer:

- a. The High Pressure Transducer does not register pressure or the pressure displayed is inaccurate.
- The pressure readings at the Touch Screen are inaccurate. The minimum voltage output is below .5VDC and or the maximum voltage output is above 5 VDC.

Solution: Check wiring and connections to and from the Transducer.
Calibrate the Transducer.
Replace the Transducer.

19. HIGH PRESSURE GAUGE [28]:

Problems & Symptoms appearing and caused by the High Pressure Gauge:

- a. The gauge needle does not move; or does not register proper pressure.
 - The High Pressure Gauge has a very small orifice at the bottom of the pipe fitting end. This orifice can become plugged with debris or corrosion.

Solution: Using a small diameter wire clean the debris from the orifice.

20. BACK PRESSURE REGULATOR [29]:

The Back Pressure Regulator Valve is adjusted manually by the operator to control operating pressure of the System. The valve contains stem seals that will wear over time and usage.

Problems & Symptoms appearing and caused by the Back Pressure Regulator:

- a. The valve leaks water from the stem.
 - Gently tighten the seal nut at the valve stem to compress the seal and stop leakage.

21. BRINE DISCHARGE FLOW METER [30]:

The Brine Discharge Flow Meter measures the brine water rate of flow from the R.O. Membrane Element & Vessel. By adding the amount of Product Water flow to the Brine Discharge Flow the operator is able to determine the total Feed Water Flow which is helpful in diagnosing problems with the High Pressure Pump.

Problems & Symptoms appearing and caused by the Brine Discharge Flow Meter:

The flow meter may become opaque with marine growth. Disassemble and clean with a soft cloth.

22. BRINE DISCHARGE T-CONNECTOR [31]

This T connector collects the brine discharge water and unpotable product water for routing out of the System in one line. If it breaks or cracks replace it.

23. BRINE DISCHARGE CONNECTOR [32 or 33]

This 90 degree elbow fitting, or Tee fitting if the Multi Media Filter is installed, attaches to the over board thru-hull fitting for connecting the brine discharge hose. If it breaks or cracks replace it.

24. THRU HULL DISCHARGE FITTING [34] **

The Discharge Thru-Hull Fitting should be installed above water level for discharge of the Brine Discharge Water from the system. If it breaks or cracks replace it.

25. PRODUCT WATER T COLLECTOR [35]

The T collector combines the product water from the two individual R.O. Membrane Elements [23 & 24]. If it breaks or cracks replace it.

26. SALINITY PROBE [36]

The Salinity Probe electronically measures, with temperature compensation, the salinity content of the Product Water. The Salinity Probe is calibrated at the factory to 800 PPM TDS NaCl at 25 degrees Celsius. Although the Salinity Probe is temperature compensated, it is not 100% linear across the full range that it must measure. The full range of salinity that the probe must attempt to measure is from 5 to 2000 PPM at 1 to 50 degrees Celsius. Always reference the probe accuracy and calibration to 800 PPM TDS NaCl at 25 degrees Celsius.

- Debris or biological growth can cause the Salinity Probe to give incorrect measurement of the Product Water Salinity.

Solution: Clean the Salinity Probe contact pins annually or at any sign of incorrect reading.

- The Salinity Probe may have drifted from it's original calibration point.

Solution: Calibrate the Salinity Probe. Refer to Section 3 of this Owner's Manual.

27. PRODUCT WATER FLOW METER [37]:

The Product Water Flow Meter measures the Product water rate of flow from the R.O. Membrane Element & Vessel. By adding the amount of Product Water flow to the Brine Discharge Flow the operator is able to determine the total Feed Water Flow which is helpful in diagnosing problems with the High Pressure Pump.

Problems & Symptoms appearing and caused by the Product Water Flow Meter:

The flow meter may become opaque with marine growth. Clean with a soft cloth.

28. 3-WAY PRODUCT WATER DIVERSION SOLENOID VALVE [38]:

The 3-Way Product Water Diversion Solenoid Valve, Electric Solenoid Actuated, is energized by the System Electronic Controller to the "Potable" position when the system produces water which meets the set salinity requirement. If the Product Water being produced is "Un-potable", high in salinity, then no signal is sent to the valve, and it thus remains in the normal open position. The "fail safe" normal open position diverts the un-potable Product Water to discharge.

Problems & Symptoms appearing and caused by the 3-Way Product Water Diversion Solenoid Valve:

Prior to assuming that the 3-Way Product Water Diversion Valve's Solenoid has failed, perform a Function Test as described in Section 3 of this Owner's Manual.

- a. The 3-Way Product Water Diversion Solenoid Valve is allowing Brine Discharge Water to mix with Potable Water.
 - There is a blockage in the Brine Discharge line creating pressure on the Brine Water. This abnormal pressure is forcing open the seat of the 3-Way Product Water Diversion Solenoid Valve allowing Brine Water to mix with Product Water.

Solution: Determine the cause of excess pressure in the Brine Discharge Line and correct it so that no back pressure is present in the Brine Discharge Line.

- The 3-Way Product Water Diversion Solenoid Valve seat is not properly adjusted allowing Brine Water to mix with Product Water.

Solution: Adjust the Valve's seats, refer to Section 8 of this Owner's Manual.

- b. The 3-Way Product Water Diversion Solenoid Valve does not switch to Potable Water even though the Touch Screen indicates that the System is OK performing normally and producing Potable Product Water.

- The Solenoid is not actuating the Valve's seat.

Solution: Check for 12 VDC at the valve's Solenoid, and at the Main Printed Circuit Board.

Check for loose Wire and correct it.

Check the valve's solenoid continuity and functionality, refer to Section 8 of this Owner's Manual. Replace the Solenoid Valve if the Solenoid is found to be non-functional.

- c. The 3-Way Product Water Diversion Solenoid Valve is always in the "good water" position even when the Touch Screen indicates that the Product Water is high in salinity.

- The Manual By-Pass button located on the side of the solenoid is in the Manual By-Pass position.

Solution: Release the button to the normal position. Refer to Section 8 of this Owner's Manual.

29. CHARCOAL FILTER [39]:

The Charcoal Filter is designed to remove foul odors from the Product Water. Sulfurous odor (rotten egg smell) transmitted to the Product Water is caused when biological matter decays in the feed water section. Fresh water flushing of the system helps to minimize this.

Problems & Symptoms appearing and caused by the Charcoal Filter:

- a. The Product Water has a smell of rotten egg.

- The smell originates in the Feed Water and passes through the R.O. Membrane Element into the Product Water.

Solution: Change Prefilter Elements with new elements and Fresh Water Flush the System to minimize the decaying biological matter.

Change the Charcoal Filter Element with a new element.

Drain and replace the Product water in the Fresh Water Tank [43]

30. pH NEUTRALIZING FILTER [40]

The product water from the system will be slightly acidic, approximately pH 6.5. This is normal for any Reverse Osmosis System. The pH Neutralizer Filter replaces alkaline, calcium carbonate, which neutralizes the pH of the product water back to a normal of 7.5. The life of the neutralizing cartridge depends on the amount of use, amount of product water flowing through it. Replace the element as necessary. **CAUTION:** Use only Sea Recovery replacement pH cartridges. Third party pH cartridges are for use with very low flow rates and cause excessive restriction resulting in Product Water Line pressure build up. These third party cartridges will damage the R.O. Membrane Element and components in the Product Water Line. Damage to the Sea Recovery System caused by the use of Non Sea Recovery supplied pH Neutralizing Cartridge is the liability and responsibility of the operator and not covered by the Sea Recovery Warranty.

31. ULTRA VIOLET STERILIZER [41]

The U.V. Sterilizer destroys at least 99.9% of any virus, bacteria, and other micro-organisms which may pass through the R.O. Membrane Element. The U.V. sterilizer is recommended if the Product Water Storage Tank is not otherwise treated by means such as chlorination.

The U.V. Lamp is rated for approximately 2,000 hours of use. When the intensity of the lamp diminishes replace the lamp.

Problems & Symptoms appearing and caused by the Ultra Violet Sterilizer:

Prior to assuming that the U.V. Sterilizer Ballast and or Lamp have failed, perform a Function Test as described in the Appendix of this Owner's Manual.

a. The U.V. Lamp is not properly functioning:

- The U.V. Lamp flickers on and off and does not remain illuminated steady.

Solution: Replace the U.V. Lamp with a new lamp.

- The U.V. Lamp illuminated steady but has lost it's original intensity.

Solution: Replace the U.V. Lamp with a new lamp.

- The U.V. Lamp does not illuminate at all.

Solution: Replace the U.V. Lamp with a new lamp.

Check the condition of the U.V. Lamp Ballast to ensure its functionality, refer to the Appendix of this Owner's Manual.

32. PRODUCT WATER CONNECTOR [42]:

The Product Water Connector attaches to the Potable Water unpressurized tank for connection of the Product Water hose. Replace it if it is damaged or cracked.

33 AUTOMATIC FRESH WATER FLUSH [46 - 49]:

Includes a 2-Way Solenoid Valve [46], Check Valve [47], Charcoal Filter [48], and TEE connector with Check Valve [49]

The fresh water flush automatically rinses the System with Fresh Water every 7 days. Fresh Water Flushing replaces the seawater in the system with less corrosive fresh water, and this also reduces the biological growth and subsequent decay that naturally occur if the feed water (sea water) is not flushed from the system with fresh water during disuse.

Fresh Water Flush 2-Way Solenoid Valve [46] is normally closed and actuates to open during the fresh water flush cycle to allow fresh water into the system.

Problems & Symptoms appearing and caused by the Fresh Water Flush 2-Way Solenoid Valve:

a. The Fresh Water Flush Cycle is off but fresh water is passing through the Fresh Water Flush 2-Way Solenoid Valve

- The valve ports may be improperly adjusted allowing by-pass.

Solution: Adjust the valve ports. Refer to Section 8 of this manual.

- a. The Fresh Water Flush Cycle is on but fresh water does not pass through the Fresh Water Flush 2-Way Solenoid Valve

- The valve ports may be improperly adjusted allowing by-pass.

Solution: Adjust the valve ports. Refer to Section 8 of this manual.

- The valve's solenoid may be electrically non functional.

Solution: Check for 12 VDC. If present, replace the valve. If 12 VDC is not present troubleshoot the electronics.

Fresh Water Flush Check Valve [47] stops feed water from entering the potable water line.

Problems & Symptoms appearing and caused by the Fresh Water Flush 2-Way Solenoid Valve:

- a. The Fresh Water Flush Check Valve [47] is allowing feed water to mix with potable water.

Solution: Replace the Fresh Water Flush Check Valve [47].

Fresh Water Flush Charcoal Filter [48] removes chlorine, if present, in the fresh water prior to flowing through the R.O. Membrane Element.

Problems & Symptoms appearing and caused by the Fresh Water Flush Charcoal Filter:

- a. The Charcoal Filter is no longer removing the chlorine from the Fresh Water.
 - As the Charcoal Filter becomes saturated it loses its ability to remove chlorine from the Fresh Water.

Solution: Replace the Charcoal Filter Element every 3 months.

Fresh Water Flush Tee Connector and Check Valve [49] stops fresh water from exiting the Inlet Thru Hull Fitting [1] and routes the fresh water through the system during the Fresh Water Flush Cycle. If debris causes the valve to not properly seat clean the internal components of the valve.

34. RINSE CLEAN INLET VALVE [50] and RINSE CLEAN OUTLET VALVE [51]

These two 3-way PVC Ball Valves are used in conjunction with each other to simplify the storage and cleaning procedures by allowing the operator to turn a valve rather than disconnect a hose. Also used for a manual fresh water flush if the Automatic Fresh Water Flush System is not installed.

Problems & Symptoms appearing and caused by the Rinse Clean Inlet and Outlet Valves:

- a. The position of these valves cause the feed and brine water to travel in a specific direction.
 - If the direction of feed water and or brine water travel is incorrect then one or both of the valves are positioned incorrectly for the given operation or cycle.

Solution: Refer to the Piping and Interconnect Diagrams throughout this Owner's Manual to determine the proper positioning of these valves.

35. CLEANING BUCKET [52]

This can be any non ferrous (non iron) container capable of holding at least 10 U.S. Gallons of water. This container is used during the R.O. Membrane Element cleaning, storing, or winterizing process.

a. The bucket or container must not leak.

- The bucket or container leaks.

Solution: Replace the leaky bucket or container.

36. **POTABLE WATER STORAGE TANK [43]** may be any non pressurized container suitable for storing Potable Water, i.e. existing water storage tank on a boat or cistern for a home. This container must not be pressurized.

37. **FRESH WATER PRESSURE PUMP [44]**

This pump must deliver fresh water to the fresh water flush assembly at a minimum of 25. If the Fresh Water Flush cycle is unable to perform due to insufficient Fresh Water flow and pressure replace the Pressure Pump with a pump capable of meeting the minimum standards stated above.

38. **AIR ENTRAINMENT TANK [45] (accumulator)**

Some Fresh Water Pressure Systems rely only on the Pressure Pump to deliver pressurized Fresh Water to the boat or home piping. Other Fresh Water Pressure Systems incorporate an Air Entrainment Tank. It is not important to the Aqua Whisper II System which configuration the boat or home has. The only requirement to the Aqua Whisper II System, for Fresh Water Flushing, is that the Fresh Water Pressure System in the boat or home must deliver to the Aqua Whisper II System during the Fresh Water Flush cycle fresh water at a minimum of 25 PSI.

D. AQUA WHISPER II SYSTEM OPERATION CONTROL SEQUENCE & PROCESS:

Touch Pad Explanation of lamps and switches:

Salinity Meter: 10 LEDs illuminate to show full range high salinity. When all 10 LEDs are illuminated the product water is being rejected and discharged over board. When 9 or less LEDs are illuminated the product water salinity is below the set point of 1000 PPM and the product water is being diverted to the post filtration and on to the ship's storage tank.

Booster Pump LED: This LED illuminates when the Booster Pump is in operation.

HP Pump LED: This LED illuminates when the High Pressure Pump is in operation.

Fresh Flush LED: This LED illuminates when the Fresh Water Flush Cycle is being performed. It flashes on and off when the system is not in operation and the Fresh Water Flush Cycle is counting down the 7 day



wait period until the next fresh water flush cycle.

Low Pressure LED: This LED illuminates when the System has shut down due to low feed pressure. Prior to the system shutting down due to low feed pressure, this LED flashes on and off for 20 seconds informing the operator that there is a low feed water pressure condition.

High Pressure LED: This LED illuminates when the System has shut down due to excess operating pressure above 975 PSI. Shut down is immediate upon reaching 975 PSI.

Start Switch: Pressing the Start switch places the system into the start sequence of operation: Booster Pump Starts; Low Pressure Transducer checks for adequate Feed Water Pressure; High Pressure Pump Starts.

Boost Pump Switch: Pressing the Boost Pump Switch (Booster Pump) causes only the Booster Pump to operate. This feature is used to operate only the Booster Pump during Multi Media Filter Back Washing or Rinsing.

Fault Reset Switch: When the System has shut down due to a Low Pressure or High Pressure condition, and either the Low Pressure or High Pressure lamp is illuminated pressing the Fault Reset Switch will clear the control logic, turn the lamp off, and allow restart of the System.

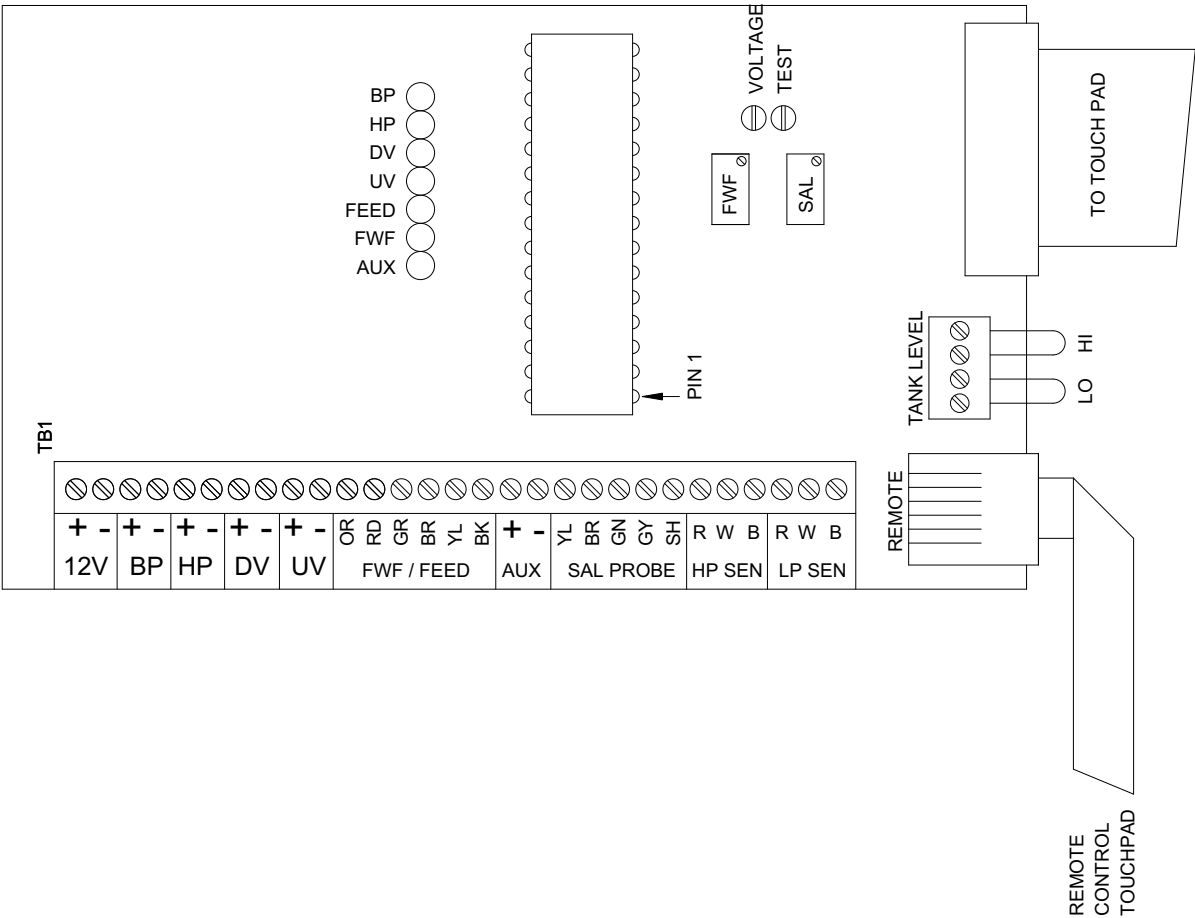
Fresh Flush Switch: Each time the system is shut down by pressing the Stop Switch once the System will perform a Fresh Water Flush Cycle. During the 7 day wait period between Fresh Water Flush cycles or if the Fresh Water Flush Cycle has been canceled, pressing the Fresh Flush Switch will initiate the Fresh Water Flush Cycle.

Stop Switch: When the System is in operation and the Stop Switch is pressed the System will enter a shut down mode first de-energizing the 3-Way Product Water Diversion Solenoid Valve, Ultra Violet Sterilizer, High Pressure Pump, and Booster Pump in that order. If pressed only once, the Fresh Water Flush Cycle will begin. If pressed twice the Fresh Water Flush Cycle will be canceled.

Elapsed Time: Shows the total cumulative hours of System Operation.

Main Printed Circuit Board, “Controller Board” Explanation of lamps, connections, and adjustments:

The following Control Sequence & Process explanation is a technical sequence which refers to positions on the Main Printed Circuit Board illustrated below.



- TO TOUCHPAD = Main Touch Pad Connector
- REMOTE = Remote Touch Pad Connector
- TANK LEVEL = High Level and Low Level Customer Supplied Potable Water Tank Level Switches
- TB 1 = Terminal Block for accessory power connections
- FWF = Fresh Water Flush Timing set
- VOLTAGE TEST = Fresh Water Flush Timing Voltage
- SAL = Product Water Salinity set

CONTROL STATUS LEDs

- FWF = Fresh Water Flush Actuator Valve
- FEED = Not used in the Aqua Whisper II
- BP = Booster Pump Electric Motor
- HP = High Pressure Pump Electric Motor
- DV = 3-Way Product Water Diversion Solenoid Valve
- UV = Ultra Violet Sterilizer
- AUX = Auxiliary output signal

NOTES:

1. Voltage measurements listed are between the specific terminals for the function provided. Never measure the voltage between any terminals and ground.
2. Do not connect any terminals to the chassis ground.
3. The voltage indicated as “HIGH” means approx. 12V while “LOW” is 0V, unless otherwise noted.

NORMAL OPERATION:

1. The LED Salinity Meter and other LED's on the touch pad illuminate for 3 seconds upon initial power up.
2. Pressing the START switch starts the system in the semi-automatic mode. The Booster Pump will start first and BOOSTER PUMP LED flashes and LOW PRESSURE FAULT LED may also flash if the low pressure is below 6 PSI.
3. After a 3 second delay and enough low pressure (>6 PSI), the high pressure pump starts. The BOOSTER PUMP LED and HIGH PRESSURE PUMP LED illuminate solid at this point. Whenever the high pressure pump is activated, the hour meter is activated to count pump hours.
4. The Back Pressure Regulator valve can be adjusted to obtain a specific operating pressure and corresponding flow of product Water.
5. When the product water salinity falls below 1000 PPM the Ultra Violet Sterilizer is actuated, and then 5 seconds later the 3-Way Product Water Diversion Solenoid Valve is actuated to deliver the potable produce water to the Post Filtration components and on to the boat's product water storage tank. The product water salinity is indicated by the Salinity Meter LED's. However, the first LED to the far Left is a power on indicator. Each of the remaining 10 LED's denote approximately 100 PPM, therefore, the right most RED LED indicates the salinity is at 1000 PPM. If for any reason the salinity level exceeds 1000 PPM the 3-Way Product Water Diversion Solenoid Valve will deactivate immediately, and the Ultra Violet Sterilizer will deactivate 5 seconds later.
6. In the normal operation, if the low pressure falls below 6 PSI but above 2 PSI the LOW PRESSURE FAULT LED will flash. This continues for 10 seconds, and if the pressure does not increase then the system shuts off with the LOW PRESSURE FAULT LED illuminated steady. If the low pressure declines below 2 PSI then the system shuts off immediately with the LOW PRESSURE FAULT LED illuminated steady.
7. Also, in the normal operation, if the high pressure exceeds 975 PSI the system shuts off immediately with the HIGH PRESSURE FAULT LED illuminated steady.
8. The Booster Pump alone can be activated by pressing the BOOST PUMP switch. With just the Booster Pump activated the High Pressure Pump may also be activated by pressing the START switch.
9. To stop the system press the STOP switch. This automatically deactivates all electrical components and initiates the Automatic Fresh Water Flush operation and 7 day repeat cycle if the Fresh Water Flush option is installed. Pressing the STOP switch twice will deactivate the Automatic Fresh Water Flush operation.
10. If the controller detects either a Low Pressure or High Pressure Transducer malfunction the system will turn off immediately with a corresponding FAULT LED flashing 5 times followed by 1 second interval flashing.
11. In the normal operation mode if the high tank level switch is installed and opens for longer than 60 seconds continuously the system will shut off automatically.
12. In any of the fault conditions the RESET switch must be pressed to clear the fault while the power is on. Removing the power from the system does not clear the fault condition.

FRESH WATER FLUSH:

1. With the system in stand-by pressing the FRESH WATER FLUSH switch activates the Automatic Fresh Water Flush operation and subsequent 7 day repeat cycle. The FWF duration must be set properly in order to enable the FWF function (see calibration mode below).

2. When the FWF duration is properly set, the system automatically goes into the FWF mode to perform the operation every time the system is in the normal operating mode and the STOP switch is pressed once.
3. To stop the FWF operation the STOP switch can be pressed anytime the system is performing the Fresh Water Flush operation.
4. After the Fresh Water Flush completes the system goes into a 7 day stand-by mode. The Fresh Water Flush cycle will repeat every 7 days until the STOP switch is pressed.
5. If a low level switch is installed and the water tank low level condition is detected the FWF does not start and reverts to the system stand-by mode.
6. If the power is lost during the FWF operation the FWF operation restarts when the power is restored.
7. If the power is lost during the 7-day waiting period the waiting period resumes counting from the point of the power loss when the power is restored.

CALIBRATION MODE:

1. Press and hold the BOOST PUMP switch while applying the power to the system causes the controller to wake up in the calibration mode. This will require two people: One to press and hold the BOOST PUMP switch while the other applies power at the circuit breaker supplying power to the system.
2. In the calibration mode, the LED Salinity Meter Flashes every second to indicate that the system is ready to be calibrated.

Salinity Meter and Salinity Probe Calibration:

- a. Pressing the Start switch allows the Salinity Probe and Meter to be calibrated.
- b. Use a test solution of 800 PPM TDS.
- c. Dip the entire Salinity Probe into the test solution and wait for 15 minutes for it to be temperature compensated.
- d. Hold the Salinity Probe up off of the bottom of the test solution container but ensure that the probes remain submerged in the test solution.
- e. Adjust R62 (SAL) on the controller board to cause the FIRST YELLOW LED to illuminate.(9th LED from the left).
- f. Press and release the STOP switch. This brings the controller back to step 2 above and ready for further calibration.
- g. Pressing and releasing the STOP switch a second time brings the controller out of the calibration mode and back to the normal ready for operation mode.

Fresh Water Flush Calibration::

- a. Pressing the FRESH WATER FLUSH switch allows the Fresh Water Flush time duration to be calibrated.
- b. Adjust R71 (FWF) for desired duration of the Fresh Water Flush operation. Note, on the average the flow rate of fresh water through the System during the Fresh Water Flush Cycle will be approximately .75 U.S. Gallons Per minute or 2.8 Liters Per Minute.

A system equipped with only 10 inch prefilters will require about 5 U.S. Gallons or 6 to 7 minutes duration.

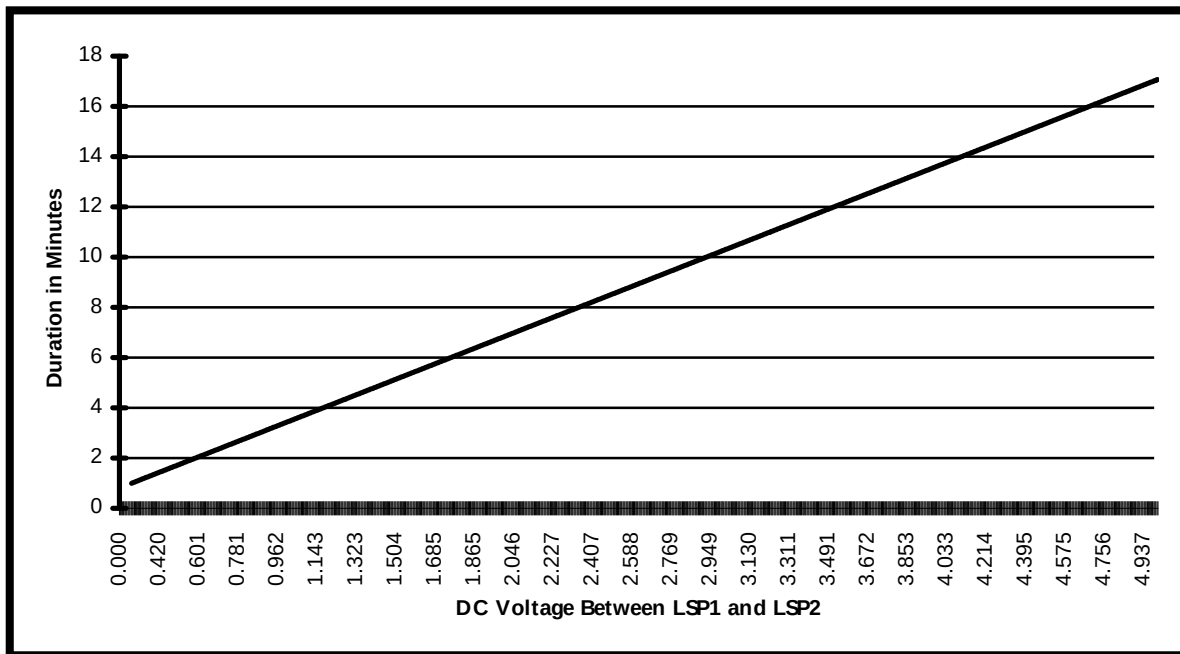
A system equipped with Commercial Prefilter and Oil Water Separator will require about 8 U.S. Gallons or 10 minutes duration.

A system equipped with Commercial Prefilter, Oil Water Separator, and Multi Media Filter will require about 10 U.S. Gallons or 12 to 14 minutes duration.

- c. The LED meter indicates the FWF duration in 2 minute increments and adjustable range is between 1 and 17 minutes. If R71 is set to less than 60 seconds (i.e. turned fully counter clockwise for 20 turns) then the FWF function is disabled.
Viewing the Salinity Meter LED's rotate R71 clockwise:

First far left LED illuminated	=	FWF disabled
Second LED illuminated	=	FWF duration is 2 to 4 minutes
Third LED illuminated	=	FWF duration is 4 to 6 minutes
Fourth LED illuminated	=	FWF duration is 6 to 8 minutes
Fifth LED illuminated	=	FWF duration is 8 to 10 minutes
Sixth LED illuminated	=	FWF duration is 10 to 12 minutes
Seventh LED illuminated	=	FWF duration is 12 to 14 minutes
Eighth LED illuminated	=	FWF duration is 14 to 16 minutes
Ninth LED illuminated	=	FWF duration is 16 to 17 minutes

- d. Alternately, the FWF duration can be adjusted precisely by measuring a DC voltage between LSP1 and LSP2 (VOLTAGE TEST) while adjusting R71 (FWF). The graph below can be used to find a DC voltage for the required duration.



- e. Press and release the STOP switch. This brings the controller back to step 2 above and ready for further calibration.
- f. Pressing and releasing the STOP switch a second time brings the controller out of the calibration mode and back to the normal ready for operation mode.

FAULT CONDITIONS:

1. If both the high and low level tank switches are installed and are open simultaneously then both high and low pressure fault LED's flash alternately. The system will be locked out of the operation mode.
2. If the Low pressure falls below 6 PSI for more than 10 seconds continuously or falls below 2 PSI in the normal operation the system will shut down with the LOW PRESSURE LED illuminated steady.
3. If the High Pressure exceeds 975 PSI in the normal operation the system shuts down with the HIGH PRESSURE LED illuminated steady.
4. If a pressure transducer failure is detected in the normal operation the corresponding (high or low) LED will flash on and off after the system shuts down.
5. All fault status are memorized in the controller even with the power removed from the system. The RESET switch must be pressed to clear any fault.

ADDITIONAL FEATURES:

1. HIGH level tank switch, when installed, will shutdown the system when the switch opens for 1 minute or longer.
2. Low level switch, when installed, will stop FWF operation when the switch opens for 1 minute or longer.
3. Alarm terminals provide 12V DC output (1A max.) when a fault condition occurs.

E. ELECTRICAL AND ELECTRONIC TROUBLESHOOTING

CAUTION: ELECTRICAL SHOCK HAZARD. A Volt / Ohm Meter will be necessary to Troubleshoot and Repair abnormalities or failures in the Electrical and Electronic circuits and components. The following procedures expose the technician to High Voltage and electrical shock hazard. Only attempt this if you are a qualified electrician and only if surrounding conditions are safe.

1. SYSTEM TOUCH PAD [54]:**Problems & Symptoms appearing and caused by the Touch Pad:**

- a. One or more switches do not function.
 - There may be a loose plug, computer logic lock up, or non functioning switch.

Solution: Turn the power off to the System. Unplug and plug back in all connections from the Touch Pad to the Controller Board. Do this 3 times to ensure any tarnish is removed. Turn the power to the System on. Attempt to operate the system. If the problem persists go to trouble shooting of the Control Logic PCB in item 2 below.

- b. One or more LEDs are not functioning properly (does not illuminate when it is supposed to).
 - There may be a loose plug, computer logic lock up, or non functioning LED.

Solution: Turn the power off to the System. Unplug and plug back in all connections from the Touch Pad to the Controller Board. Do this 3 times to ensure any tarnish is removed. Turn the power to the System on. Attempt to operate the system. If the problem persists go to trouble shooting of the Control Logic PCB later in this section.

2. SYSTEM CONTROL LOGIC PRINTED CIRCUIT BOARD [54]:**Problems & Symptoms appearing and caused by the Control Logic Circuit Board:**

- a. One or more switches do not function.
 - There may be a loose plug, computer logic lock up, or non functioning switch.

3. REMOTE CONTROL TOUCH PANEL [55]

Refer to item 1. SYSTEM TOUCH PAD [55] above for similar troubleshooting.

4. SOFT MOTOR STARTER [56]

The Soft Motor Starter, used only in AC (Alternating Current) Single Phase systems, reduces the initial startup amperes required to start the high pressure pump motor [21] and in turn allows a smaller sized KW generator to start the system. Starting amperage is reduced by 40% with the Soft Start installed. The maximum design rated Horse Power that the Soft Motor Starter will accept is 3 Horse Power.

Should the Soft Motor Starter fail to function refer to wiring diagrams in Section 8 of this Owner's Manual. Check all wiring for correct position and tight connection. Check wiring from the incoming power, through the Soft Motor Starter, and at the Electric Motor that it is controlling.

5. Owner or Installer Supplied Items that are Not Numbered or shown on the Piping and Interconnect Diagrams but are included in the Electrical Diagrams in Section 8 of this Owner's Manual:

FRESH WATER TANK HIGH LEVEL SWITCH:

This owner/installer supplied Fresh Water Tank High Level Switch provides an optional feature to the System Control Logic that allows the System to shut off automatically when the Fresh Water Tank [43] is full. Additionally, the System will not start when the Fresh Water Tank High Level Switch signals the System Control Logic that the Fresh Water Tank [43] is full.

When installed and connected to the Main Printed Circuit Board, the Fresh Water Tank High Level Switch must be connected as a N.C. (Normally Closed) 1PST (One Pole Single Throw) switch.

When the Fresh Water Tank [43] is several inches below the full mark the switch is Closed. As water rises and reaches the top of the full mark the switch Opens. This informs the System Control Logic that the Fresh Water Tank is full, the System will shut down if operating, and the System will not start while the tank is full.

If operation of the System is desired when the Fresh Water Tank Switch signals the System Control Logic that the Fresh Water Tank is full then the System may be operated in the Manual mode.

6. ELECTRICAL CONTROL BOX [53]:

The Electrical Control Box contains all of the Electronic and Electrical circuits and components. Troubleshooting of major components is described below:

- Fuses
- High Pressure Pump Contactor
- Booster Pump Contactor
- Fresh Water Flush
- Customer Supplied Alarm
- 12 VDC Power Supply
- Main Printed Circuit Board
- Step Down Transfer used in 3 phase systems only

Additional external devices connected to the Main Printed Circuit Board:

- U.V. Sterilizer [41]
- 3-Way Product Water Diversion Solenoid Valve [38]
- 2-Way Fresh Water Flush Solenoid Valve [46]
- Low Pressure Transducer [20]
- High Pressure Transducer [27]
- Customer Supplied Low Level Tank Switch
- Customer Supplied High Level Tank Switch
- Customer Supplied Alarm

Fuses

There are 2 fuses protecting the 12 VDC Power Supply primary circuit. Should one or both of these fuses fail this is an indication of high current draw from any one of several 12 VDC devices in the System. Devices powered from the 12 VDC produced by the 12 VDC Power Supply include:

- Main Printed Circuit Board
- Main Touch Screen
- Remote Touch Screen
- High Pressure Pump Contactor
- Booster Pump Contactor
- Fresh Water Flush
- Fresh Water Flush 2-way Solenoid Valve
- 3-Way Product Water Diversion Valve Solenoid
- U.V. Sterilizer

Troubleshooting the cause of fuse failure must include physical inspection and electrical check of all of these devices and all wires connected to these devices in order to pinpoint the cause of the high current resulting in the failure of the fuse(s).

High Pressure Pump Contactor

Should the High Pressure Pump Electric Motor fail to start check for operating voltage at the following component and in the following order:

- a. High Pressure Pump Electric Motor Power Leads at the Electric Motor Junction Box
- b. Main Terminal Strip power from Contactor to Motor
- c. High Pressure Pump Contactor T (Terminal)
- d. High Pressure Pump Contactor L (Line)
- e. Main Terminal Strip power from Power Source to Contactor

Check for Control Voltage at the following points

- a. Terminal Strip "TB1" "HP"

Check for Illumination of Control Status LED

- a. HP

Booster Pump Contactor

Should the Booster Pump Electric Motor fail to start check for operating voltage at the following component and in the following order:

- a. Booster Pump Electric Motor Power Leads at the Electric Motor Junction Box
- b. Main Terminal Strip power from Contactor to Motor
- c. Booster Pump Contactor T (Terminal)
- d. Booster Pump Contactor L (Line)
- e. Main Terminal Strip power from Power Source to Contactor

Check for Control Voltage at the following points

- a. Terminal Strip "TB1" "BP"

Check for Illumination of Control Status LED

- a. BP

Fresh Water Flush Relay

Should the Automated Fresh Water Flush 2-Way Solenoid Valve fail to actuate check for operating voltage at the following component and in the following order:

- a. Terminal Strip “TB1” “FWF”

Check for Illumination of Control Status LED

- a. FWF

Customer Supplied Alarm

The maximum allowable current consumption at the customer’s supplied alarm is 1 Ampere at 12 VDC.

12 VDC Power Supply

The 12 VDC Power Supply provides power to:

- Main Printed Circuit Board
- Main Touch Pad
- Remote Touch Pad
- High Pressure Pump Contactor
- Booster Pump Contactor
- Fresh Water Flush 2-way Valve Solenoid
- 3-Way Product Water Diversion Valve Solenoid
- U.V. Sterilizer

If the 12 VDC Power Supply is not functional then all of the above components will not function, and the System will not function.

Should the 12 VDC Power Supply fail, check for allowable high voltage (64 to 264 VAC) into it and regulated low voltage (12 VDC) out of it:

- a. Check for operating voltage at TS1 supplying voltage to the 2 fuses
- b. Check for operating voltage at the input of the 2 fuses
- c. Check for operating voltage at the output of the 2 fuses
- d. Check for operating voltage at the input of the 12 VDC Power Supply
- e. Check for 12 VDC at the output of the 12 VDC Power Supply.

Main Printed Circuit Board

The Main printed Circuit Board controls, supplies power to, and or receives signals from the various electronic and electrical components within the System. The Main Printed Circuit Board is clearly marked indicating connection points for each component along with 12 VDC polarity of each component receiving power from it.

The Main Printed Circuit Board also incorporates LED visual indications of the components it controls. When the respective LED is illuminated the controlled device is receiving power and therefore is functioning. For example, when the Booster Pump is operating the “BP” CONTROL STATUS LED at the Main Printed Circuit Board will illuminate.

Always troubleshoot and track voltage at the end of the line first and work your way up to the start of the line. For example, when determining why a Booster Pump is not operating first check the voltage at the Booster Pump and work your way back to each component checking for voltage across each connection and each component.

Step Down Transformer used in 3 phase systems only

The Step Down Transformer is not required for single phase systems. It is only required for three phase systems. It accepts the high voltage operating power at its primary and steps the voltage down to 115 VAC out of the transformer's secondary for primary input power to the 12 VDC Power Supply.

Notes:

[illegible]

Section 7

Maintenance & Repair

Maintenance and Repair Notes and Cautions

Maintenance and Repair will require understanding of:

- Electrical Circuits
- Electronic Circuits
- Electric Motors
- Hydraulic Systems
- Liquid Pressures and Flows
- Electro Mechanical Systems
- Mechanical knowledge and skills

Do not attempt maintenance and repair if you are not familiar with or are not proficient in the above fields of expertise.

USE CAUTION WHEN PERFORMING MAINTENANCE AND REPAIR.

DO NOT PERFORM MAINTENANCE UNLESS:

1. The System Feed Water Sea Cock Valve [2] is closed.
2. The electrical power to the system is switched "**OFF**", **LOCKED**, and **TAGGED**.
3. Chapter 9, "EXPLODED PARTS VIEWS" of this Owners Manual is available.

WARNING: ELECTRICAL SHOCK HAZARD. A Volt / Ohm Meter will be necessary. The following procedures expose the technician to High Voltage and electrical shock hazard. Only attempt this if you are a qualified electrician and only if surrounding conditions are safe.

From time to time, Sea Recovery may make programming changes to the Control Logic (CONTROL VER).

Other physical production changes may also be made from time to time and are tracked by Sea Recovery through the System Serial Number.

Troubleshooting and repair methods and results can vary depending on the System Serial Number and the specific pre or post filtration options installed in the System.

When requesting assistance from Sea Recovery or one of Sea Recovery's service dealers, you must inform us of your specific System Model Number and Serial Number. This allows us to look up your particular System's test records and expedites our ability to assist you. If we are given a wrong model number or wrong serial number this will lead to frustration for you, wrong troubleshooting information from us, wrong repair information from us, and failure to diagnose or correct the problem. Additionally, in order for us to expedite troubleshooting and repair or maintenance, and assist you accurately, we must know all optional equipment installed in the System.

ALWAYS PROVIDE THE FOLLOWING INFORMATION:

SYSTEM MODEL: **AQUA WHISPER II**

SERIES: ☐ **COMPACT FRAME** **OR** ☐ **MODULAR**

SPECIFIC CAPACITY: **SINGLE R.O. MEMBRANE VESSEL:** ☐ **450 GPD;** ☐ **700 GPD;** ☐ **900 GPD**

DOUBLE R.O. MEMBRANE VESSEL: ☐ **900 GPD;** ☐ **1400 GPD;** ☐ **1800 GPD**

OPERATING VOLTAGE CYCLES AND PHASE: ☐ **VAC,** ☐ **HZ,** ☐ **SINGLE OR THREE PHASE**

LIST OF INSTALLED PREFILTRATION AND POST FILTRATION OPTIONS:

INLINE VACUUM/PRESSURE GAUGE [4]:	☐ YES	☐ NO
INLINE VACUUM/PRESSURE GAUGE [6]:	☐ YES	☐ NO
INLINE VACUUM/PRESSURE GAUGE [8]:	☐ YES	☐ NO
INLINE VACUUM/PRESSURE GAUGE [11]:	☐ YES	☐ NO
INLINE VACUUM/PRESSURE GAUGE [15]:	☐ YES	☐ NO

SINGLE PLANKTON FILTER [9]:	☐ YES	☐ NO
DOUBLE PLANKTON FILTER [9]:	☐ YES	☐ NO
MULTI MEDIA FILTER [10]:	☐ YES	☐ NO
COMMERCIAL PREFILTER [12]:	☐ YES	☐ NO
OIL WATER SEPARATOR [16]:	☐ YES	☐ NO
DUAL 10 INCH PREFILTER [13 & 14]:	☐ YES	☐ NO

pH NEUTRALIZING FILTER [40]:	☐ YES	☐ NO
ULTRA VIOLET STERILIZER [41]:	☐ YES	☐ NO

REMOTE CONTROL [55]:	☐ YES	☐ NO
SOFT MOTOR STARTER [56]:	☐ YES	☐ NO

MAINTENANCE & REPAIR

Are you mechanically inclined? Troubleshooting and subsequent correction or repair of the Aqua Whisper II will require understanding of:

Electrical Circuits	Electronic Circuits	Electric Motors
Hydraulic Systems	Liquid Pressures and Flows	Electro Mechanical Systems
Mechanical knowledge and skills		

Do not attempt troubleshooting and/or subsequent correction or repair if you are not familiar with, are not confident in performing, or are not proficient in the above fields of expertise.

USE CAUTION WHEN TROUBLESHOOTING. DO NOT PERFORM MAINTENANCE UNLESS:

1. The system Feed Water Sea Cock Valve [2] is closed.
2. The system main electrical disconnect switch is switched **"OFF"**, **LOCKED**, and **TAGGED**.
3. Chapter 9, "EXPLODED PARTS VIEWS" of this USERS MANUAL is available.

WARNING: ELECTRICAL SHOCK HAZARD. A Volt / Ohm Meter will be necessary. The following procedures expose the technician to High Voltage and electrical shock hazard. Only attempt this if you are a qualified electrician and only if surrounding conditions are safe.

CAUTION AVOID CHEMICAL ATTACK TO THE SYSTEM: Do not use for storage or cleaning and do not expose the Sea Recovery R.O. System to:

hydrogen peroxide	chloramine	chloramine-T	N-chloroisocyanurates
chlorine dioxide	hypochlorite	chlorine	iodine
bromine	bromide	phenolic disinfectants	petroleum products

or any other specific chemical not approved in writing by Sea Recovery Corp. Use of non authorized or misuse of authorized chemicals voids warranty. Never use third party so called "Reverse Osmosis Chemicals" for storage or cleaning. Third Party chemicals will dissolve copolymer components within the Sea Recovery System and will destroy the R.O. Membrane Element. Use of and subsequent damage caused by non Sea Recovery Chemicals are the liability and responsibility of the operator and are not covered by the Sea Recovery Warranty.

Do not connect any water line to the Sea Recovery R.O. System that may contain any of the above listed chemicals. Examples: Do not connect the Sea Recovery R.O. System to the ships potable product water tank if that tank has been treated with a Brominator as Bromine destroys the co-polymer components within the system. Do not subject the Sea Recovery R.O. Membrane(s) to any water source that may contain chlorine or other oxidants as they destroy the R.O. Membrane Element.

If you use detergents to clean the internal wetted parts of the system ensure that the internal parts are rinsed thoroughly, wiped and dried prior to reassembly. After the components have been reassembled, product water can be used to remove any feed water residue from the exterior surfaces of the components.

Weekly Quick Check: The following steps ensure that potential problems are resolved preventing major repairs:

1. Inspect all fasteners for tightness including brackets, screws, nuts, and bolts. Pay special attention to the High Pressure Pump and Electric Motor since they are subject to increased vibration.
2. Clean any salt water or salt deposits from the system with a wet rag.
3. Check for water leaks throughout the System and supporting water lines.
4. Check all tubing and high-pressure hoses for wear and abrasion against rough surfaces. The hoses must not contact heated or abrasive surfaces.

OPERATOR MAINTENANCE INTERVALS

The frequency of required maintenance is dependent on the regularity of usage, the condition of the intake water (the location of use), the length of time the system is exposed to water, the total running time and, in some cases, the manner in which the system is installed or operated. Because of these factors, it is virtually impossible to comprise an exact timetable for required maintenance. The following maintenance timetable is an estimate of the time intervals at which maintenance may be required on the various system components. This is based upon factual data compiled from Sea Recovery installations around the world. However, this schedule must be adjusted to each individual system depending upon the variables listed.

COMPONENT	MAINTENANCE REQUIRED	TIME INTERVAL CONTINUOUS	TIME INTERVAL INTERMITTENT DUTY
Sea Strainer	Inspect & Clean Screen & Housing	weekly	100 hours
Plankton Filter	Inspect & clean	weekly	100 hours
Multi Media Filter	Back wash & Rinse	when pressure drops 20 PSI across the filter	
Pre-filter	Replace element(s)	Low Pressure <6 psi	Low Pressure <6 psi
Oil/water Separator	Replace element	Low Pressure <6 psi	Low Pressure <6 psi
High Pressure Pump	Internal Factory Service	Approximately 8000 hours of operation	
R. O. Membrane	Clean Element(s)	When production or salt rejection decreases by 10%	
Salinity Probe	Clean Probes	Annually	Annually
Charcoal Filter	Replace Element	3 months	3 months
pH Neutralizing Cartridge	Replace Cartridge	when calcium carbonate granules are depleted	
U.V. Sterilizer	Replace lamp & clean quartz sleeve	2000 Hours	2000 Hours
Fresh Water Flush Charcoal Element	Replace Element	3 months	3 months
Other			
Other			
Other			
Other			
Other			

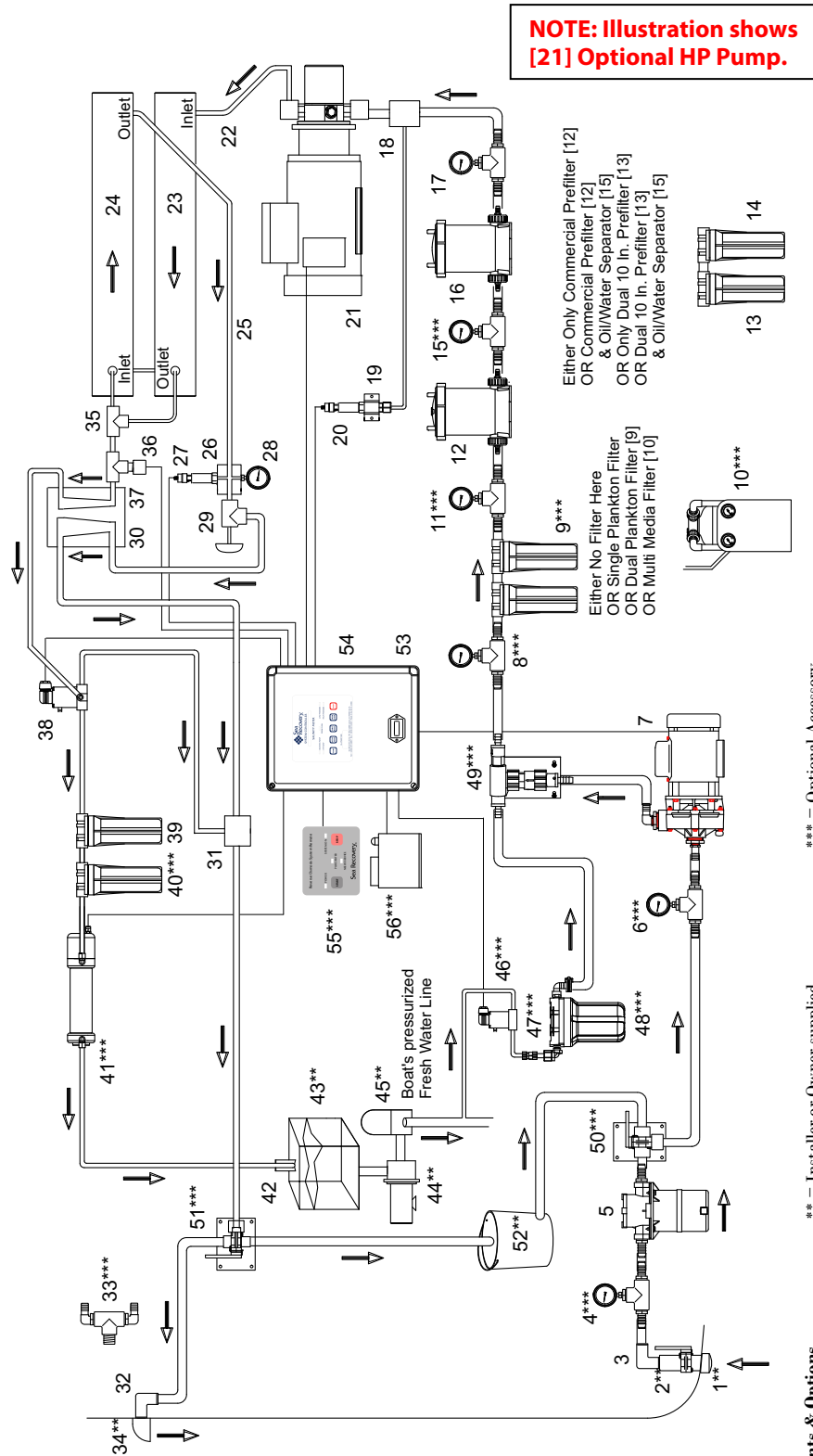
WARNING: Components, spare parts, and consumables utilized within the Sea Recovery Aqua Whisper II System can be specific to Sea Recovery specifications and are not commercially available from other sources. Other Components utilized within the Sea Recovery Aqua Whisper II System are modified by Sea Recovery for a specific purpose of compatibility and are not commercially available from other sources.

Many of these special Sea Recovery components can appear to be similar to commercially available. Extensive and expensive damage to the Sea Recovery System **WILL** result if incompatible components are used in the Sea Recovery System. Damage caused to the Sea Recovery System as a result of third party components is the liability and responsibility of both the Marine Dealer that sold the components for use in the Sea Recovery System as well as the Service Dealer or Owner/Operator that purchased and installed the third party component(s) in the Sea Recovery System and is not covered by the Sea Recovery Warranty.

Always insist on only Sea Recovery supplied components, spares, and consumables.

INDIVIDUAL COMPONENT MAINTENANCE & REPAIR: The component names include in brackets [] the ID number assigned in the Piping and Interconnect Diagrams Illustrated through out this Owner's Manual, as well as on the following page.

Aqua Whisper II Component Identification Diagram. Illustrated with "either / or" Prefiltration Options, all Post Filtration Options, the Rinse/Clean Valves, Remote Touch Pad, Soft Motor Starter, and Inline Pressure Gauges.



NOTE: Illustration shows [21] Optional HP Pump.

I.D. of Components & Options

1. Inlet Thru Hull **
2. Sea Cock Valve **
3. Inlet Connection
4. Inlet Pressure Gauge ***
5. Sea Strainer
6. Inlet Pressure Gauge ***
7. Booster Pump
8. Inlet Pressure Gauge ***
9. Plankton Filter ***
10. Multi-Media Filter ***
11. Inlet Pressure Gauge ***
12. Commercial Prefilter
13. 25 Micron 10" Prefilter
14. 5 Micron 10" Prefilter
15. Inlet Pressure Gauge ***
16. Oil Water Separator
17. Inlet Pressure Gauge ***
18. T-Connector Pressure Pick-up
19. Low Pressure Manifold
20. Low Pressure Transducer
21. High Pressure Pump & Motor
22. High Pressure Hose
23. Membrane & Vessel #1
24. Membrane & Vessel #2
25. High Pressure Hose
26. High Pressure Manifold
27. High Pressure Transducer
28. High Pressure Gauge
29. Back Pressure Regulator
30. Flow Meter - Brine Discharge
31. Discharge T-Connection
32. Brine Discharge Connector
33. Multi Media Filter Waste Tee ***
34. Thru Hull Discharge Fitting
35. T-Connector Product Water
36. Salinity Probe
37. Flow Meter - Product Water
38. 3-way Diversion Valve
39. Charcoal Filter
40. pH Neutralizer ***
41. U.V. Sterilizer ***
42. Product Water Connector
43. Potable Water Storage Tank **
44. Fresh Water Pressure Pump **
45. Air Entrainment Tank (Accumulator) **
46. Auto Fresh Water Flush Solenoid Valve ***
47. Auto Fresh Water Flush Check Valve ***
48. Auto Fresh Water Flush Charcoal Filter ***
49. Auto Fresh Water Flush Check Valve ***
50. Rinse Clean Inlet Valve ***
51. Rinse/Clean Outlet Valve ***
52. Rinse/Clean Container or Bucket **
53. Electrical Control Box
54. System Touch Pad
55. Remote Control Touch Pad ***
56. Soft Start ***

*** = Optional Accessory

** = Installer or Owner supplied

1. **Inlet Thru Hull Fitting [1]:** Non Sea Recovery component. Keep the Inlet Thru Hull Fitting free and clear of debris and marine growth. If the Inlet Thru Hull Fitting is clogged, this results in a low feed pressure condition, which causes the system to shut off.

Blockage at the Inlet Thru-Hull Fitting causes the System to shut off due to lack of Feed Water Flow. Unfortunately, since it is under water operators are reluctant to thoroughly inspect the Inlet Thru-Hull Fitting for problems. This can cause time consuming frustrations in attempting to gain feed water flow by trouble shooting other components in the System.

The Inlet Thru-Hull Fitting must be free and clear allowing the System to draw 4.5 U.S. Gallons Per Minute / 17 Liters Per Minute through it with minimal resistance. Any blockage at the Inlet Thru-Hull Fitting will cause low pressure and low flow problems at the System. This Inlet Thru-Hull Fitting must be a Forward Facing Scoop so that the System receives a positive flow of water as the boat is under way. It must be minimum 3/4" inside diameter. It must be installed in a position on the bottom of the Hull so as to allow free flowing Feed Water without air.

CAUTION: A flat profile, flush mount, inlet thru-hull fitting will cause a vacuum as the boat is under way, and this will cause loss of feed water flow and cavitation of the Booster Pump and High Pressure Pump resulting in continual system shut down due to low feed water flow and pressure. The resulting failure of the system to remain in operation is attributed to improper installation, is the liability of the installer, and is not covered by the Sea Recovery warranty.

CAUTION: If the thru-hull fitting has been placed in a position on the underside of the hull that allows air to continually enter the thru-hull fitting, this will cause the system to continually shut down due to loss of feed water. The resulting failure of the system to remain in operation is attributed to improper installation, is the liability of the installer, and is not covered by the Sea Recovery warranty.

CAUTION: The Sea Recovery System must not be tied into another existing auxiliary water line already supplying another accessory on the boat. Using one Thru Hull fitting for other equipment will cause the Sea Recovery System to draw air or cavitate leading to continual system shut down. The resulting failure of the system to remain in operation is attributed to improper installation, is the liability of the installer, and is not covered by the Sea Recovery warranty.

CAUTION: If the Sea Recovery System is connected to a Sea Chest or Stand Up Pipe, **do not plumb the Sea Recovery System feed line to the "top" of the Sea Chest or Stand Up Pipe.** If plumbed into the top of these feed water arrangements, the Sea Recovery System will experience continual shut down due to air inducement into the system. The resulting failure of the system to remain in operation is attributed to improper installation, is the liability of the installer, and is not covered by the Sea Recovery warranty. **Plumb the Sea Recovery System to the "bottom" of such feed water arrangements to ensure a continual air free supply of feed water to the system.**

2. **Sea Cock Valve [2]:** Non Sea Recovery component. The packing and connections of the Inlet Sea Cock Valve must be tight and must properly seal. Clean the valve cavity of debris or replace the seal and seat or the entire valve, as required. This section is under a vacuum condition while operating the system. Loose fittings or a worn seal will allow air to enter the Sea Recovery system causing continual shut down due to subsequent low feed water pressure.
3. **Inlet Connection [3]:** Replace if damaged.
4. **Inline Vacuum / Pressure Gauges [4, 6, 8, 11, 15, & 17]:** If the Vacuum/Pressure gauge needle does not move; or does not register proper vacuum or pressure this may be caused by a plugged orifice. The Vacuum/Pressure Gauges have a very small orifice at the bottom of the pipe fitting end. This orifice can become plugged with debris or corrosion. Using a small diameter wire clean the debris from the orifice. Replace the gauge if cleaning of the orifice does not restore functionality.

5. Sea Strainer [5]: Keep the mesh screen free and clear of debris. When the mesh screen is clogged, it results in a low-pressure condition causing system shut off. This section is under a vacuum condition while operating the system. If the Sea Strainer's bowl is loose or if the O-ring seal is worn or not properly seated, air will enter the system causing continual shut down due to subsequent low feed water pressure. Access to the mesh screen is through the top lid of the sea strainer housing.

6. Booster Pump [7]: (centrifugal; counter clockwise rotation as viewed from volute end {front end} of pump)

a. Electric Motor:

Troubleshoot electric motor failure to ensure that any abnormality from the power, wiring, wiring connections, contactor, or control circuit are not at fault or at cause. If the electric motor has failed, it will require repair. However, depending upon failure, replacement may be more cost effective than repair. If failure of the motor is due to an external source, not the motor itself, then correct the cause or else the replacement or repaired motor will fail again.

Failures of the electric motor may be:

- Bearing failure. Bearings are field replaceable.
- Winding failure. Generally caused by low or high power, below or above the specified voltage or cycle requirements of the system. This is Not economically repairable.
- Internal centrifugal switch. Generally mechanical failure of the switch. Field replaceable.
- Capacitor failure. Generally caused by low power feeding the motor and or low cycles from the power source. Also caused by rapidly repeating starting and stopping of the motor. Field replaceable.

The Electric Motor is 1/2 horse power, Totally Enclosed Fan Cooled, 2 pole, dual Cycle, and dual Voltage.

WARNING: The Booster Pump MUST rotate in the COUNTER CLOCKWISE DIRECTION ONLY
Rotating the Booster Pump in the clockwise direction will cause extensive damage to it. Never operate the Booster Pump in the clockwise direction.

WARNING: When switching from Three Phase Generator power to Three Phase Shore power ALWAYS check phases prior to operating the Aqua Whisper II System else Reverse Rotation along with extensive damage to the Booster Pump will occur should the power be out of phase.

Problems & Symptoms appearing and caused by the Booster Pump or its Electric Motor:

- 1) The **Single Phase** (115 or 230 VAC) Electric Motor "hums", pulls starting current (locked rotor) amperage, does not rotate, and trips the supply power circuit breaker when attempting to operate the System.

The **Single Phase** Electric Motor is a capacitor start motor. If the motor was started with low voltage, a drop in voltage during starting, and if this was repeated several times in rapid concession the capacitor will short out. Without the aid of a working capacitor the motor will "hum", pull starting current (locked rotor) amperage, not rotate, and trip the supply power circuit breaker when attempting to operate the System.

Low voltage will also cause the same symptom. Low voltage is caused by an undersized power supply or generator, undersized power lead wires to the System or motor, loose power wire, or connection at the motor or within the power supply line, and "burnt" contacts on the motor starter relay (contactor).

Solutions:

- Check wiring size and connections to, from, and in between the Power Supply and the electric motor. Correct wire size or any loose wires.
- Check the capacitor on the motor, and replace it if it has shorted out.
- Measure voltage at the motor during attempt to start it. If voltage drops more than 10% locate and correct the reason.
- Check the motor starter relay, contactor, for “burnt” contacts.

- 2) The **Three Phase** (230 // 380 // 460 VAC) Electric Motor “hums”, pulls starting current (locked rotor) amperage, does not rotate, and trips the supply power circuit breaker when attempting to operate the System.

The **Three Phase** Electric Motor requires all three power lines (all three phases) to be operative else it will “single phase” causing extensive damage to the motor’s internal windings.

Low voltage will also cause the same symptom. Low voltage is caused by an undersized power supply or generator, undersized power lead wires to the System or motor, loose power wire, or connection at the motor or within the power supply line, and “burnt” contacts on the motor starter relay (contactor).

Solutions:

- Check wiring size and connections to, from, and in between the Power Supply and the electric motor. Correct wire size or any loose wires.
- Measure voltage at the motor during attempt to start it. If voltage drops more than 10% locate and correct the reason. Cross check voltage across all 3 power leads.
- Check the motor starter relay, contactor, for “burnt” contacts.

- 3) The Electric Motor makes an unusual “grinding” sound when operated.

Solutions:

- Check and replace as necessary the front and rear bearings.
- Check to see if the fan is rubbing against the fan guard.

b. Booster Pump Head:

Replace the ceramic seal approximately every 2000 hours, or at the sign of leakage P/N SRC BPSK-5:

Seal Replacement:

DISASSEMBLY: Remove the four 3/8-16 Bolts holding the volute to the motor bracket. To remove the impeller, remove the bearing cap on the motor to expose the screwdriver slot on the motor shaft. Hold the motor shaft with a large screwdriver and remove the impeller by grasping it with your hand and turning the impeller counter clockwise. Remove the Seal. Two screwdrivers wedged into the seal at 180 degrees apart serve as tools to wedge the seal out. The ceramic seat is removed by removing the end bell gasket.

REASSEMBLY: Clean the motor shaft and the bracket of any corrosion or salt deposits. Replace the end bell gasket and the tap seat portion into the bracket cavity. Use a new gasket. Place the ceramic seat into the cavity over the shaft. Make sure that the polished side is toward the end of the shaft. Tap into place evenly using a hollow piece of wood or plastic tool. If a metal tool is used to tap it into place, protect the seat with cardboard or a clean cloth. Lubricate the shaft with water, water and soap or a light oil and slip the rotating portion of the seal over the shaft with the carbon element toward the ceramic. Slide it down onto the shaft as far as possible. Apply blue Loctite to the motor shaft threads. Hold the Motor shaft and reinstall the impeller. Tighten the impeller by turning it clockwise until it is snug. Reinstall the volute. Tighten the bolts evenly. Thoroughly prime the pump.

Some Electric Motors supplied by Sea Recovery have permanently sealed and lubricated bearings. Others require lubrication from time to time. If your Electric Motor has grease jerks at each end of the motor, over the front and rear bearings, the bearings require lubrication every 6 months. Give three pumps of high temperature motor bearing lubricant into each grease jerk. Use a Polyurea Base Grease such as Chevron SRI (Polyurea Base) or Shell Dolium R (Polyurea Base). **DO NOT USE LITHIUM OR SILICONE BASE GREASE.**

7. Plankton Filter [9] Element Cleaning:

1. Unscrew the bowl counter clockwise.
2. Remove the Plankton Filter Element(s) from the bowl(s).
3. Remove the O-Ring(s) from the top of the bowl(s).
4. Clean the mesh screen filter element(s) with a bristle brush and water spray.
5. Wipe the O-Ring(s) with a damp cloth.
6. Lightly, sparingly, lubricate the O-Ring(s) with O-Ring lubricant.
7. Place the O-Ring(s) back onto the bowl(s).
8. Insert the cleaned or new plankton filter element(s) into the bowl(s).
9. Screw the bowl(s) on clockwise.
10. Hand snug to seal the O-Ring; **do not use a wrench or other tool to tighten; do not over tighten. Over tightening transfers stress to the lid and bowl threads causing the lid or bowl to fail (crack or break) and making subsequent disassembly difficult.**

8. Multi Media Filter [10] Backwash:

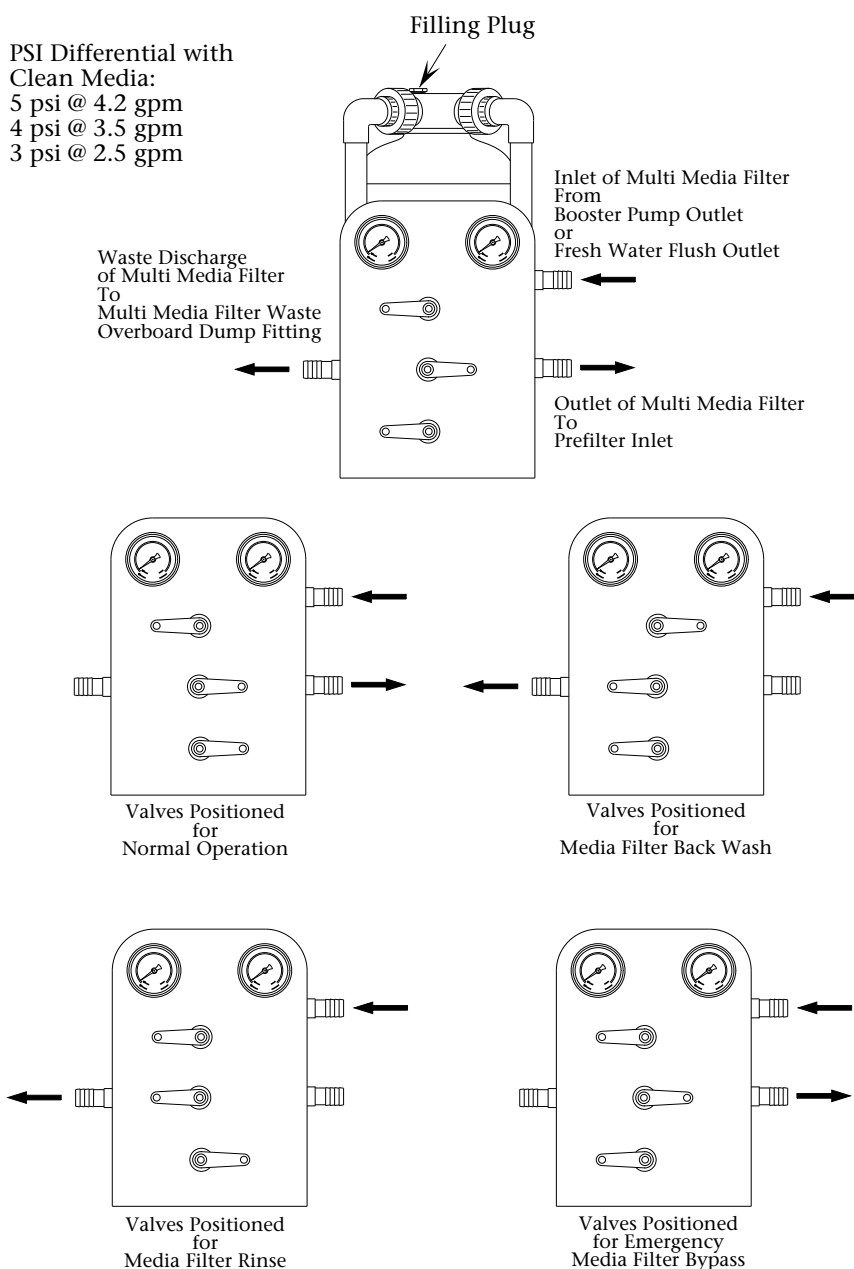
The Multi Media Filter contains fine gravel and #20 silica sand. This silica sand traps suspended solids larger than 20 micron. The top layer of the silica sand within the Multi Media Filter becomes packed with suspended solids and restricts flow through it. When the silica sand becomes packed with suspended solids, as indicated by a loss of pressure across it, it must then be back washed to waste. This back washing procedure fluffs the silica sand and dislodges the suspended solids from the sand base. During back washing the suspended solids are discharged to waste through the Multi Media Filter Waste outlet to the Brine Discharge Multi Media Filter Waste Tee [32].

If replacing the media, the Multi Media Filter requires approximately 15 lbs (7 kg) of small gravel (1/8 x 1/4 inch) first (on the bottom) then approximately 26 lbs (12 kg) of #20 silica sand last (on top of the small gravel).

NOTE: the new gravel and sand contain fines and contaminates. The Multi Media Filter must be back washed prior to use.

Instructions for Backwashing of the Multi Media Filter:

- a. Open the Inlet Sea Cock Valve [2].
- b. Position the Rinse Clean Inlet Valve [50], if installed, to the normal operating position towards the Sea Strainer [5].
- c. Position the Rinse Clean Outlet Valve [51], if installed, to the normal operating position towards the Brine Discharge Thru-Hull Fitting [34].
- d. Position the Multi Media Filter valves to Backwash
- e. Operate only the Booster Pump by pressing the Boost Switch.
- f. After 10 minutes of back washing press Stop to stop the Booster Pump.
- g. Position the Multi Media Filter Valves to Rinse.
- h. Operate only the Booster Pump by pressing the Boost Switch.
- i. After 5 minutes of Rinsing Stop the Booster Pump.
- j. Position the Multi Media Filter Valves to Normal Operation.

VALVE POSITIONING OF THE MULTI MEDIA FILTER DURING 4 SEPARATE MODES OF OPERATION

- 9. Commercial Prefilter [12] Element Replacement:** The Commercial Prefilter Pleated Cartridge Element may be cleaned with water spray once or twice. After cleaning the expected life will be reduced in half. Attempts to clean the element more than twice will result in a very short life and will damage the element rendering it useless. Change the element after the first or second cleaning. Clean or replace the element when plugged to the extent that the pressure into the High Pressure Pump is 10 PSI (69 kPa) or less. At slightly below 6 PSI the System will turn off and display a fault screen indicating low pressure.

CAUTION: Do not use third party prefilter elements; use only Sea Recovery Prefilter Elements. Third party prefilter elements on the market do not properly fit, the seams fall apart, they will allow by-pass.

WARNING: By-pass of debris through the third party element will extensively damage the High Pressure Pump. By-pass of debris through the third party element will also prematurely foul the R.O. Membrane Element. Use of third party prefilter elements will void any and all Sea Recovery warranty to the High Pressure Pump and the R.O. Membrane Element.

IMPORTANT: Use of third party prefilter elements will void any and all Sea Recovery warranty to the High Pressure Pump and the R.O. Membrane Element.

DO NOT ACCEPT THIRD PARTY PREFILTER ELEMENTS FROM ANY MARINE DEALER. USE ONLY SEA RECOVERY SUPPLIED PREFILTER ELEMENTS. The resulting failure of the system to remain in operation, and or damage to the Sea Recovery System caused by Third Party Prefilter Elements is attributed to improper maintenance and operation, is the liability of the operator and owner, and is not covered by the Sea Recovery warranty.

a. Commercial Prefilter Element Replacement:

To clean or replace the Commercial Prefilter Element:

1. Unscrew the lid locking ring counter clockwise.
2. Remove and discard the used Commercial Prefilter Pleated Cartridge Element from the housing.
3. Thoroughly clean the inside of the bowl. The High Pressure Pump is manufactured to very tight tolerance spacing between moving parts. Any debris entering the Pump will cause extensive and expensive damage to the internal parts. The Sea Recovery Prefilter will stop any debris and protect the High Pressure Pump. Use caution when changing filter elements and do not allow any debris from the prefilter element to enter the outlet port of it's housing.
4. Inspect the O-Ring attached to the lid. Replace if damaged or if the lid leaks water.
5. Wipe the O-Ring with a damp cloth.
6. Sparingly lubricate the O-Ring with O-Ring lubricant.
7. Insert the cleaned or new Sea Recovery Commercial Prefilter Pleated Cartridge Element into the bowl.
8. Replace the lid into the top of the housing.
9. Replace the lid locking ring. **Tighten ONLY two finger tight. Finger or lightly Hand snug to retain the lid in place. Do not use a wrench or other tool to tighten. Do not over tighten. Over tightening causes stress to the bowl and lid lock ring threads leading to cracks, breakage, and difficult disassembly at the next filter change.**
10. Open the Sea Cock Valve, open the air bleed valve located on the lid. Bleed any air from the Commercial Prefilter Housing. After water appears close the air bleed valve. It may be necessary to operate the Booster Pump manually in order to purge the Commercial Prefilter housing of air.

WARNING: For safety reasons ALWAYS purge air from the Commercial Prefilter Housing.

10. Dual Prefilter [13 & 14] Element Replacement:

The Prefilter Pleated Cartridge Element may be cleaned with water spray once or twice. After cleaning the expected life will be reduced in half. Attempts to clean the element more than twice will result in a very short life and will damage the element rendering it useless. Change the element after the first or second cleaning. Clean or replace the element when plugged to the extent that the pressure into the High Pressure Pump is 10 PSI (69 kPa) or less. At slightly below 6 PSI the System will turn off and display a fault screen indicating low pressure.

CAUTION: Do not use third party prefilter elements; use only Sea Recovery Prefilter Elements. Third party prefilter elements on the market do not properly fit, the seams fall apart, they will allow by-pass.

WARNING: By-pass of debris through the third party element will extensively damage the High Pressure Pump. By-pass of debris through the third party element will also prematurely foul the R.O. Membrane Element. Use of third party prefilter elements will void any and all Sea Recovery warranty to the High Pressure Pump and the R.O. Membrane Element.

IMPORTANT: Do not use “string wound” or “fiber” prefilter elements. These type of elements are designed for the Photographic Film Developing industry. When used in sea water, they will plug up rapidly in 1/10th or less the time causing frequent shut down of the system and very frequent changing which will also lead to very high cost of maintenance. Use of String Wound or Fiber type elements will only lead to user frustration and very high maintenance costs. Use of third party prefilter elements will void any and all Sea Recovery warranty to the High Pressure Pump and the R.O. Membrane Element.

DO NOT ACCEPT THIRD PARTY PREFILTER ELEMENTS FROM ANY MARINE DEALER. USE ONLY SEA RECOVERY SUPPLIED PREFILTER ELEMENTS. The resulting failure of the system to remain in operation, and or damage to the Sea Recovery System caused by Third Party Prefilter Elements is attributed to improper maintenance and operation, is the liability of the operator and owner, and is not covered by the Sea Recovery warranty.

a. 10 Inch Dual Prefilter [13 & 14] Element Replacement:

To clean or replace the Prefilter Element:

1. Unscrew the bowl counter clockwise.
2. Remove and discard the used Prefilter Pleated Cartridge Element from the bowl.
3. Remove the O-Ring from the top of the bowl.
4. Thoroughly clean the inside of the bowl. The High Pressure Pump is manufactured to very tight tolerance spacing between moving parts. Any debris entering the Pump will cause extensive and expensive damage to the internal parts. The Sea Recovery Prefilter will stop any debris and protect the High Pressure Pump. Use caution when changing filter elements and do not allow any debris from the prefilter element to enter the outlet port of it's housing.
5. Wipe the O-Ring with a damp cloth.
6. Sparingly lubricate the O-Ring with O-Ring lubricant.
7. Place the O-Ring back onto the bowl.
8. Insert the cleaned or new Sea Recovery 20 micron Prefilter Pleated Cartridge Element into the Prefilter [13] bowl.
9. Screw the bowl on clockwise. **Hand snug to seal the O-Ring; do not use a wrench or other tool to tighten; do not over tighten. Over tightening causes stress to the bowl and lid threads leading to cracks, breakage, and difficult disassembly at the next filter change.**
10. Insert the cleaned or new Sea Recovery 5 micron Prefilter Pleated Cartridge Element into the Prefilter [14] bowl.

11. Screw the bowl on clockwise. **Hand snug to seal the O-Ring; do not use a wrench or other tool to tighten; do not over tighten. Over tightening causes stress to the bowl and lid threads leading to cracks, breakage, and difficult disassembly at the next filter change.**

11. Oil/Water Separator [16] Filter Element Replacement:

The Oil/Water Separator Coalescing Filter Element is not cleanable. Replace the element when plugged to the extent that the pressure into the High Pressure Pump is 10 PSI (69 kPa) or less. At slightly below 6 PSI the System will turn off and display a fault screen indicating low pressure.

CAUTION: Do not use third party oil/water separator coalescing elements; use only Sea Recovery Oil/Water Separator Elements. Third party Oil/Water Separator elements on the market do not properly fit, the seams fall apart, they will allow by-pass.

WARNING: By-pass of debris through the third party element will extensively damage the High Pressure Pump. By-pass of debris through the third party element will also prematurely foul the R.O. Membrane Element. Use of third party filter elements will void any and all Sea Recovery warranty to the High Pressure Pump and the R.O. Membrane Element.

DO NOT ACCEPT THIRD PARTY FILTER ELEMENTS FROM ANY MARINE DEALER. USE ONLY SEA RECOVERY SUPPLIED FILTER ELEMENTS. The resulting failure of the system to remain in operation, and or damage to the Sea Recovery System caused by Third Party Oil/Water Separator Elements is attributed to improper maintenance and operation, is the liability of the operator and owner, and is not covered by the Sea Recovery warranty.

a. Oil/Water Separator Filter Element Replacement:

To replace the Oil/Water Separator Filter Element:

1. Unscrew the lid locking ring counter clockwise.
2. Remove and discard the used Oil/Water Separator Filter Element from the housing.
3. Thoroughly clean the inside of the bowl. The High Pressure Pump is manufactured to very tight tolerance spacing between moving parts. Any debris entering the Pump will cause extensive and expensive damage to the internal parts. The Sea Recovery Prefilter will stop any debris and protect the High Pressure Pump. Use caution when changing filter elements and do not allow any debris from the prefilter element to enter the outlet port of it's housing.
4. Inspect the O-Ring attached to the lid. Replace if damaged or if the lid leaks water.
5. Wipe the O-Ring with a damp cloth.
6. Sparingly lubricate the O-Ring with O-Ring lubricant.
7. Insert the new Sea Recovery Oil/Water Separator Filter Element into the bowl.
8. Replace the lid into the top of the housing.
9. Replace the lid locking ring. **Tighten ONLY two finger tight. Finger or lightly Hand snug to retain the lid in place. Do not use a wrench or other tool to tighten. Do not over tighten. Over tightening causes stress to the bowl and lid lock ring threads leading to cracks, breakage, and difficult disassembly at the next filter change.**
10. Open the Sea Cock Valve, open the air bleed valve located on the lid. Bleed any air from the Oil/Water Separator Filter Housing. After water appears close the air bleed valve. It may be necessary to operate the Booster Pump manually in order to purge the filter housing of air.

WARNING: For safety reasons ALWAYS purge air from the Oil/Water Separator Filter Housing.

12. **T-Connector Pressure Pick-Up [18]:** Replace any hose or tube that is kinked. Disconnect each end of the tube and blow air through the tube to ensure that it is not blocked. Replace if damaged.

13. Low Pressure Manifold [19]: Replace the manifold if damaged.

14. Low Pressure Transducer [20]: The Low Pressure Transducer is not repairable and can not be calibrated. If inoperative check connections at the Transducer and at the Printed Circuit Board to ensure there is no visible corrosion or loose connections.

15. High Pressure Pump and Electric Motor [21]:

a. Electric Motor:

Troubleshoot electric motor failure to ensure that any abnormality from the power, wiring, wiring connections, contactor, or control circuit are not at fault or at cause. If the electric motor has failed, it will require repair. However, depending upon failure, replacement may be more cost effective than repair. If failure of the motor is due to external source, not the motor itself, then correct the cause or else the replacement or repaired motor will fail again.

Failures of the electric motor may be:

- Bearing failure. Bearings are field replaceable.
- Winding failure. Generally caused by low or high power, below or above the specified voltage requirements of the system. This is Not economically repairable.
- Internal centrifugal switch. Generally mechanical failure of the switch. Field replaceable.
- Capacitor failure. Generally caused by low power feeding the motor and or low cycles from the power source. Also caused by rapidly repeating starting and stopping of the motor. Field replaceable.

The Electric Motor is 3 horse power, Totally Enclosed Fan Cooled, 2 pole, dual Cycle, and dual Voltage.

WARNING: The High Pressure Pump MUST rotate in the COUNTER CLOCKWISE DIRECTION ONLY. Rotating the High Pressure Pump in the clockwise direction will cause extensive damage to it. Never operate the High Pressure Pump in the clockwise direction.

WARNING: When switching from Three Phase Generator power to Three Phase Shore power ALWAYS check phases prior to operating the Aqua Whisper II System else Reverse Rotation along with extensive damage to the High Pressure Pump will occur should the power be out of phase.

Problems & Symptoms appearing and caused by the High Pressure Pump or its Electric Motor:

- 1) The **Single Phase** (115 or 230 VAC) Electric Motor “hums”, pulls starting current (locked rotor) amperage, does not rotate, and trips the supply power circuit breaker when attempting to operate the System.

The **Single Phase** Electric Motor is a capacitor start motor. If the motor was started with low voltage, a drop in voltage during starting, and if this was repeated several times in rapid concession the capacitor will short out. Without the aid of a working capacitor the motor will “hum”, pull starting current (locked rotor) amperage, not rotate, and trip the supply power circuit breaker when attempting to operate the System.

Low voltage will also cause the same symptom. Low voltage is caused by an undersized power supply or generator, undersized power lead wires to the System or motor, loose power wire, or connection at the motor or within the power supply line, and “burnt” contacts on the motor starter relay (contactor).

Solutions:

Check wiring size and connections to, from, and in between the Power Supply and the electric motor. Correct wire size or any loose wires.

Check the capacitor on the motor, and replace it if it has shorted out.

Measure voltage at the motor during attempt to start it. If voltage drops more than 10% locate and correct the reason.

Check the motor starter relay, contactor, for “burnt” contacts.

- 2) The **Three Phase** (230 // 380 // 460 VAC) Electric Motor “hums”, pulls starting current (locked rotor) amperage, does not rotate, and trips the supply power circuit breaker when attempting to operate the System.

The **Three Phase** Electric Motor requires all three power lines (all three phases) to be operative else it will “single phase” causing extensive damage to the motor’s internal windings.

Low voltage will also cause the same symptom. Low voltage is caused by an undersized power supply or generator, undersized power lead wires to the System or motor, loose power wire, or connection at the motor or within the power supply line, and “burnt” contacts on the motor starter relay (contactor).

Solutions:

Check wiring size and connections to, from, and in between the Power Supply and the electric motor. Correct wire size or any loose wires.

Measure voltage at the motor during attempt to start it. If voltage drops more than 10% locate and correct the reason. Cross check voltage across all 3 power leads.

Check the motor starter relay, contactor, for “burnt” contacts.

- 3) The Electric Motor makes an unusual “grinding” sound when operated.

Solutions:

Check and replace as necessary the front and rear bearings.

Check to see if the fan is rubbing against the fan guard.

b. High Pressure Pump:

This High Pressure Pump is a Quintiplex Radial Axial Positive Displacement Plunger Pump made of high grade Duplex material specifically designed for sea water Reverse Osmosis applications. This Pump is not commercially available. This pump is specifically manufactured to Sea Recovery specifications.

WARNING: Two similar Pumps are commercially available. One has a higher flow rate and the other has a lower flow rate. Both of these pumps will cause damage to the Sea Recovery System because of excess flow or under flow. The use of any similar pump, not supplied by Sea Recovery, will either cause the Electric Motor to fail, or the R.O. Membrane Element to prematurely foul. USE ONLY SEA RECOVERY SUPPLIED PARTS AND COMPONENTS FOR THE SEA RECOVERY AQUA WHISPER II SYSTEM.

As with all Positive Displacement pumps it must receive a specified minimum amount of water at a positive pressure. A vacuum at the inlet of the pump will cause cavitation and damage. This pump does not use oil, it is self lubricated with the feed water. Internal components are designed for 8,000 hours of continual service in sea water. As with any component exposed to sea water, use is best.

The Pump is manufactured to very tight tolerance spacing between moving parts. Any debris entering the Pump will cause extensive and expensive damage to the internal parts. The Sea Recovery Prefilter will stop any debris and protect the High Pressure Pump. Use caution when changing filter elements and do not allow any debris from the prefilter element to enter the outlet port of it's housing.

The Aqua Whisper II High Pressure Pump is not field repairable. If the Aqua Whisper II High Pressure Pump fails to properly function return it to Sea Recovery, or to a Sea Recovery Authorized Dealer for return to Sea Recovery.

An Aqua Whisper II High Pressure Pump requiring maintenance within the warranty period, and if after examination by Sea Recovery is found to be non-operational due to a warranty failure, will be repaired or replaced with a rebuilt pump at Sea Recovery's option.

An Aqua Whisper II High Pressure Pump requiring maintenance that is not within the warranty period, or is damaged due to non warranty reasons, will be repaired, replaced with a rebuilt pump, or replaced with a new pump depending on the severity of damage and customer's desire.

For repair or replacement, contact Sea Recovery for a Material Return Authorization and shipping instructions.

16. High Pressure Hose [22 & 25]:

The High Pressure Hose has been assembled with crimp fittings by Sea Recovery. The High Pressure Hose is NOT repairable. Should a leak, damage, or failure develop order a replacement hose from Sea Recovery.

17. Reverse Osmosis Membrane and Pressure Vessel Assembly [23 & 24]:

NOTES:

- The Aqua Whisper II Membrane Element is accessible with the Vessel still attached to the frame, provided there is sufficient room to the left and right of the System to remove the R.O. Membrane Element.
- Replace all Brine and Product Water O-Rings attached to the End Plugs within the High Pressure Vessel Assembly each time the Reverse Osmosis Membrane Element is removed or replaced. Ensure these O-Rings are on hand prior to repair.
- R.O. Membrane Elements are only installed and removed from the INLET end of the High Pressure Vessel.

a. Disassembly of the Reverse Osmosis Membrane and Vessel Assembly: (Refer to Exploded Parts View on Section 9 page 39.)

1. Disconnect the High Pressure Hose from each end of the High Pressure Vessel Assembly.
2. Using a 5/16" Allen wrench remove the 3 each Socket Head Cap Screws #10 from the three-piece Segment Rings #8 located at each end of the Pressure Vessel.
3. Push inward on the End Plug #6 & #7 and Remove the three-piece segment ring #8 from one end, repeat for the other end.
4. Remove the Port Retainer #9 from each end.
5. Remove the High Pressure Port #4 & #5 from each end.
6. Remove the product water tube #18 from the product water tube fitting #12.
7. Remove the product water tube fitting #12 and nipple #11 from the end plug.
8. Insert all three of the Socket Head Cap Screws #10 finger tight back into the End Plug #6 & #7. These screws are used as a grip to remove the End Plug.
9. Grasp one or more of the Socket Head Cap Screws with a pair of pliers and pull slowly outward to remove the End Plug. There is some resistance due to the two Brine O-Rings

exerting friction against the Vessel wall. With the End Plug removed from the High Pressure Vessel, the Reverse Osmosis Membrane Element is visible.

10. Remove and discard the brine O-rings from each of the End Plugs #6.
11. Remove and discard the Product Water O-rings from each of the End Plugs #7.
12. Clean the end plugs with a cloth and inspect each for any sign of wear, cracks, or damage.
13. Sparingly, lightly, lubricate NEW Brine O-Rings and new Product Water O-Rings.
14. Place the NEW Product Water O-Rings into the product port inner O-Ring groove in each of the End Plugs.
15. Place the NEW Brine O-Rings onto the outer Brine O-Ring grooves of each of the End Plugs.
16. **CAUTION:** At each end of the Reverse Osmosis Membrane Element is a Product Water Tube approximately $\frac{3}{4}$ " diameter by 1" long. The outside diameter surface of this product water tube is a sealing surface, which isolates the Product Water from the Feed Water. The surface of the Product Water Tube must be scratch free. Never use pliers or other grabbing tools on the Product Water Tube. Do not drop the R.O. Membrane onto a hard surface as the Product Water Tube may be damaged.

With your fingers grasp the Product Water Tube attached to the R.O. Membrane Element from the INLET end of the Pressure Vessel and pull outward. If resistance is met then cup the INLET end of the High Pressure Vessel with one hand and shake downward to dislodge the R.O. Membrane Element. The R.O. Membrane Element may also be pushed from the Outlet end of the vessel towards the Inlet end.

17. Run a rag through the High Pressure Vessel to remove any biological film or debris from the inside of the vessel.

18. A new Sea Recovery R.O. Membrane Element comes complete with a "U" cup Brine Seal #8 at one end of the Element. **This Brine Seal must be positioned at the INLET end of the Pressure Vessel.**

INLET End

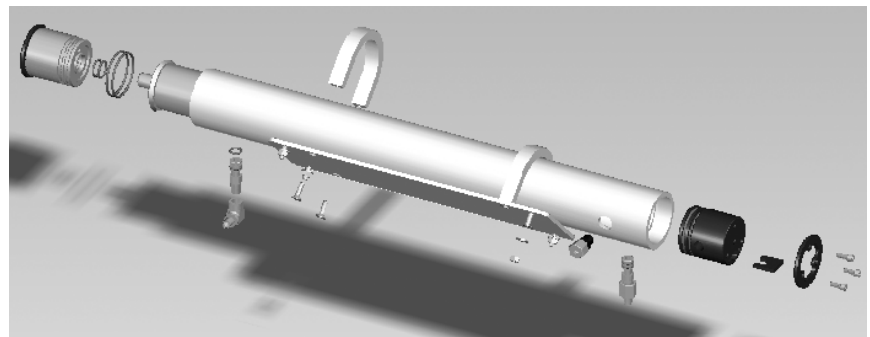
Feed Water Entry End

R.O. Membrane Element Brine Seal End

OUTLET End

Brine Discharge End

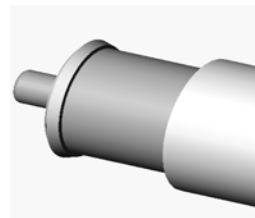
no brine seal on this end



Install a new R.O. Membrane Element with attached "U" cup Brine Seal into the Pressure Vessel. Place the end of the R.O. Membrane Element that DOES NOT have the Brine Seal attached into the INLET end of the Pressure Vessel and slide it into the Pressure Vessel (Insert the down stream end [end without a brine seal] of the Reverse Osmosis Membrane Element into the upstream inlet end of the High Pressure Vessel.)

Inlet end of Pressure Vessel

Brine Seal End of R.O. Membrane Element



19. Slide the Membrane Element into the High Pressure Vessel, past the brine seal, until the Membrane Element product water tube is 4 inches past the end lip of the High Pressure Vessel.

20. Insert the End Plug with new attached O-Rings into the High Pressure Vessel while aligning the High Pressure Port and Product Water Port to the respective holes in the High Pressure Vessel. Continue pushing inward on the End Plug until its exposed end travels just past the Segment Ring Groove in the Pressure Vessel. Ensure that the Ports of the End Plug are aligned with the Port Holes of the High Pressure Vessel.
21. Insert the High Pressure Port Fitting with attached O-Rings into the High Pressure Port.
22. Replace the Port Retainer.
23. Insert the three-piece Segment Ring Set into the Segment Ring Groove of the High Pressure Vessel. Align the Segment Ring Set with the tapped holes in the End Plug for insertion of the three Socket Head Cap Screws. Attach the three Socket Head Cap Screws and tighten.
24. Connect the High Pressure Hoses to the respective fitting on the Pressure Vessel.

18. High Pressure Manifold [26]:

Replace the High Pressure Manifold if it is visibly cracked or broken and leaking. Replace High Pressure fitting O-rings if damaged, worn, or leaking.

19. **High Pressure Transducer [27]:** The Pressure Transducers are not repairable and can not be calibrated. If inoperative check connections at the Transducer and at the Printed Circuit Board to ensure there is no visible corrosion or loose connections.
20. **High Pressure Gauge [28]:** If the Pressure gauge needle does not move; or does not register proper pressure this may be caused by a plugged orifice. The Pressure Gauges have a very small orifice at the bottom of the pipe fitting end. This orifice can become plugged with debris or corrosion. Using a small diameter wire clean the debris from the orifice. Replace the gauge if cleaning of the orifice does not restore functionality.
21. **Back Pressure Regulator Valve [29]:**
 - a. **Valve Packing Leak:**
If the Back Pressure Regulator valve leaks from the valve stem, lightly tighten the packing gland nut located below the valve stem. Should adjustment fail to stop the leak, replace the stem and internal packing or replace the entire valve. Refer to the exploded parts view in Section 10 of this Owner's Manual.
22. **Brine Discharge Flow Meter [30]:**

The electronic flow meters used in the Aqua Whisper II System are not repairable. If the flow meter gives an inaccurate reading calibrate it. Refer to Section 3 of this Owner's Manual.
23. **Brine Discharge T-Connector [31]:** The Brine Discharge T-Connector is not repairable. If it breaks or should a crack develop replace it.
24. **Brine Discharge Connector [32 or 33]:** This 90 degree elbow fitting attaches to the over board thru-hull fitting for connecting the brine discharge hose. If it breaks or cracks replace it.
25. **Thru-Hull Discharge Fitting [34]:** This Owner or Installer supplied Discharge Thru-Hull Fitting is not repairable. If it breaks or cracks replace it.
26. **Product Water T-Collector [35]:** The Product Water T-Collector is not repairable. If it breaks or should a crack develop replace it.
27. **Salinity Probe [36]:** The salinity probe requires cleaning from time to time should debris build up onto the monel probes. Clean the probes once a year.

- a. Unscrew the black tube fitting nut below the probe to disconnect it from the control manifold.
- b. Using a soft bristle brush, scrub the probes to remove any built up debris. Thoroughly dry the probe area.

Salinity Probe Calibration:

Should the salinity reading become inaccurate calibrate it. Refer to Section 3 of this Owner's Manual.

28. Product Water Flow Meter [37]:

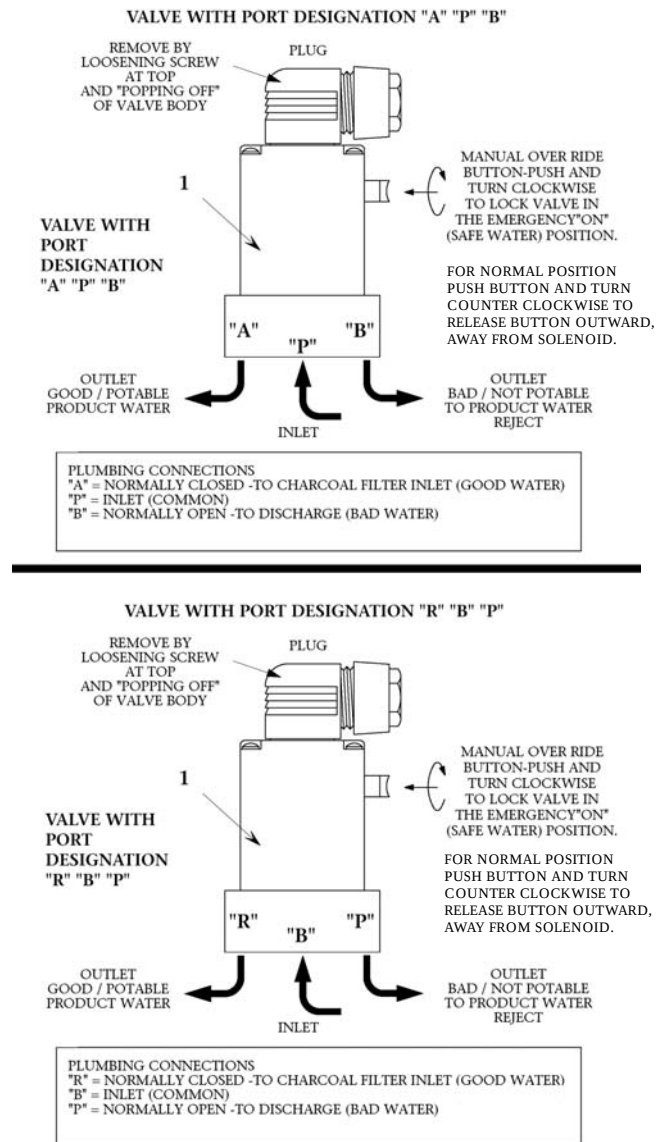
The electronic flow meters used in the Aqua Whisper II System are not repairable. If the flow meter gives an inaccurate reading calibrate it. Refer to Section 3 of this Owner's Manual.

29. 3-way Product Water Diversion Solenoid Valve [38]:

- a. Do not assume that the Valve's Solenoid is not operational. Check it by performing a Function Test as described in Section 3 of this Owner's Manual.
- b. Adjustment of outlet ports: Over tightening of the tube fittings into the valve's body can cause the Diversion Valve internal ports to move out of proper position resulting in internal blockage or bypassing.

Refer to the Illustration at the right and follow the instructions listed below.

- 1) Remove Diversion Valve from the system and adjust ports.
- 2) Position the manual over ride button OUTWARD to normal position by first pushing the button inward and rotating it counter clockwise allowing it to spring outward away from the coil body.
- 3) With your mouth, blow into port "P", air should expel from port "B" which is the "normally open" or "bad water" port.
- 4) If it is extremely difficult to expel air from port "B" or if no air expels from port "B", then port "B" requires adjustment.



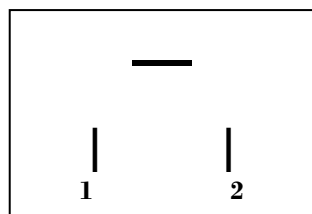
- 5) Again blow into port “P” while plugging port “B” with a finger tip. No air should expel from port “A”.
- 6) If air expels from port “A”, then port “A” requires adjustment.
- 7) Position the manual over ride button INWARD to manual over ride position by pushing the button inward and rotating it clockwise allowing it to lock inward close to the coil body.
- 8) With your mouth, blow into port “P”, air should expel from port “A” which is the “normally closed” or “good water” port.
- 9) If it is extremely difficult to expel air from port “A” or if no air expels from port “A”, then port “A” requires adjustment.
- 10) Again blow into port “P” while plugging port “A” with a fingertip. No air should expel from port “B”.
- 11) If air expels from port “B”, then port “B” requires adjustment.

b. Solenoid Valve Coil Check:

- 1) The 3-way Product Diversion Valve Solenoid operates from 12 VDC. When the “System OK” screen appears, and the CONTROL STATUS LED “DV” is illuminated, the Valve’s solenoid receives 12 VDC.

To check the condition of the Diversion Valve solenoid coil:

- a) While System is operating and producing potable water as indicated by the System OK screen, and confirmed by the CONTROL STATUS “DV” LED illuminated, using a voltmeter set to DC, check the voltage at the din connector terminals at the top of the 3-Way Diversion Valve’s solenoid..
- b) If 12 VDC is present at the din connector terminals then the control circuit is operating normally, but the 3-way Diversion Valve Coil may be shorted or open. Check the solenoid coil continuity.
- c) This check can only be performed with the solenoid electrically disconnected from the Control Board. Remove the Din Connector from the solenoid. Using an Ohm meter measure the continuity of the solenoid coil as shown below.



Measure the DC resistance between pins 1 & 2.
Proper resistance reading is approx. 12 to 15 Ω .

- d) If an open circuit exists, or if the resistance is much greater than or less than 12 to 15 Ω , then replace the solenoid coil or the entire valve.
- e) If 12 VDC is not present at the din connector terminals, then the cable connections may be loose, the cable may be broken, or the control circuit may be inoperable. Check these components.
- f) Check for 12 VDC at the connection points of the Diversion Valve Solenoid Coil on the Control Printed Circuit Board.

- g) If 12 VDC is present while system is operating and while the “System OK” Screen appears and the CONTROL STATUS LED “DV” is illuminated, then the Diversion Valve cable is loose at one of the connections or the cable is defective.
- h) If there is no voltage present while system is operating and while the “System OK” Screen appears and the CONTROL STATUS LED “DV” is illuminated, then troubleshoot the Control Printed Circuit Board.

30. Charcoal Filter [39]: A sulfurous (rotten eggs) odor from the product water requires the replacement of the Charcoal Element. Otherwise, the Charcoal Element should be replaced every 3 to 4 months. It is not cleanable.

CAUTION: Do not use third party charcoal or carbon filter elements; use only Sea Recovery Charcoal Filter Elements. Many third party Charcoal Filter Elements on the market do not properly fit, the seams fall apart, and they will allow by-pass.

WARNING: Many third party Charcoal and Carbon Filter Elements on the market are designed for a very low flow rate and will cause extensive and expensive damage to the Sea Recovery System resulting from several hundred pounds of pressure build up on the product water line. Excessive pressure resulting from third party Charcoal or Carbon Filter Elements will damage: R.O. Membrane Element, Product Water Flow Meter, 3-Way Product Water Diversion Valve, Charcoal Filter Housing, and the Product Water Line.

DO NOT ACCEPT THIRD PARTY CHARCOAL FILTER ELEMENTS FROM ANY MARINE DEALER. USE ONLY SEA RECOVERY SUPPLIED CHARCOAL FILTER ELEMENTS. The resulting failure of the system to remain in operation, and or damage to the Sea Recovery System caused by Third Party Charcoal or Carbon Filter Elements is attributed to improper maintenance and operation, is the liability of the operator and owner, and is not covered by the Sea Recovery warranty.

To replace the Charcoal Filter Element:

1. Unscrew the bowl counter clockwise.
2. Remove the Charcoal Filter Element from the bowl.
3. Remove the O-Ring from the top of the bowl and take care to not damage it.
4. Replace the Charcoal Filter Element with a new Sea Recovery element.
5. Wipe the O-Ring with a damp cloth.
6. Sparingly lubricate the O-Ring lightly with O-Ring lubricant.
7. Place the O-Ring back onto the bowl.
8. Insert the new, Sea Recovery Charcoal Filter Element into the bowl.
9. Screw the bowl on clockwise.
10. Hand snug to seal the O-Ring, do not use a wrench or other tool to tighten, do not over tighten. Over tightening causes stress to the lid and bowl threads resulting in damage, breakage, or cracks and subsequent removal difficult.

31. pH Neutralizing Filter [40]: The pH Neutralizing cartridge will require replacement when the calcium carbonate within the cartridge has dissolved.

CAUTION: Do not use third party pH Neutralizing Filter Elements or Cartridges; use only Sea Recovery pH Neutralizing Filter Cartridges. Sea Recovery’s pH Neutralizing Cartridge is specifically modified to allow the high volume of product water flow through it with no back pressure build up.

WARNING: Third party pH Neutralizing Cartridges and Elements on the market are designed for a very low flow rate and will cause extensive and expensive damage to the Sea Recovery System resulting from several hundred pounds of pressure build up on the product water line. Excessive pressure resulting from third party pH Neutralizing Cartridges or Elements will damage: R.O. Membrane Element, Product Water Flow Meter, 3-Way Product Water Diversion Valve, Charcoal Filter Housing, pH Neutralizing Housing, and the Product Water Line.

DO NOT ACCEPT THIRD PARTY pH NEUTRALIZING FILTER ELEMENTS OR CARTRIDGES FROM ANY MARINE DEALER. USE ONLY SEA RECOVERY SUPPLIED pH NEUTRALIZING FILTER CARTRIDGES. The resulting failure of the system to remain in operation, and or damage to the Sea Recovery System caused by Third Party pH Neutralizing Elements or Cartridges is attributed to improper maintenance and operation, is the liability of the operator and owner, and is not covered by the Sea Recovery warranty.

To replace the pH Neutralizing Cartridge:

1. Unscrew the bowl counter clockwise.
2. Remove the pH Neutralizing Cartridge from the bowl.
3. Remove the O-Ring from the top of the bowl and take care to not damage it.
4. Replace the pH Neutralizing Cartridge with a new Sea Recovery Cartridge.
5. Wipe the O-Ring with a damp cloth.
6. Sparingly lubricate the O-Ring lightly with O-Ring lubricant.
7. Place the O-Ring back onto the bowl.
8. Insert the new, Sea Recovery pH Neutralizing Cartridge into the bowl.
9. Screw the bowl on clockwise.
10. Hand snug to seal the O-Ring, do not use a wrench or other tool to tighten, do not over tighten. Over tightening causes stress to the lid and bowl threads resulting in damage, breakage, or cracks and subsequent removal difficult.

- 32. Ultraviolet Sterilizer [41]:** The UV Sterilizer lamp emits a low frequency form of light. This light degrades and loses intensity and ability to sterilize biological matter over approximately 8,000 hours of use. Therefore, the lamp may remain lit, but requires replacement every 4000-8000 hrs. Refer to UV Maintenance detail on Page 27 in this section.

CAUTION: Make sure that system power is turned off before beginning sterilizer maintenance. Ultra Violet light is harmful to eyes and skin.

WARNING: High Voltage is generated from the Ultra Violet power supply and applied to the Ultra Violet Lamp.

Lamp Replacement:

- a. Remove the four screws on the ballast box and remove lid.
- b. Remove the rubber boot and carefully pull lamp out of the quartz sleeve.
- c. Replace the lamp. During lamp replacement clean the quartz sleeve as well. The quartz sleeve should be crystal clear and if it has discolored, it must be cleaned or replaced.

Quartz Sleeve Cleaning:

- a. Remove the four screws on the ballast box and remove lid.
- b. Remove the rubber boot and carefully pull lamp out of the quartz sleeve.
- c. Unscrew and remove the two compression nuts (ballst box and view port).
- d. Remove the O-ring on the view port side only.
- e. With care pull the quartz sleeve out from the ballast box side.
- f. Clean the quartz tube with water and a bottlebrush without moving the O-ring . Dry with a soft cloth. Handle the quartz sleeve carefully.

Reassembly:

- a. Replace old O-rings with new O-rings.
- b. Insert the quartz sleeve (close-end first) through the ballast box passthru until O-ring contact passthru. Screw on the ballast box compression nut. Insert view port O-ring and screw on view port compression nut..
- c. Attach a new U.V. Lamp into the plug.
- d. Slide the lamp into the Quartz Sleeve and install rubber boot over the compression nut.
- e. Reassemble the ballast box with the four screws.

- 33. Fresh Water Flush Carbon Filter Element [48]:** The Carbon Filter Element in the Fresh Water Flush should be replaced every 3 months.

The Fresh Water Flush will automatically flush the system with Fresh Water every 7 days. The duration of the flush cycle will be 90 seconds for a system connected to 60 Hz power and to 120 seconds for systems connected to 50 Hz power.

CAUTION: Do not use third party charcoal or carbon filter elements; use only Sea Recovery Carbon Filter Elements. Many third party Charcoal and Carbon Filter Elements on the market do not properly fit, the seams fall apart, and they will allow by-pass.

WARNING: Many third party Charcoal and Carbon Filter Elements on the market are designed for a very low flow rate and will cause the Sea Recovery Aqua Whisper II Fresh Water Flush Cycle to abort due to lack of sufficient fresh water flow to the High Pressure Pump.

DO NOT ACCEPT THIRD PARTY CHARCOAL OR CARBON FILTER ELEMENTS FROM ANY MARINE DEALER. USE ONLY SEA RECOVERY SUPPLIED CARBON FILTER ELEMENTS. The resulting failure of the Fresh Water Flush Cycle, and or damage to the Sea Recovery System caused by Third Party Charcoal or Carbon Filter Elements is attributed to improper maintenance and operation, is the liability of the operator and owner, and is not covered by the Sea Recovery warranty.

To replace the Carbon Filter Element:

1. Unscrew the bowl counter clockwise.
2. Remove the Carbon Filter Element from the bowl.
3. Remove the O-Ring from the top of the bowl and take care to not damage it.
4. Replace the Carbon Filter Element with a new Sea Recovery element.
5. Wipe the O-Ring with a damp cloth.
6. Sparingly lubricate the O-Ring lightly with O-Ring lubricant.
7. Place the O-Ring back onto the bowl.
8. Insert the new, Sea Recovery Carbon Filter Element into the bowl.
9. Screw the bowl on clockwise.
10. Hand snug to seal the O-Ring, do not use a wrench or other tool to tighten, do not over tighten. Over tightening causes stress to the lid and bowl threads resulting in damage, breakage, or cracks and subsequent removal difficult.

UV STERILIZER MAINTENANCE

Follow the preventative maintenance procedures to maximize the efficiency, reliable, and longevity of the UV unit.

Refer to Table 1 Periodic Maintenance Table for recommended maintenance schedule.

- **WARNING!** The most important consideration is operator safety. The following directly relates to operator safety. All personnel must review and comply with the following.

 **CAUTION!** Operators must observe Safety Requirements at all times

Safety Requirements

The following safety requirements are mandatory. Failure to comply can cause injuries and/or damages to the UV unit.

1. Never look directly at the blue ultraviolet lamp when it's "ON". Never operate the ultraviolet lamp outside the stainless steel cabinet. UV light exposure can severely burn and damage eyes and skin.
2. Properly ground the UV unit. Failure to properly ground the UN unit can cause severe electrical shock hazard.
3. Provide watertight piping and compression nut seals. Failure to provide watertight seals can cause damage to electrical components or cause electrical shock hazard.
4. Disconnect power before servicing the UV unit. The UV lamp and electrical components operate with high voltage electrical power. Do not attempt to service the UV unit without first disconnecting the power source. Shut off the source of power at the main panel breaker and use appropriate tag-out or lock-out procedures to prevent accidental power-up.
5. Only qualified service personnel should perform services to the UV unit.
6. Remove pressure before servicing the UV unit.
7. Never operate the UV unit for more than 30 minutes without water flow. Elevated water temperature can damage the UV unit.
8. Do not exceed 3 "Start/Stop" cycles per 24-hour period. Exceeding 3 cycles will subjected the lamp filament to excessive thermal stress leading to premature failure of the UV lamp.

Unit Maintenance

The exterior surfaces of the UV unit should be kept clean and dry. In most cases it may be necessary to clean the exterior of the unit once a month. Use soft cloth and soapy water, or any commercial stainless steel cleaner.

Interior of the ballast box should be inspected for debris. Any debris should be removed using vacuum.

Quartz Sleeve

Debris and other matter in the water will settle onto the quartz sleeve and eventually block the ultraviolet rays from penetrating into the water. It is necessary to determine a cleaning schedule for the quartz sleeve. The frequency will depend on the specific type of water being processed and the duty cycle of the unit.

Inspect the quartz sleeve 30 days after initial installation to assess the amount of contamination collected over the 30-day period. Use the finding to determine a reasonable schedule and frequency for periodic cleaning.

Clean-In-Place (CIP) cleaning is sometimes effective in removing debris from the quartz sleeve. Conduct a CIP cleaning test to determine its effectiveness. If CIP cleaning is not effective, then a manual cleaning or replacement is required.

When the quartz sleeve is due for cleaning, use the following procedures.

1. Turn off the water source to the UV unit.
2. Disconnect the power source to the UV unit.
3. Drain the UV treatment chamber.

4. Remove the ballast box cover.
5. Remove rubber boot and carefully pull out the UV lamp through the compression nut pass-thru.
6. Use a channel lock to remove the compression nuts.
7. Remove the Quartz Sleeve carefully.
8. Wash the Quartz Sleeve with mild soapy water and rinse in clean hot water.

If dirt remains after rinsing, the quartz sleeve should be replaced. Contact your local CSR to order a replacement.

NOTE! Failure to perform quartz sleeve maintenance may reduce the efficiency of the UV light to adequately treat water in the treatment chamber.

Checking for Leaks

Visual inspect the UV unit exterior for signs of leakage. The cause of any leakage must be located and repaired.

If a leakage is detected, perform the following.

1. Shut off all electrical power. Shut off the source of power at the main panel breaker and use appropriate tag-out procedures to prevent accidental power-up.
2. Depressurize the UV unit.
3. Remove ballast box cover and remove the rubber boot.
4. Locate which end of the quartz sleeve is leaking.

Repairing Leaks

If both ends of the quartz sleeve are leaking, perform the following on both ends.

1. Use a channel lock to loosen and remove the compression nut.
2. Remove the quartz sleeve O-ring without pulling the quartz sleeve out.
3. Lubricate the quartz sleeve tip with clean water and place new O-ring. Ensure the O-ring has all-round contact with the cylinder pass-thru.
4. Replace and tighten the compression nut.
5. Refill the treatment chamber and verify a leak-free condition.

Measuring Performance

Every UV unit must be tested periodically to verify its efficiency. Regardless of the intended application or any optional equipment provided with the UV unit, the most accurate procedure is the Post-UV Analysis. The Post-UV Test must be performed in accordance with standard testing methods, see Section 0 below.

Verifying Lamp Operation

The UV lamp is “ON” when the blue light is emitting thru the viewport.

Obtaining Water Samples

Vast majority of unsatisfactory Post-UV Test results are directly related to the improper sample-taking techniques. Although several commercial sample collection apparatuses are available, the proper manufacturer's sample procedures must be followed.

NOTE! Sea Recovery recommends a valve with a discharge orifice not to exceed ¼" (6mm).

Sampling Procedure

Use sterile sample bottles obtained from reliable laboratory that has been autoclaved and kept in plastic bag for this procedure.

1. Use temporary tube to direct water from UV unit to container or drainage.
2. Pressurize the UV unit and flush unit with sample valve fully opened for 3.5 minutes. After flushing for 3.5 minutes, reduce valve opening to 50% and flush for 3 minutes.
3. Open the sample bottle and keep the inside of the cap facing down.
4. Fill the sample bottle and avoid breathing directly into the bottle or touching the inside of the bottle, cap, or neck.
5. Immediately cover and secure the cap after filling the sample bottle.
6. Label the sample bottle and place in a clean plastic bag.
7. Take sample bottle to the laboratory for plating as soon as possible.

NOTE! Sample processing must begin within 3 hours after sample collection and must comply with accepted standard methods.

Periodic Maintenance Table

The table below represents the recommended Periodic Maintenance (PM) for the SP Series UV Unit.

Description	Init.	Daily	Mn	Ann.	Other
Quartz Sleeve Cleaning	x				
Quartz Sleeve Replacement*	x				
Operating Condition	x				
Unit Cleaning	x		x		
Leak Inspection	x	x	x		
UV Lamp Inspection	x	x	x		
UV Lamp Replacement-SP-1				x	4,400 hrs
UV Lamp Replacement-SP-2				x	8,000 hrs

Table 1 Periodic Maintenance Table

* Quartz Sleeve replacement will occur more frequently for systems operating with continuous high flow rate or low water quality water, and less frequently for systems operating with low flow rate or high water quality.

Replacement Parts List

Part	Part No.
Stainless Steel Cylinder	40000300CV
UV Lamp	40000100CV
Quartz Sleeve	40000400CV
Compression Nut	40001400CV
O-ring	40001300CV

Table 2 Replacement Parts List

UV Unit Specifications

Type	12 VDC Operating UV Sterilizer for 2 gallon per minute of water flow
Ballast Type	Solid State
Bulb Type	16 Watts Single Ended
Bulb Life	8000 Hours minimum
Materials	Body: SS304; Ballast Box: PVC
Power Cord	4 meters 2 conductors
Weight	500g Body

Table 3 General Specifications

Temperature Range	Operating: +3°C to +40°C; Dry Storage: -25°C to +85°C
-------------------	---

Table 4 Environmental Specifications

Operating Voltage Range	10.56V minimum; 16.50V maximum
Current	1.45A maximum @ Standard Test Voltage
UV Dosage	22mJ/cm ² @ 254nm

Table 5 Electrical Specifications

Operating Pressure	50psi
Inlet/Outlet Ports	1/4" NPT Female
Flow Rate	2 gpm
Disinfection Rate	99%

Table 6 Mechanical Specifications

Section 8

Electrical Information

Electrical Requirements

Electrical Specifications

Electrical Wire Sizes

Electrical Diagrams

Notes:

[illegible]

A. ELECTRICAL REQUIREMENTS & INFORMATION:

CAUTION, DO NOT PERFORM INSTALLATION UNLESS:

1. The System Feed Water Sea Cock Valve [2] is closed.
2. The system main electrical disconnect switch is switched "OFF", **LOCKED**, and **TAGGED**.

WARNING: ELECTRICAL SHOCK HAZARD. A Volt / Ohm Meter will be necessary. The following installation procedures expose the installer to High Voltage and electrical shock hazard. Only attempt this if you are a qualified electrician and only if surrounding conditions are safe.

CAUTION: Always allow slack in electrical cables. Allow the cable to enter or leave from the strain relief in a straight manner for several inches to ensure proper connection, to relieve stress to the cable and fitting, and to allow ease of detachment and reattachment for maintenance or replacement. If electrical cables are pulled tight causing them to bend at the strain relief, they will pull out of the strain relief causing a dangerous electrical shock condition, the wire may break, and the strain relief will lose its water-tight integrity.

- 1. Amperage Notes:** The Electric Motors within the Aqua Whisper II systems start in series with time delay between each motor starting after the Touch Screen “Start” Switch is pressed. First, the Booster Pump starts, then the main High Pressure Pump Electric Motor starts. Alternatively, the Booster Pump and High Pressure Pump may be started manually by accessing the manual operation mode from the Touch Screen.

During start up, the current of the Booster Pump Electric Motor surges to “Locked Rotor” amperage for a fraction of a second after which the current drops to normal running load. Then the High Pressure Pump Electric Motor starts and surges to “locked Rotor” amperage for a fraction of a second after which the current drops to normal running load.

Therefore, the **maximum surge current** equals the Booster Pump Electric Motor normal running amperage plus the High Pressure Pump Electric Motor starting amperage. **Normal operational amperage** equals the normal operating amperage of the Booster Pump Electric Motor plus the normal operating amperage of the High Pressure Pump Electric Motor.

- 2. POWER SOURCE REQUIREMENTS:** Check line voltage and frequency to ensure that it agrees with system set voltage, cycles, and phase. Grounding and circuit protection should be done in accordance with National Electrical Code. See connection diagram on nameplate of motor or refer to the diagrams within this manual.

Voltage	HZ (AC)	Min. HZ	Max. HZ	Min. Voltage	Max. Voltage
AC Systems					
120 VAC	60 HZ	58 Hz	62 Hz	108 VAC	132 VAC
230 VAC	60 HZ	58 Hz	62 Hz	207 VAC	253 VAC
100 VAC	50 HZ	48 Hz	52 Hz	90 VAC	110 VAC
220 VAC	50 HZ	48 Hz	52 Hz	198 VAC	242 VAC

3. MOTOR ROTATION:

Refer to Booster Pump and High Pressure Pump markings to determine proper rotation.

Three Phase Systems: Ensure proper rotation by jogging each motor from the manual operation mode.

B. ELECTRICAL MOTOR SPECIFICATIONS:

(H.P. = Horse Power; RPM = Revolutions Per Minute; FLA = Full Load Amperes; LRA = Locked Rotor Amperes @ Start Up)

ALTERNATING CURRENT SYSTEMS:**Single Phase Alternating Current:**

VAC	Hz	High Pressure Pump Motor				Booster Pump Motor			
		H.P	RPM	FLA	LRA	H.P	RPM	FLA	LRA
110	50	3	2850	23	89	.5	2850	7.4	20
220	50	3	2850	11.5	44	.5	2850	3.7	10
115	60	3	3450	25.4	86	.5	3450	9.4	20
230	60	3	3450	12.7	43	.5	3450	4.7	10

Three Phase Alternating Current:

VAC	Hz	High Pressure Pump Motor				Booster Pump Motor			
		H.P	RPM	FLA	LRA	H.P	RPM	FLA	LRA
220	50	2.5	2850	7.9	24.9	.5	2850	2.5	8.2
380	50	2.5	2850	4.6	14.4	.5	2850	1.5	4.7
230	60	3	3450	7.6	23.8	.5	3450	2.4	7.9
460	60	3	3450	3.8	11.9	.5	3450	1.2	3.9

C. RECOMMENDED CIRCUIT BREAKER SUPPLYING POWER TO SYSTEM AMPERAGE RATING:

Operating AC Voltage	Phase	Recommended Circuit Breaker
110 - 115 VAC	Single	50 Ampere
220 - 230 VAC	Single	25 Ampere
220 VAC	Three	15 Ampere
380 VAC	Three	10 Ampere
460 VAC	Three	10 Ampere

D. RECOMMENDED POWER WIRE SIZE TO Aqua Whisper II SYSTEM and Pump Motors:**RECOMMENDED MINIMUM POWER WIRE SIZE TO Aqua Whisper II SYSTEM:**

Operating Voltage	Phase	Maximum Load	Recommended Minimum Wire Size for Length of run		
			10 Ft / 3 meter	25 Ft / 8 meter	50 Ft / 15 meter
110-115 VAC	Single	34.8 Ampere	10 AWG / 6 mm ²	8 AWG / 10 mm ²	8 AWG / 10 mm ²
220-230 VAC	Single	17.4 Ampere	12 AWG / 4 mm ²	12 AWG / 4 mm ²	12 AWG / 4 mm ²
220-230 VAC	Three	10.4 Ampere	14 AWG / 2.5 mm ²	14 AWG / 2.5 mm ²	14 AWG / 2.5 mm ²
380 VAC	Three	6.1 Ampere	14 AWG / 2.5 mm ²	14 AWG / 2.5 mm ²	14 AWG / 2.5 mm ²
460 VAC	Three	5 Ampere	14 AWG / 2.5 mm ²	14 AWG / 2.5 mm ²	14 AWG / 2.5 mm ²

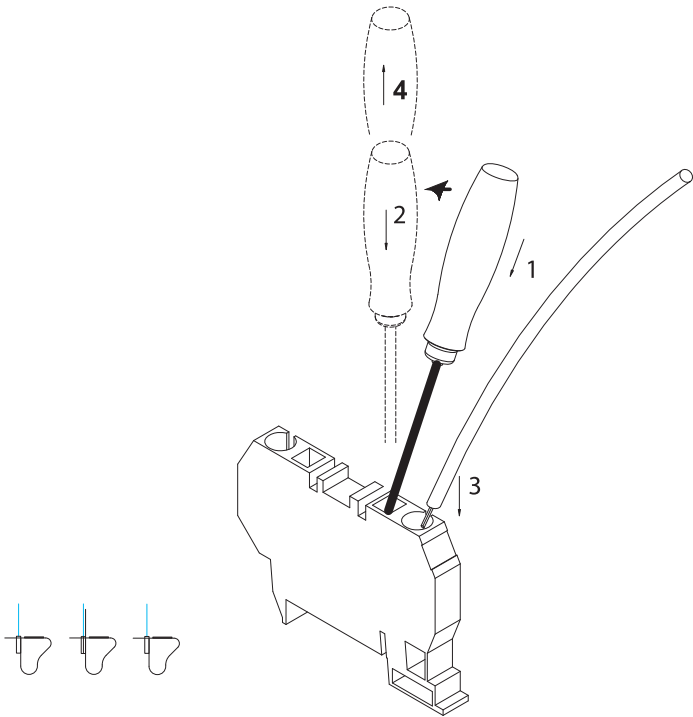
RECOMMENDED MINIMUM POWER WIRE SIZE TO Aqua Whisper II BOOSTER PUMP:

Operating Voltage	Phase	Maximum Load	Recommended Minimum Wire Size for Length of run		
			10 Ft / 3 meter	25 Ft / 8 meter	50 Ft / 15 meter
110-115 VAC	Single	9.4 Ampere	14 AWG / 2.5 mm ²	14 AWG / 2.5 mm ²	14 AWG / 2.5 mm ²
220-230 VAC	Single	4.7 Ampere	14 AWG / 2.5 mm ²	14 AWG / 2.5 mm ²	14 AWG / 2.5 mm ²
220-230 VAC	Three	2.5 Ampere	16 AWG / 1.5 mm ²	16 AWG / 1.5 mm ²	16 AWG / 1.5 mm ²
380 VAC	Three	1.5 Ampere	16 AWG / 1.5 mm ²	16 AWG / 1.5 mm ²	16 AWG / 1.5 mm ²
460 VAC	Three	1.2 Ampere	16 AWG / 1.5 mm ²	16 AWG / 1.5 mm ²	16 AWG / 1.5 mm ²

RECOMMENDED MINIMUM POWER WIRE SIZE TO Aqua Whisper II HIGH PRESSURE PUMP:

Operating Voltage	Phase	Maximum Load	Recommended Minimum Wire Size for Length of run		
			10 Ft / 3 meter	25 Ft / 8 meter	50 Ft / 15 meter
110-115 VAC	Single	25.5 Ampere	12 AWG / 4 mm ²	10 AWG / 6 mm ²	10 AWG / 6 mm ²
220-230 VAC	Single	12.7 Ampere	14 AWG / 2.5 mm ²	12 AWG / 4 mm ²	12 AWG / 4 mm ²
220-230 VAC	Three	7.9 Ampere	14 AWG / 2.5 mm ²	14 AWG / 2.5 mm ²	14 AWG / 2.5 mm ²
380 VAC	Three	4.6 Ampere	14 AWG / 2.5 mm ²	14 AWG / 2.5 mm ²	14 AWG / 2.5 mm ²
460 VAC	Three	3.8 Ampere	14 AWG / 2.5 mm ²	14 AWG / 2.5 mm ²	14 AWG / 2.5 mm ²

E. Illustrated method of Wire Insertion into terminal strips:

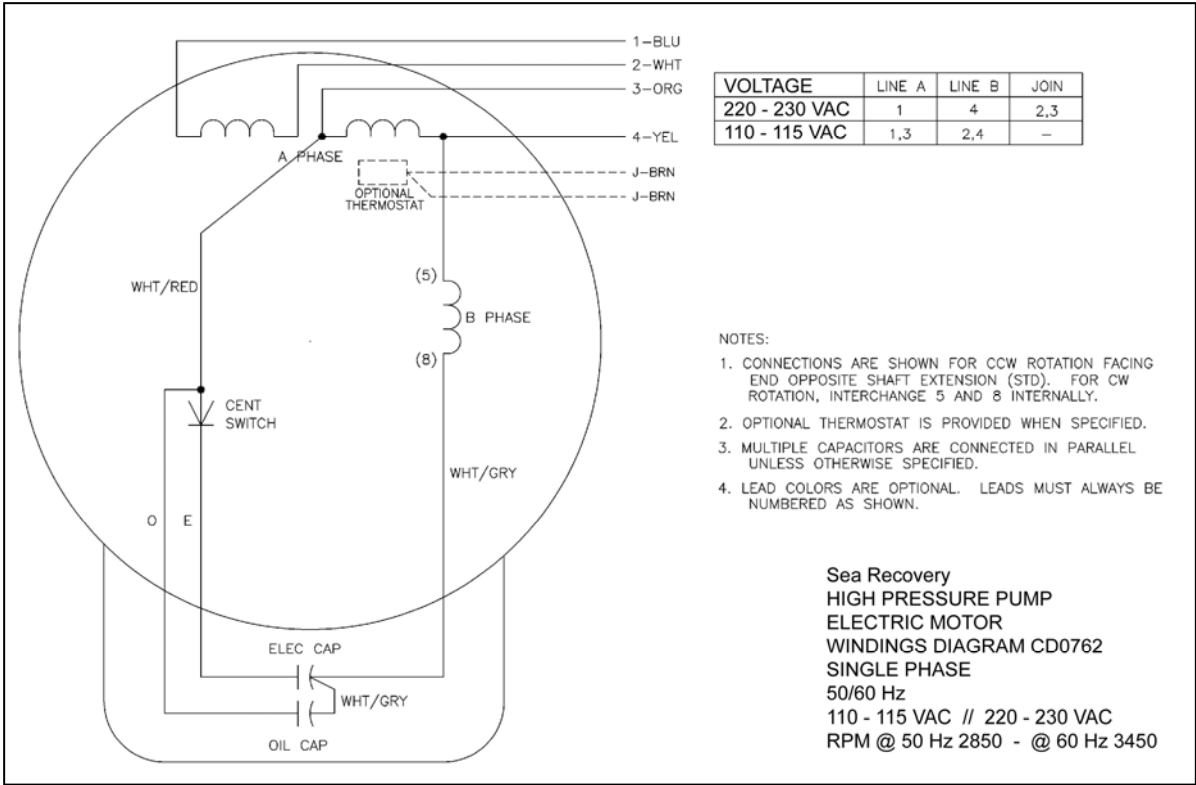
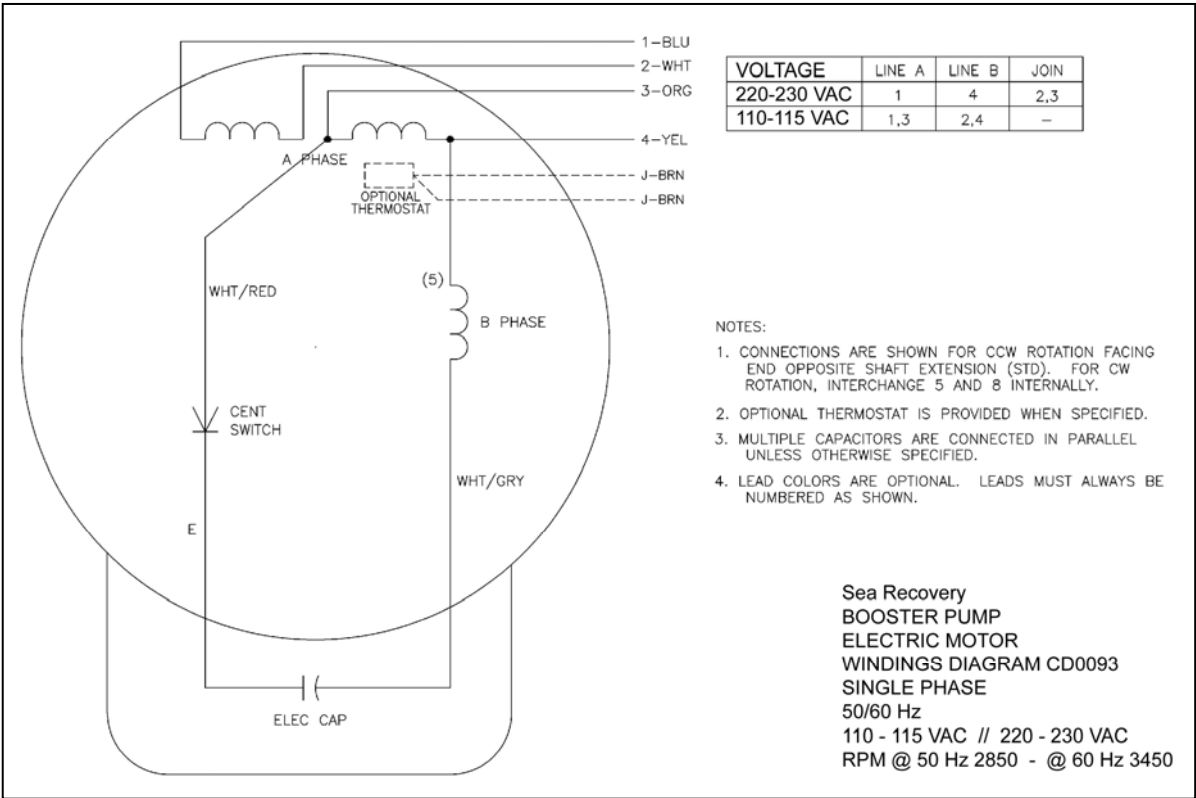


F. Wire Size Cross Reference American Wire Gauge (AWG) vs. Metric Wire Sizes

AWG	Diameter Inch	Square Inch (In²)	Diameter Millimeters	Square Millimeters (mm²)
0000	0.4600	0.1661	11.6840	107.1649
000	0.4096	0.1317	10.4038	84.9683
00	0.3648	0.1045	9.2659	67.3980
0	0.3249	0.0829	8.2525	53.4609
1	0.2893	0.0657	7.3482	42.3871
2	0.2576	0.0521	6.5430	33.6069
3	0.2294	0.0413	5.8268	26.6516
4	0.2043	0.0328	5.1892	21.1385
6	0.1620	0.0206	4.1148	13.2913
8	0.1285	0.0130	3.2639	8.3626
10	0.1019	0.0082	2.5883	5.2588
12	0.0808	0.0051	2.0523	3.3064
14	0.0641	0.0032	1.6281	2.0809
16	0.0508	0.0020	1.2903	1.3070
18	0.0403	0.0013	1.0236	0.8225
20	0.0320	0.0008	0.8128	0.5186
22	0.0254	0.0005	0.6452	0.3267

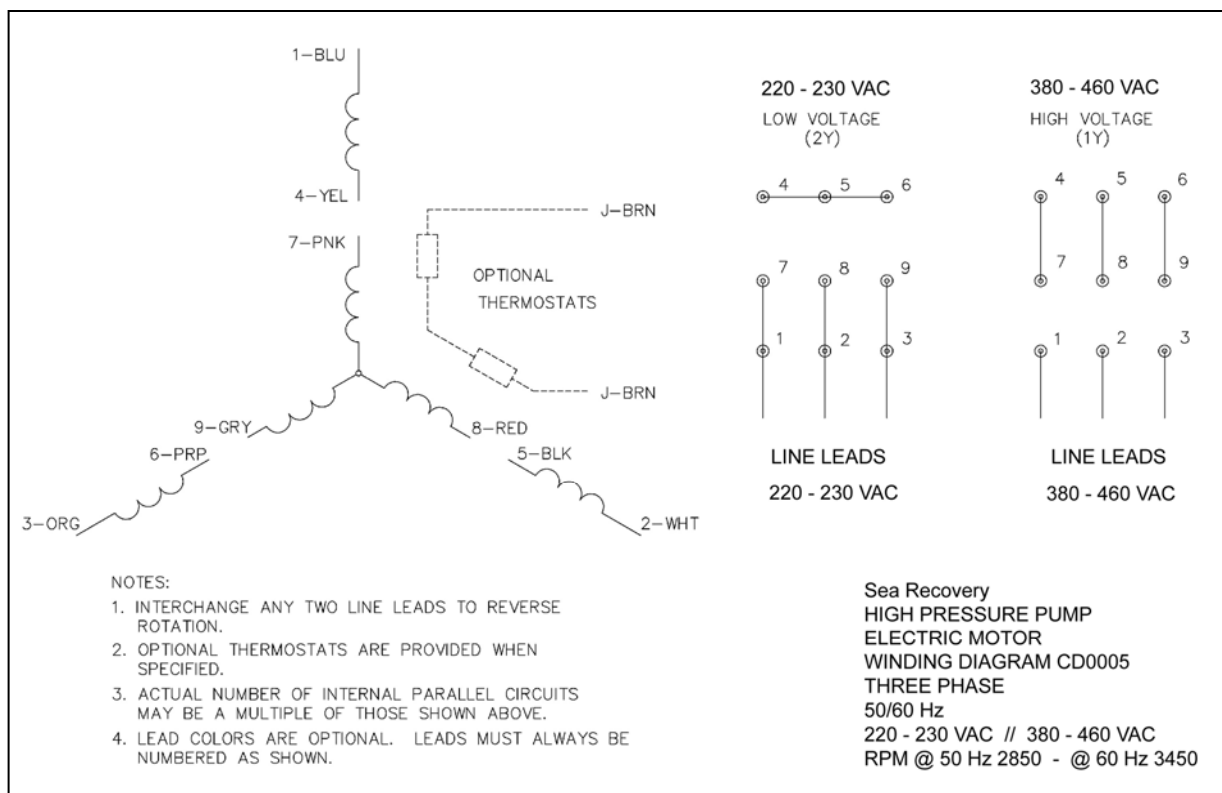
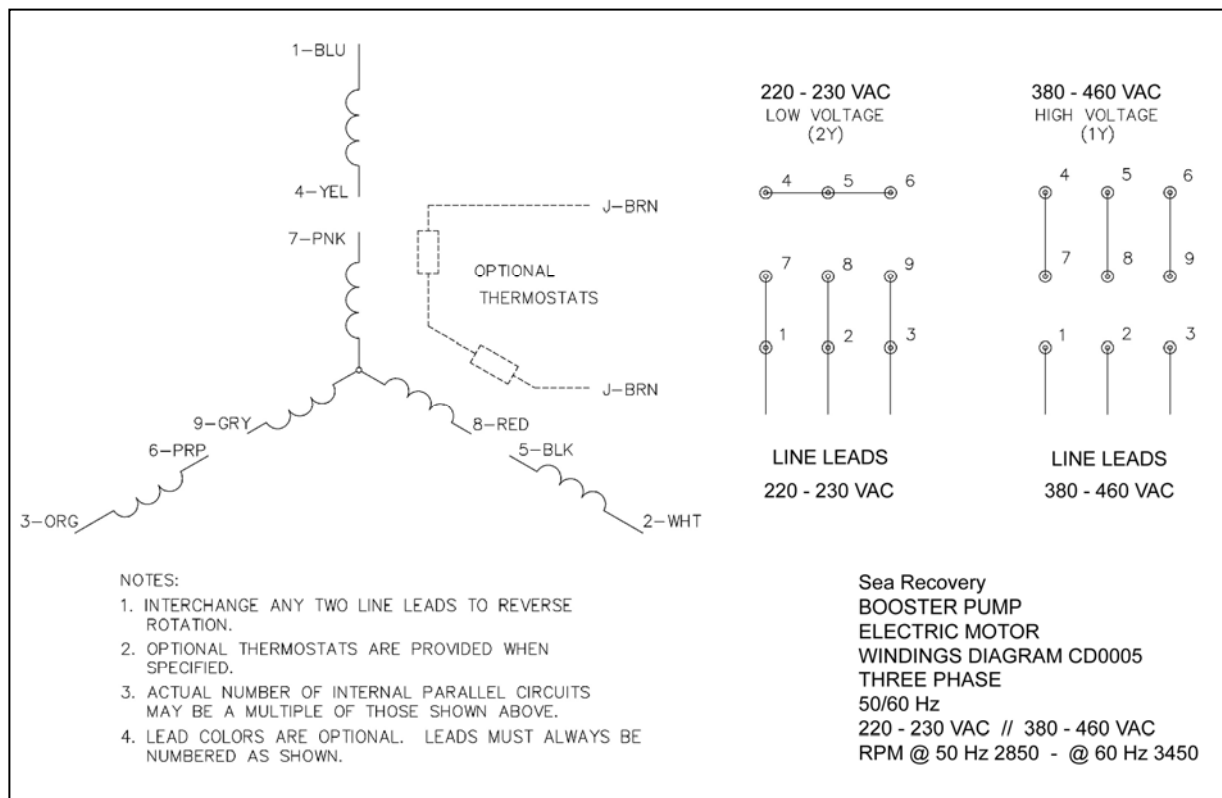
American Wire Gauge AWG	dia inch	sq. inch	Metric Wire Gauge dia mm	sq mm	Metric Wire Size mm²
0000	0.4600	0.1661	11.6840	107.1649	100
000	0.4096	0.1317	10.4038	84.9683	85
00	0.3648	0.1045	9.2659	67.3980	65
0	0.3249	0.0829	8.2525	53.4609	50
1	0.2893	0.0657	7.3482	42.3871	40
2	0.2576	0.0521	6.5430	33.6069	32
3	0.2294	0.0413	5.8268	26.6516	32
4	0.2043	0.0328	5.1892	21.1385	19
6	0.1620	0.0206	4.1148	13.2913	13
8	0.1285	0.0130	3.2639	8.3626	8
10	0.1019	0.0082	2.5883	5.2588	5
12	0.0808	0.0051	2.0523	3.3064	3
14	0.0641	0.0032	1.6281	2.0809	2
16	0.0508	0.0020	1.2903	1.3070	1
18	0.0403	0.0013	1.0236	0.8225	0.8
20	0.0320	0.0008	0.8128	0.5186	0.5
22	0.0254	0.0005	0.6452	0.3267	0.35

ELECTRIC MOTOR WINDING / WIRING DIAGRAMS
SINGLE PHASE, 50/60 Hz, 110 - 115 VAC // 220 - 230 VAC



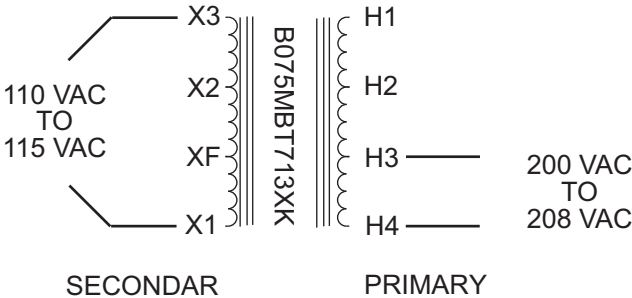
ELECTRIC MOTOR WINDING / WIRING DIAGRAMS

THREE PHASE, 50/60 Hz, 220 - 230 VAC // 380 - 460 VAC

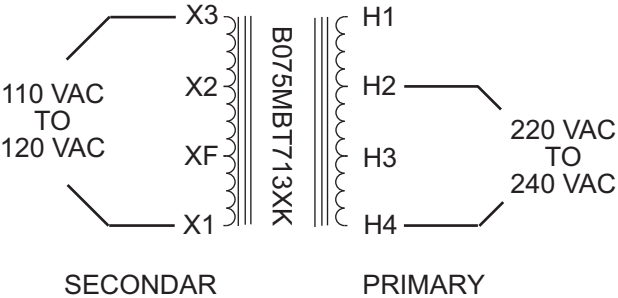


Three Phase Power Supplied to the Aqua Touch System
Step Down Transformer Primary and Secondary
(inside the System Control Box)
Wiring and Voltages

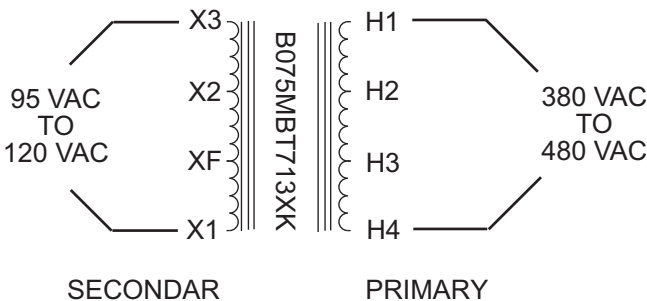
Three Phase Aqua Touch System Voltage
from 200 VAC to 208 VAC



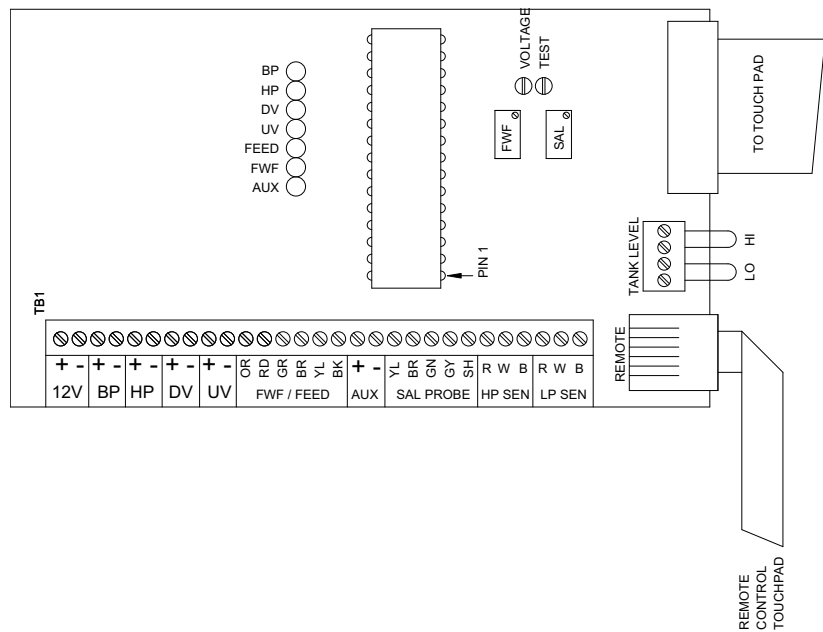
Three Phase Aqua Touch System Voltage
from 220 VAC to 240 VAC



Three Phase Aqua Touch System Voltage
from 380 VAC to 480 VAC



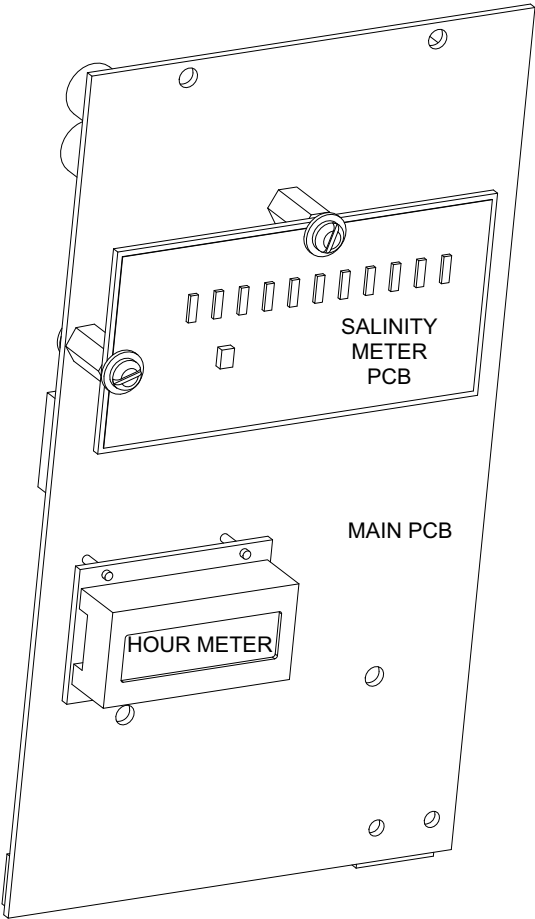
PCB MAIN ASSEMBLY PART NUMBER B596800012



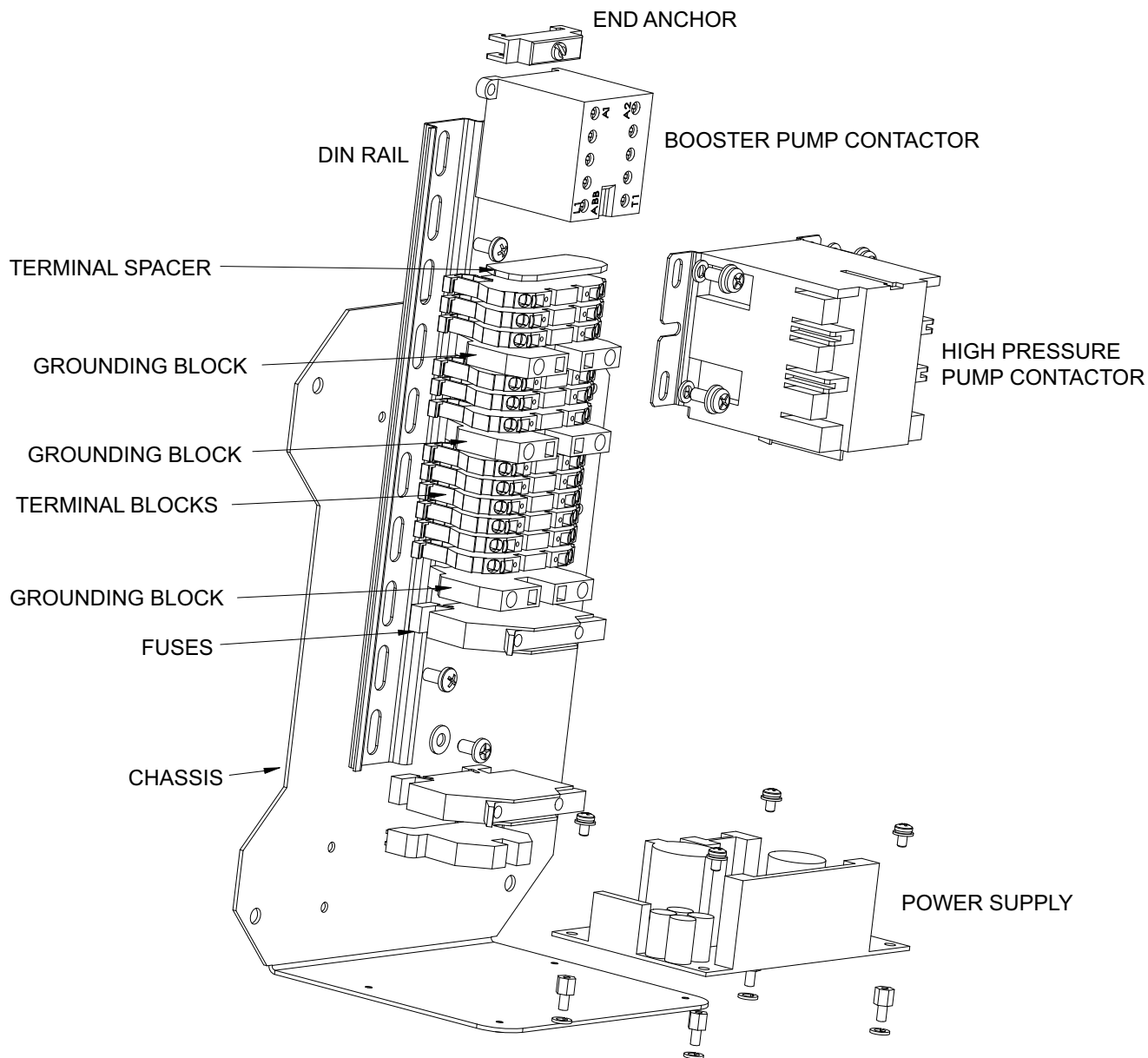
TOP VIEW

PCB MAIN ASSEMBLY
PART NUMBER B596800012

REAR VIEW

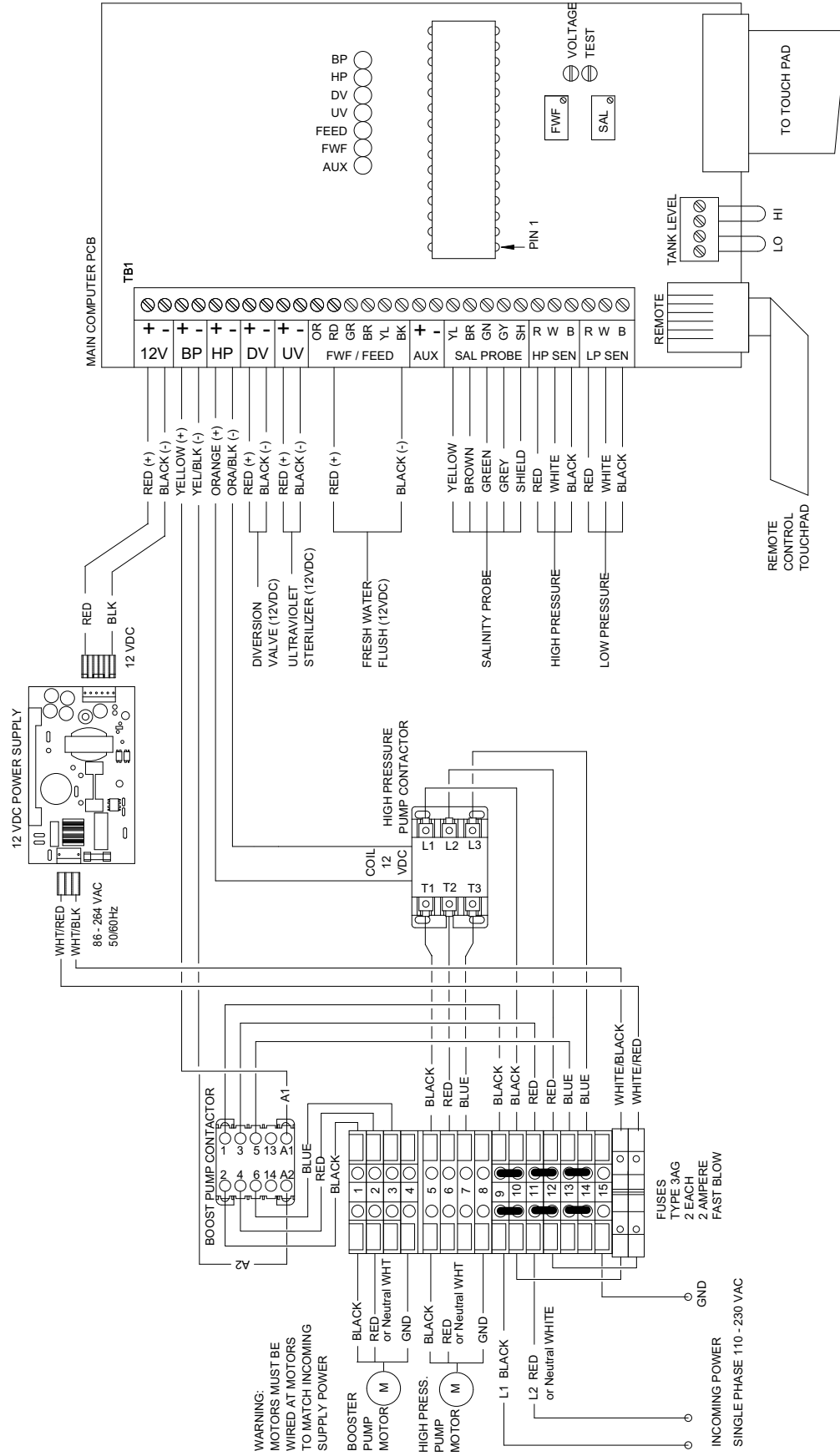


AQUA WHISPER II ELECTRICAL CONTROLLER CHASSIS
110-230 VAC 50/60 Hz SINGLE PHASE



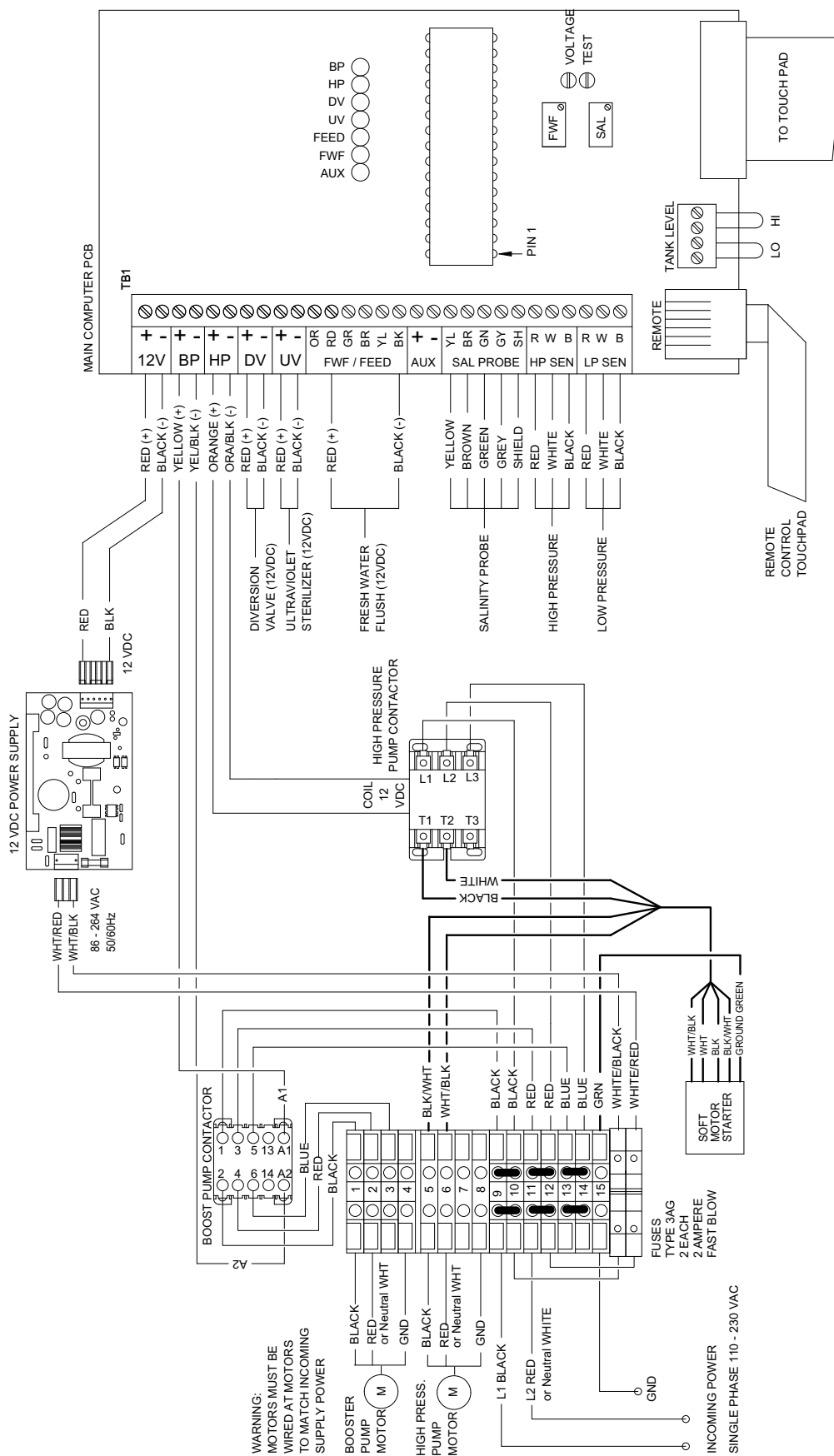
AQUA WHISPER II ELECTRICAL DIAGRAM

110-230 VAC 50-60 Hz SINGLE PHASE



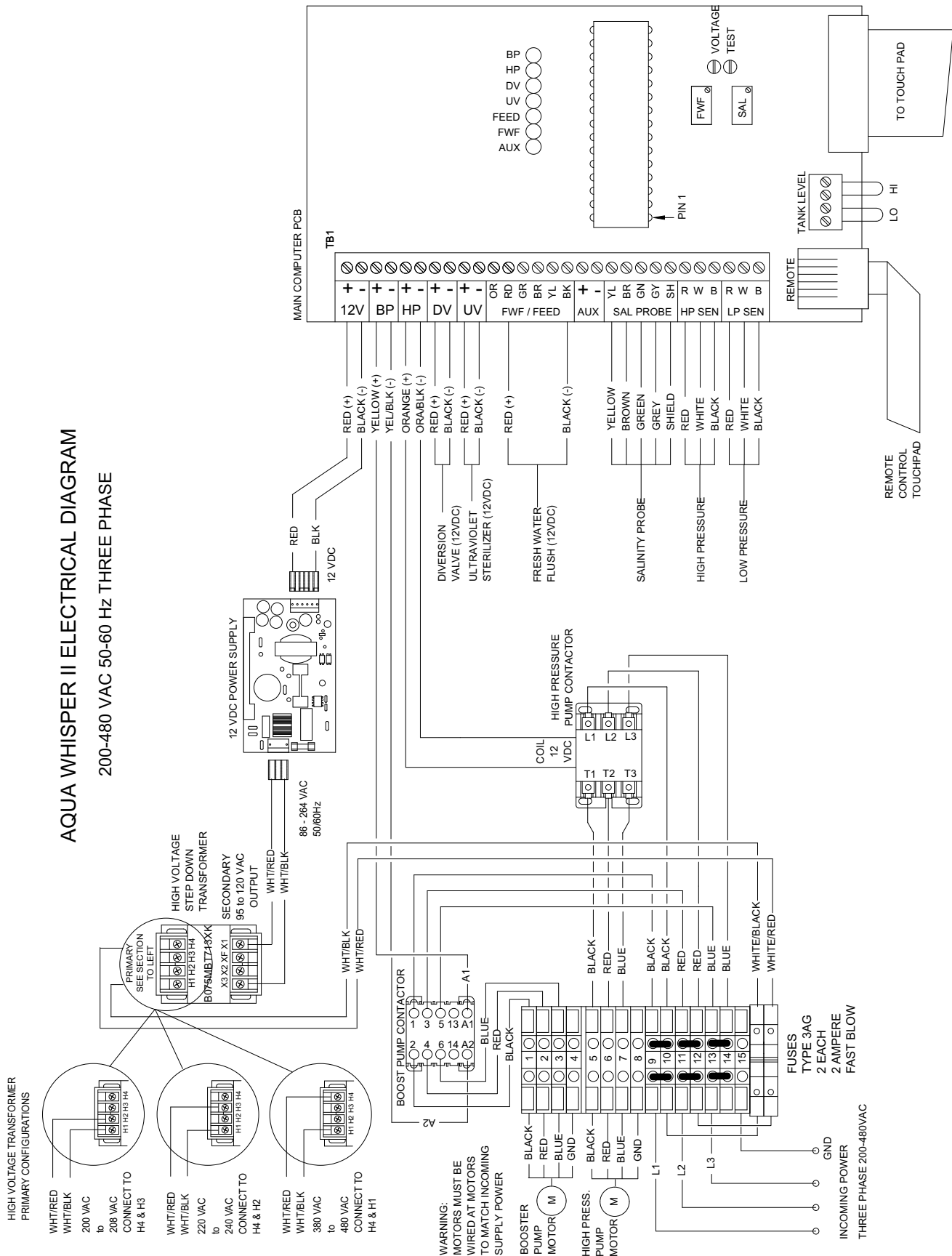
AQUA WHISPER II ELECTRICAL DIAGRAM

110-230 VAC 50-60 Hz SINGLE PHASE WITH SOFT MOTOR STARTER



AQUA WHISPER II ELECTRICAL DIAGRAM

200-480 VAC 50-60 Hz THREE PHASE



Section 9

Exploded Parts Views

with

Part Numbers & Descriptions

To locate your local Sea Recovery Dealer visit our web site at <http://www.searecovery.com>
or contact Sea Recovery

Sea Recovery Corporation
P.O. Box 5288
Carson, California 90745-5288
U.S.A.

Tel: 1-310-637-3400 • Fax: 1-310-637-3430

Email: srcsales@searecovery.com • Web: <http://www.searecovery.com>

From time to time, Sea Recovery may make programming changes to the Control Logic (CONTROL VER).

Other physical production changes may also be made from time to time and are tracked by Sea Recovery through the System Serial Number.

Troubleshooting and repair methods and results can vary depending on the System Serial Number and the specific pre or post filtration options installed in the System.

When requesting assistance from Sea Recovery or one of Sea Recovery's service dealers, you must inform us of your specific System Model Number and Serial Number. This allows us to look up your particular System's test records and expedites our ability to assist you. If we are given a wrong model number or wrong serial number this will lead to frustration for you, wrong troubleshooting information from us, wrong repair information from us, and failure to diagnose or correct the problem. Additionally, in order for us to expedite troubleshooting and repair or maintenance, and assist you accurately, we must know all optional equipment installed in the System.

ALWAYS PROVIDE THE FOLLOWING INFORMATION:

SYSTEM MODEL: **AQUA WHISPER II**

SERIES: **__ COMPACT FRAME** **OR** **__ MODULAR**

SPECIFIC CAPACITY: **SINGLE R.O. MEMBRANE VESSEL: __450 GPD; __700 GPD; __900 GPD**

DOUBLE R.O. MEMBRANE VESSEL: __900 GPD; __1400 GPD; __1800 GPD

OPERATING VOLTAGE CYCLES AND PHASE: **____ VAC, ____ HZ, ____ SINGLE OR THREE PHASE**

LIST OF INSTALLED PREFILTRATION AND POST FILTRATION OPTIONS:

INLINE VACUUM/PRESSURE GAUGE [4]:	__ YES	__ NO
INLINE VACUUM/PRESSURE GAUGE [6]:	__ YES	__ NO
INLINE VACUUM/PRESSURE GAUGE [8]:	__ YES	__ NO
INLINE VACUUM/PRESSURE GAUGE [11]:	__ YES	__ NO
INLINE VACUUM/PRESSURE GAUGE [15]:	__ YES	__ NO

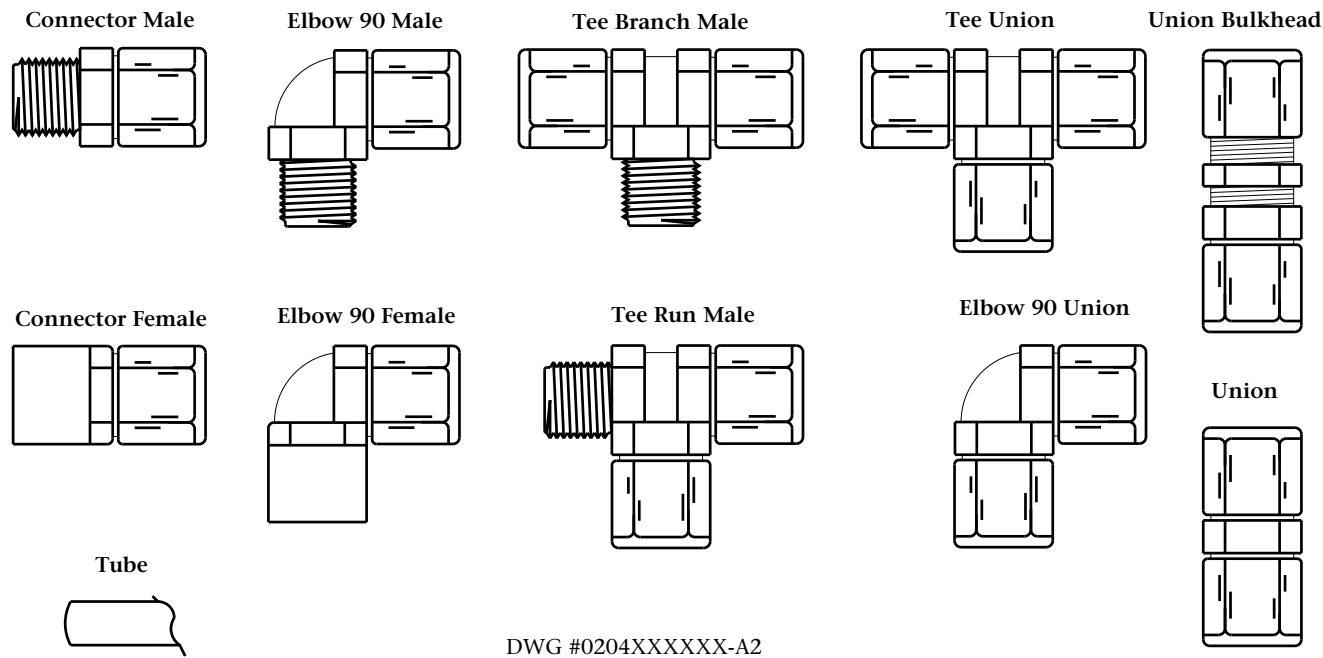
SINGLE PLANKTON FILTER [9]:	__ YES	__ NO
DOUBLE PLANKTON FILTER [9]:	__ YES	__ NO
MULTI MEDIA FILTER [10]:	__ YES	__ NO
COMMERCIAL PREFILTER [12]:	__ YES	__ NO
OIL WATER SEPARATOR [16]:	__ YES	__ NO
DUAL 10 INCH PREFILTER [13 & 14]:	__ YES	__ NO

pH NEUTRALIZING FILTER [40]:	__ YES	__ NO
ULTRA VIOLET STERILIZER [41]:	__ YES	__ NO

REMOTE CONTROL [55]:	__ YES	__ NO
SOFT MOTOR STARTER [56]:	__ YES	__ NO

COMMON TO BOTH THE
COMPACT AND MODULAR STYLE

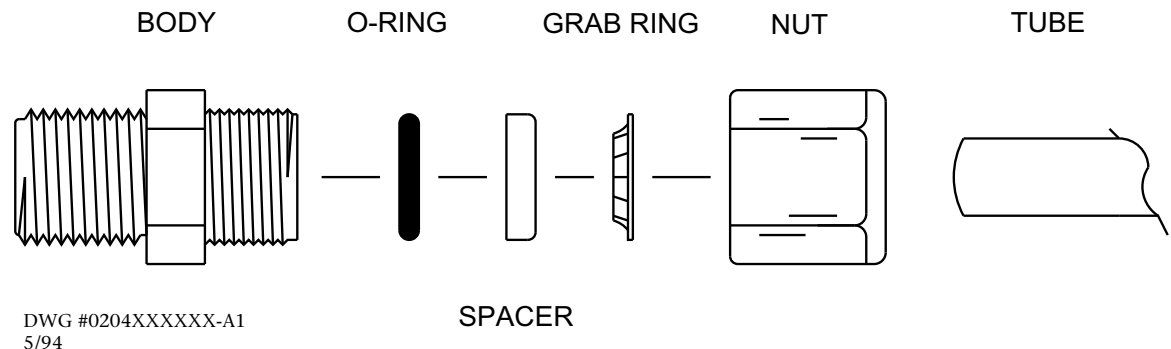
AVAILABLE TUBE FITTINGS



DWG #0204XXXXXX-A2

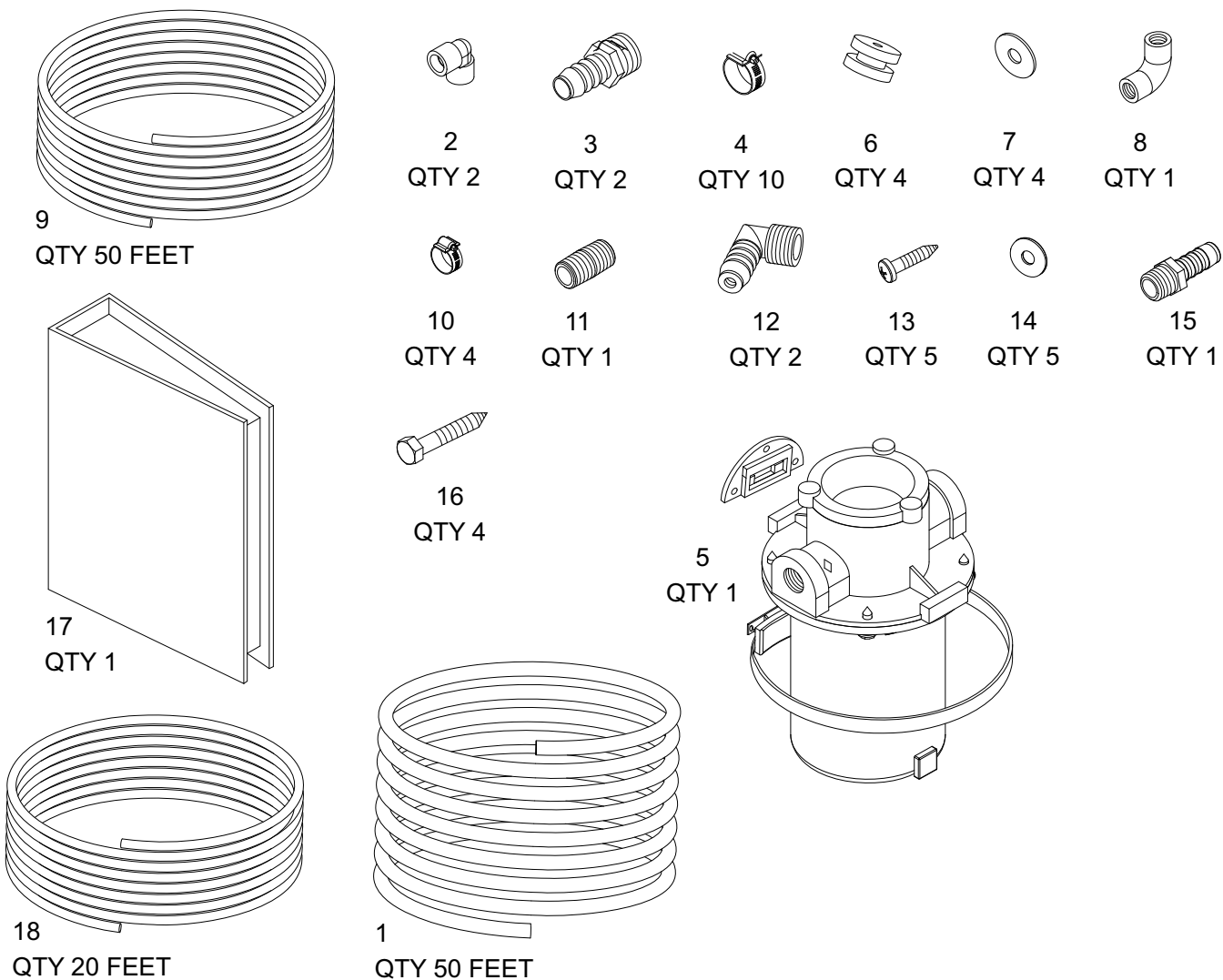
Specify Type of Fitting	and	Specify Tube Size	and	Specify Pipe Size	and	Specify Male or Female
Connector Male		1/4" O.D.		1/4		MNPT or FNPT
Connector Female		3/8" O.D.		3/8		MNPT or FNPT
Elbow 90 Male		1/2" O.D.		1/2		MNPT or FNPT
Elbow 90 Female		5/8" O.D.		3/4		MNPT or FNPT
Tee Branch Male						
Tee Run Male						
Tee Union						
Elbow Union						
Union Bulkhead						
Union						

LOW PRESSURE THERMAL PLASTIC TUBE FITTING



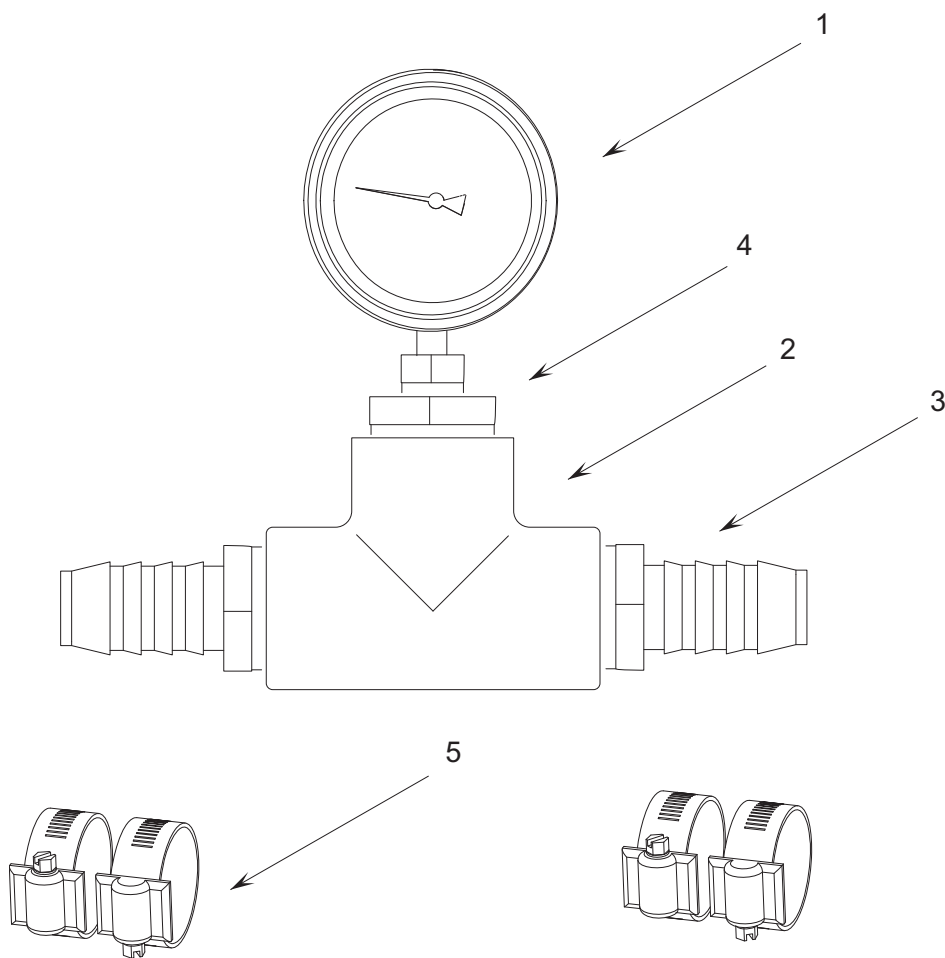
DWG #0204XXXXXX-A1
5/94

ITEM	PART NUMBER	DESCRIPTION	QTY	U/M
1 - 18	B001130001	INSTALLATION KIT AQTCM	1	EACH
1	0328066666	HOSE CLEAR BRAID 3/4"	50	FEET
2	0101013783	ELB90 3/4 FPT X 3/4 FPT PVC	2	EACH
3	0101653783	ADAP 3/4 MPT X 3/4 BARB PVC	2	EACH
4	05181434AA	HOSE CLAMP 3/4" SS	10	EACH
5	0421051239	SEA STRAINER-3/4 BRONZE	1	EACH
6	2115030120	RUBBER MOUNT 90 LB AQM	4	EACH
7	061110049000	WASHER FENDER 5/16" SS	4	EACH
8	0101012583	ELB90 1/2 FPT X 1/2 FPT PVC	1	EACH
9	0328065066	HOSE CLEAR BRAID 1/2"	50	FEET
10	05181432AA	HOSE CLAMP 1/2"	4	EACH
11	01013725CL	NIPPLE 1/2 NPT X CLOSE PVC	1	EACH
12	0101073783	ELB90 3/4 MPT X 3/4 BARB PVC	2	EACH
13	061170628016	SC PHIL PAN "A" 10 X 1 SS	5	EACH
14	061080028000	WASHER FLAT #10 SS	5	EACH
15	0112652500	ADAP 1/2 MNPT X 1/2 BARB NYLON	1	EACH
16	061172149036	SC HEX "A" 5/16 X 2 1/4 SS	4	EACH
17	B651130001	OWNERS MANUAL AQUA WHISPER II	1	EACH
18	0312123569	TUBE 3/8 BLACK	20	FEET

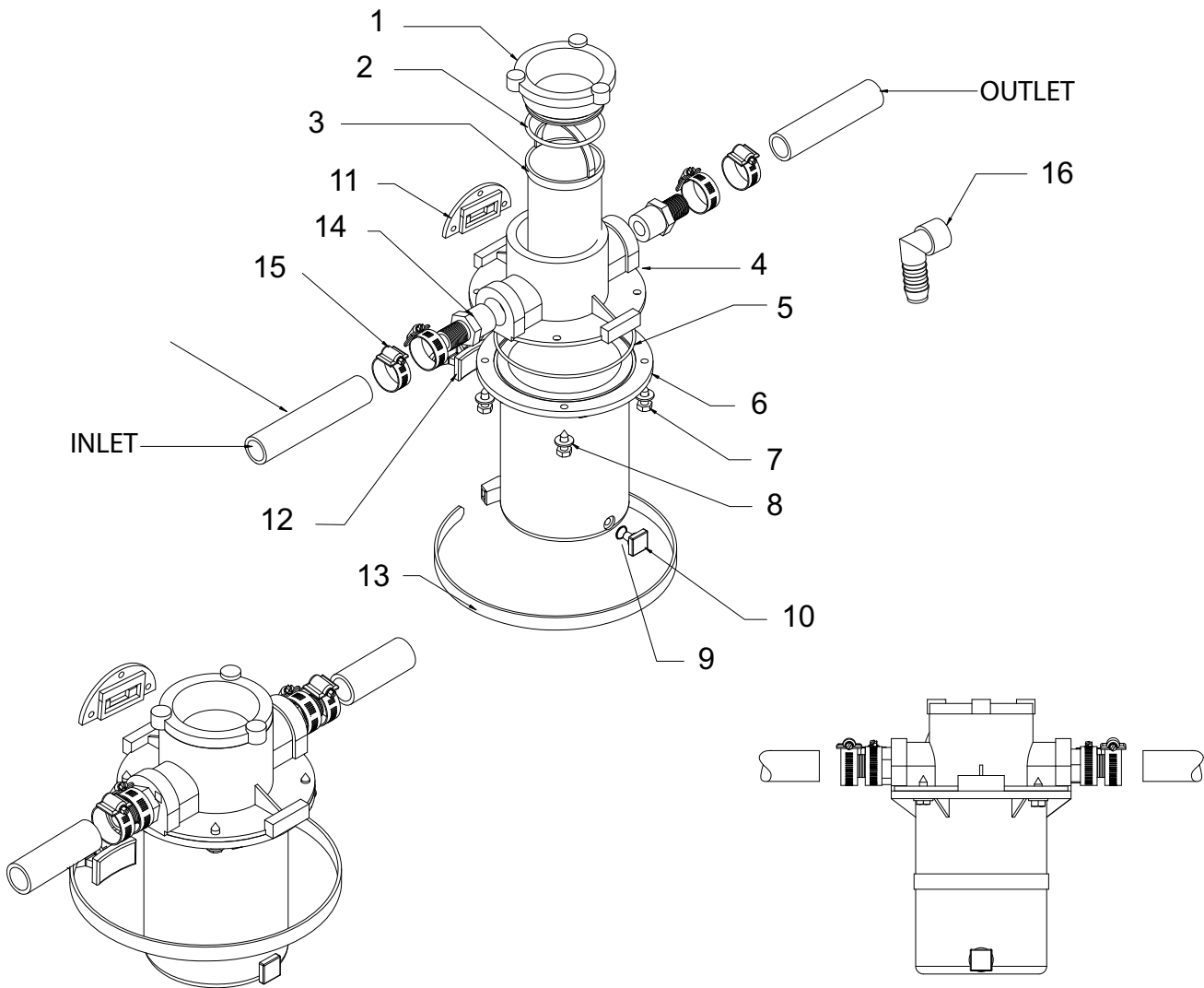


ITEM	PART NUMBER	DESCRIPTION	U/M	QTY
1 - 5	B148000001	DIFFERENTIAL LOW PRES GAUGE ASSY		
1	10180103CC	GAUGE -30/0/70 BPM NPT	EACH	1
2	0101423783	TEE 3/4 FT X 3/4 FT X 3/4 FT PVC	EACH	1
3	0101653783	ADAP 3/4 MPT X 3/4 BARB PVC	EACH	2
4	0101293483	RB 3/4 MT X 1/4 FT PVC	EACH	1
5	05181434AA	HOSE CLAMP 3/4 SS	EACH	4

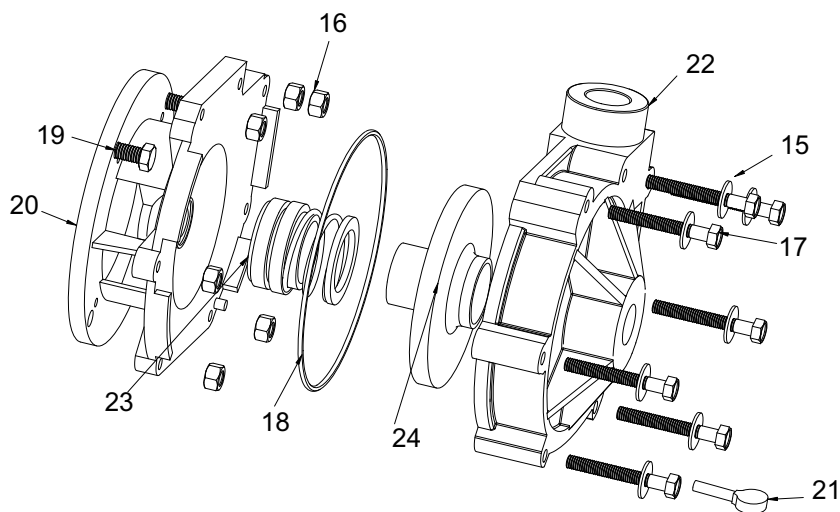
This optional assembly is used between each feed water line component (prefiltration components) to measure the inlet and outlet pressure of each component. Knowing the inlet and outlet pressure assists the operator in maintenance requirements such as required filter changes.



ITEM	PART NUMBER	DESCRIPTION	QTY	U/M
1-13	0421051239	SEA STRAINER-3/4" BRONZE		
1		CAP BRONZE	1	EACH
2	0421051239-2	O-RING, CAP SEAL 3/4" BRONZE SEA STRAINER	1	EACH
3	0421051239-7	BASKET MONEL, 3/4" BRONZE SEA STRAINER	1	EACH
4		BODY	1	EACH
5	0421051239-4	O-RING SIGHT GLASS 3/4" BRONZE STRAINER	1	EACH
6		SIGHT GLASS	1	EACH
7		SCREW 1/4-20 X 5/8" HS	4	EACH
8		WASHER 1/4" PFW-2 SET	4	EACH
9		O-RING DRAIN PLUG	1	EACH
10		DRAIN PLUG	1	EACH
11		UPPER BRACKET	1	EACH
12		LOWER BRACKET	1	EACH
13		STRAP	1	EACH
14	0101653783	ADAP 3/4 MPT X 3/4 BARB PVC	2	EACH
15	05181434AA	HOSE CLAMP 3/4" SS	4	EACH
16	0101073783	ELB90 3/4 MPT X 3/4 BARB PVC	2	EACH
17	061170628016	SC PHIL PAN "A" 10 X 1 SS	5	EACH
18	061080028000	WASHER FLAT #10 SS	5	EACH



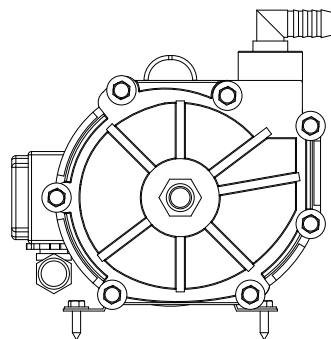
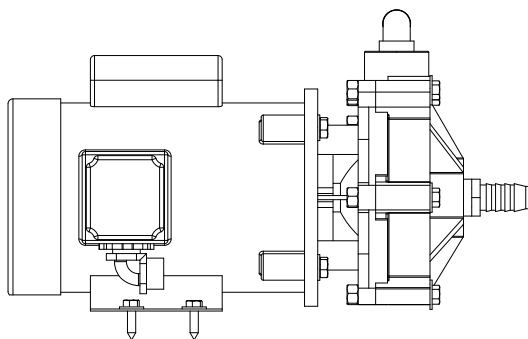
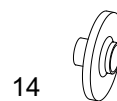
ITEM	PART NUMBER	DESCRIPTION	QTY	U/M
BOOSTER PUMP HEAD AQM-AT 50/60/				
13	B655800009	MAINTENANCE SEAL KIT		
14	291211181PP	MAINTENANCE IMPELLER KIT		
15-24	1221515772	BOOSTER PUMP HEAD N200		
15		WASHER FLAT # 10 SS	7	EACH
16		Nut Hex 3/8" SS	7	EACH
17		SCREW HEX 5/16-18 X 2 1/2"	7	EACH
18	26141260PP	GASKET BOOSTER PUMP N200	1	EACH
19		BOLT HEX 3/8-16 X 1 1/4" SS	2	EACH
20		MOTOR MOUNTING BRACKET	1	EACH
21		DRAIN PLUG	1	EACH
22		BOOSTER PUMP VOLUTE N200	1	EACH
23	1221515772-3	SEAL BOOSTER PUMP HEAD	1	EACH
24	29121181PP	IMPELLER	1	EACH



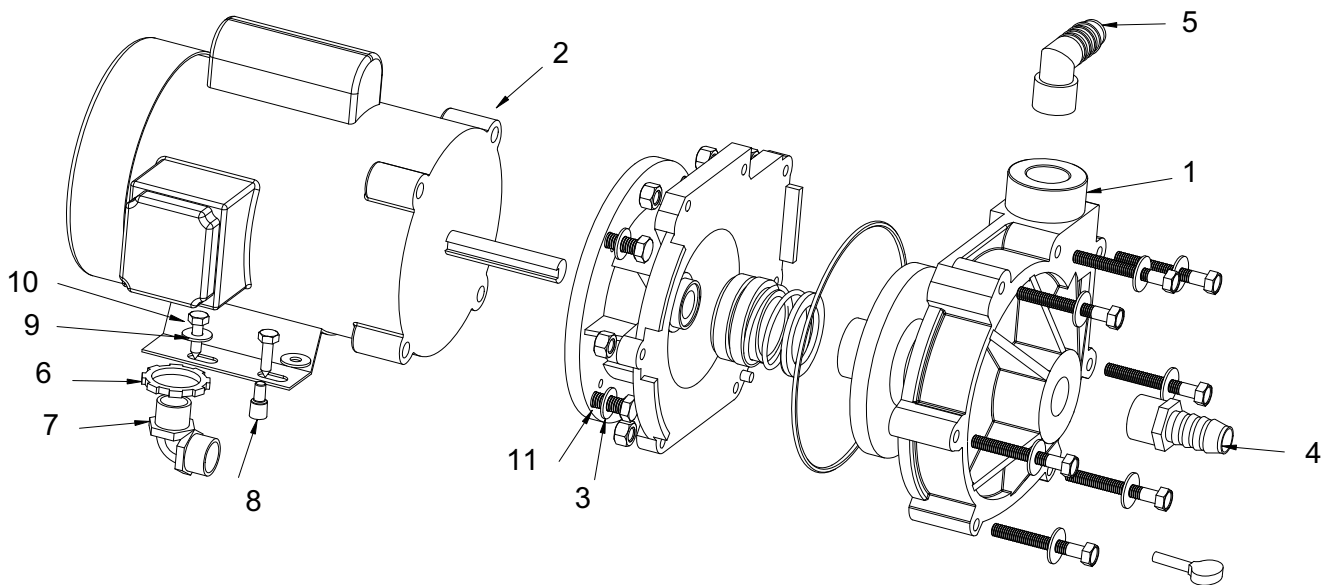
MAINTENANCE SEAL KIT
B655800009



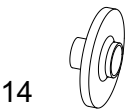
MAINTENANCE IMPELLER KIT
291211181PP



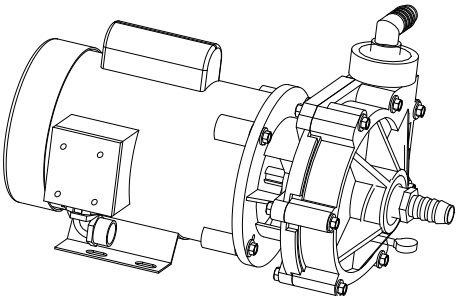
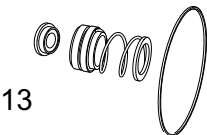
ITEM	PART NUMBER	DESCRIPTION	QTY	U/M
1-12	B016120001	BOOSTER PUMP ASSY AQM-AT 50/60/1 SINGLE PHASE 115-230 VAC 60HZ & 100-220 VAC 50HZ	1	EACH
1	1221515772	BOOSTER PUMP HEAD N200	1	EACH
2	1519081110	MOTOR 1/2 HP 110/230-50/60/1PH	1	EACH
3	061080056000	WASHER FLAT 3/8" SS	4	EACH
4	0101653783	ADAP 3/4 MPT X 3/4 BARB PVC	1	EACH
5	0101073783	ELB90 3/4 MPT X 3/4 BARB PVC	1	EACH
6	063200066000	NUT LOCK 1/2" STEEL	1	EACH
7	1920023632	STRAIN RELIEF 90 CG90-6250	1	EACH
8	31313849CD	TERMINAL CONN AW 22/12 GAUGE	2	EACH
9	061100043000	WASHER FLAT OS 1/4" SS	4	EACH
10	061172143016	SC HEX "A" 1/4 X 1" SS	4	EACH
11	061142157020	BOLT HEX 3/8-16 X 1 1/4" SS	4	EACH
13	B655800009	MAINTENANCE SEAL KIT		
14	291211181PP	MAINTENANCE IMPELLER KIT		



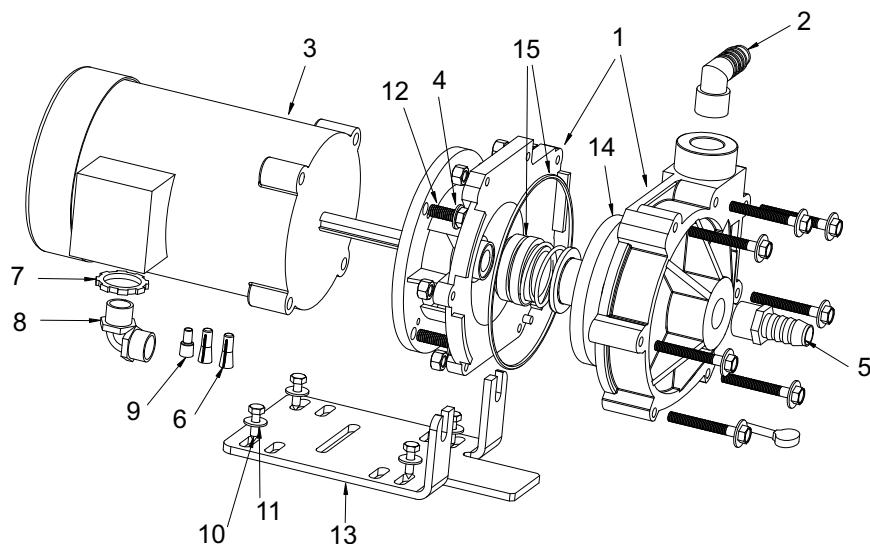
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MAINTENANCE SEAL KIT
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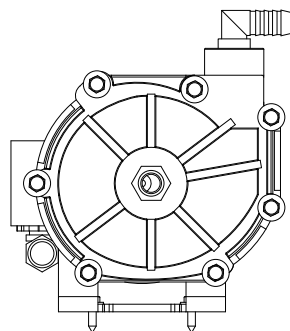
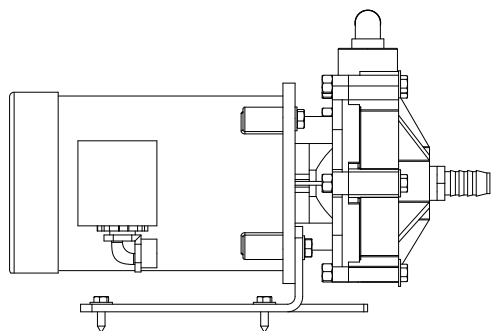
ITEM	PART NUMBER	DESCRIPTION	QTY	U/M
1-13	B016120002	BOOSTER PUMP ASSY AQM-AT 50/60/3 THREE PHASE 200-380 VAC 50HZ & 208-460 VAC 60HZ	1	EACH
1	1221515772	BOOSTER PUMP HEAD N200	1	EACH
2	0101073783	ELB90 3/4 MPT X 3/4 BARB PVC	1	EACH
3	1520181110	MOTOR 1/2 HP 208/230/460 50/60	1	EACH
4	061080056000	WASHER FLAT 3/8" SS	4	EACH
5	0101653783	ADAP 3/4 MPT X 3/4 BARB PVC	1	EACH
6	3131210495	WIRE NUT YELLOW	3	EACH
7	063200066000	NUT LOCK 1/2" STEEL	1	EACH
8	1920023632	STRAIN RELIEF 90 CG90-6250	1	EACH
9	31313849CD	TERMINAL CONN AW 22/12 GAUGE	1	EACH
10	061172143016	SC HEX "A" 1/4 X 1 SS	4	EACH
11	061100043000	WASHER FLAT OS 1/4" SS	4	EACH
12	061142157020	BOLT HEX 3/8-16 X 1 1/4" SS	4	EACH
13	1221514722-3	BOOSTER PUMP BRACKET MOUNTING	1	EACH
14	291211181PP	MAINTENANCE IMPELLER KIT		
15	B655800009	MAINTENANCE SEAL KIT		



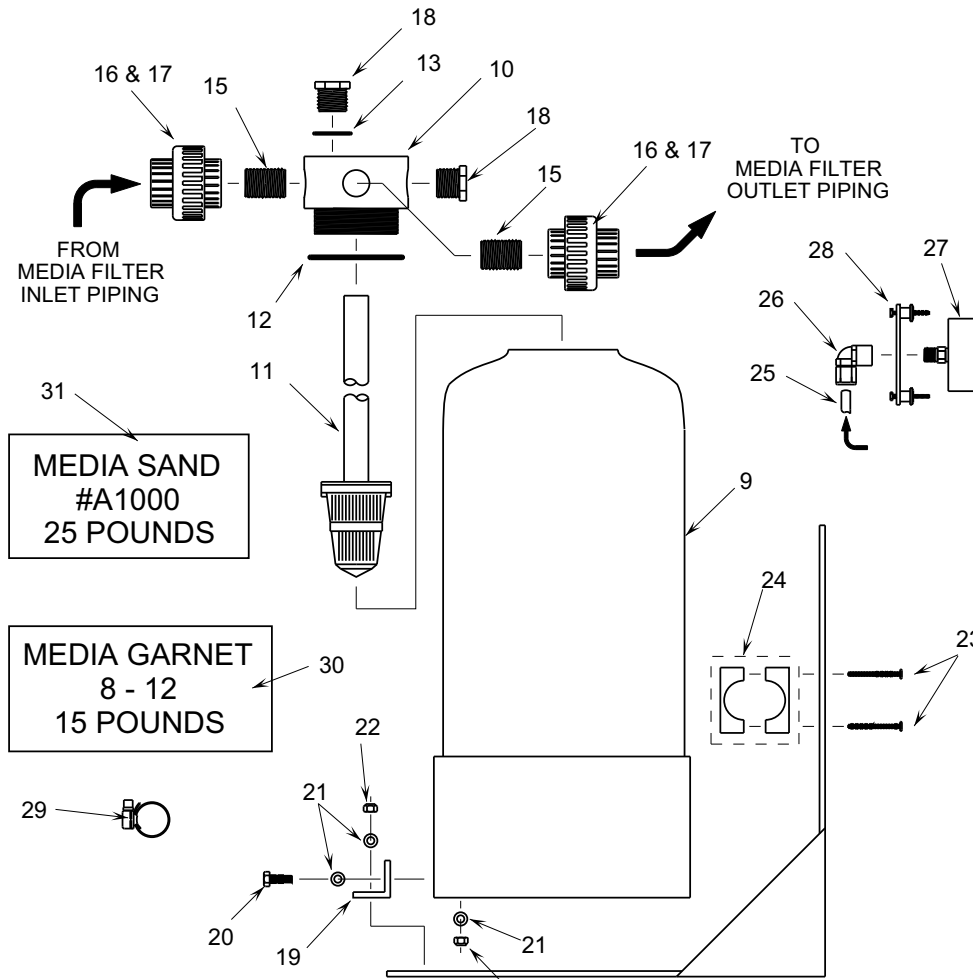
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MAINTENANCE IMPELLER KIT



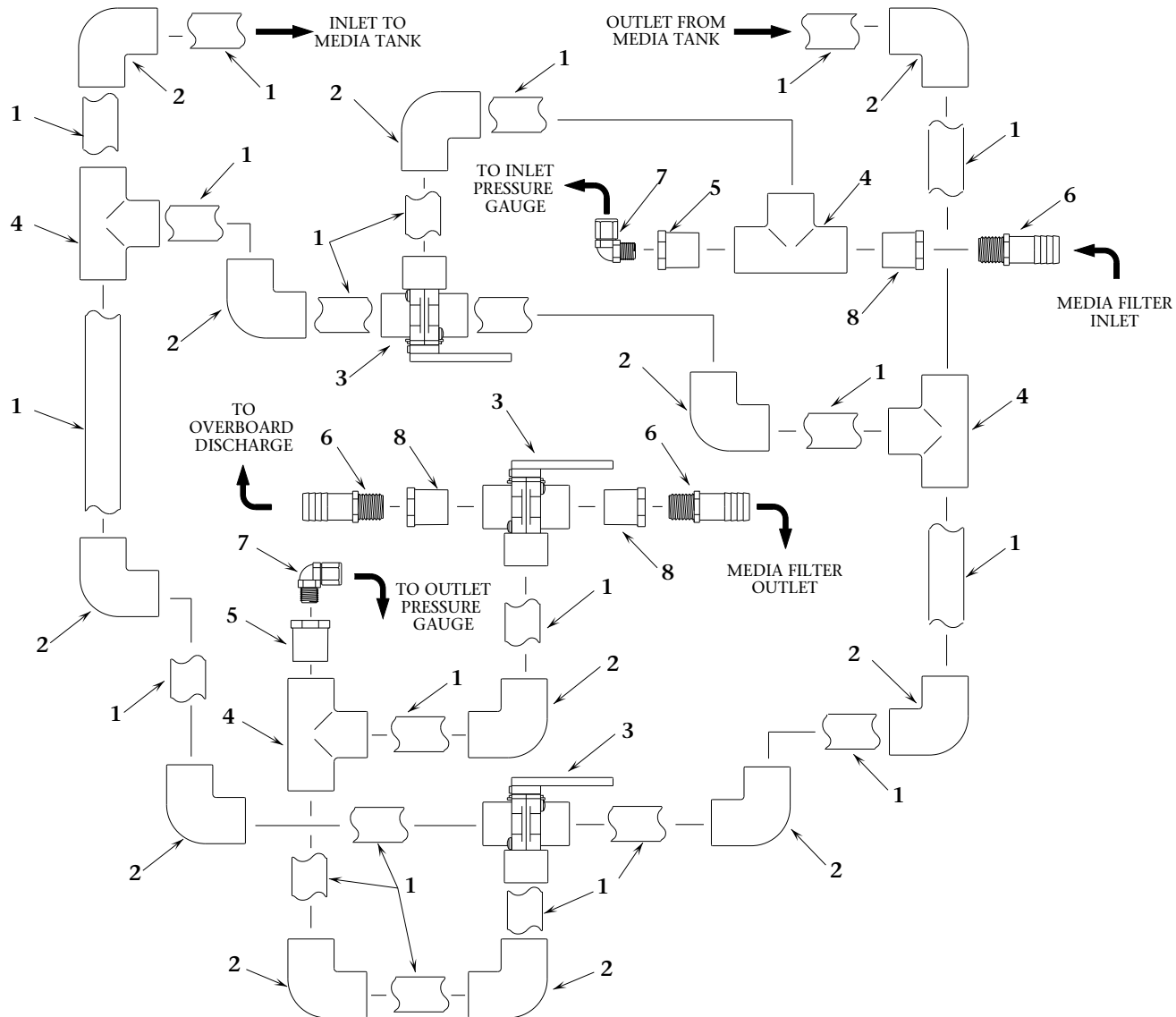
B655800009
MAINTENANCE SEAL KIT



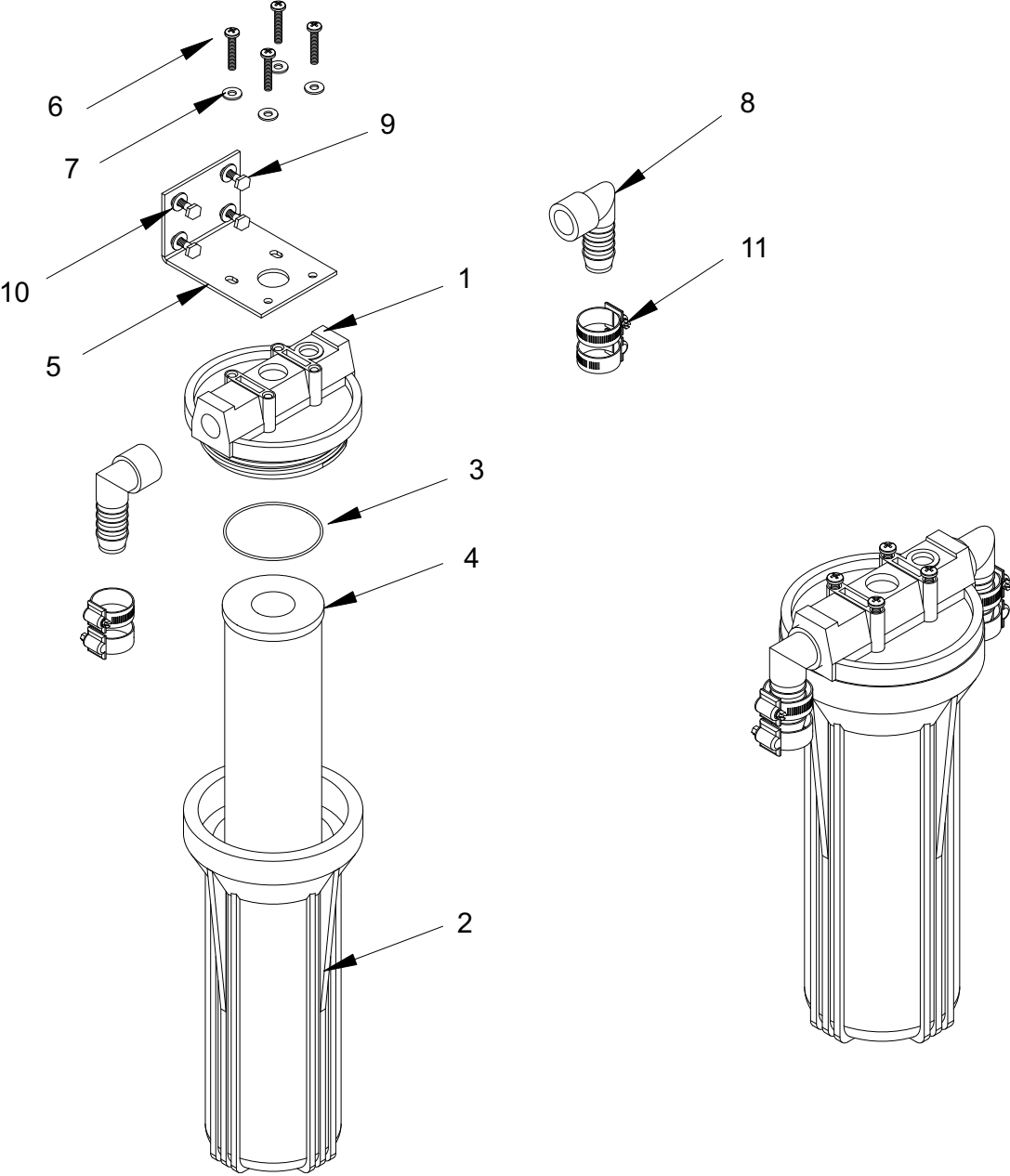
ITEM	PART NUMBER	DESCRIPTION	QTY	U/M
1-31	B071080002	MEDIA FILTER -ASSY/AW-AQM-AT >SEP 98		
9-14	0708040468	MEDIA FILTER 818 ALMOND AW >SEP 98	1	EA
9	0708040468-1	TANK MEDIA FILTER ASSY/AW >SEP 98		
10	0708040400-1	LID MEDIA FILTER ASSY/AW >SEP 98		
11	0708040400-2	LATTERAL PICK UP MEDIA FILTER ASSY/AW >98		
12	2614017300	O-RING 334 MEDIA LID 97		
13	2614017400	O-RING 117 MEDIA TOP INLET		
14	2614017500	O-RING 21- PLUG MEDIA LID 1/2"		
15	01013737CL	NIPPLE 3/4" NPT X CLOSE PVC	2	EA
16	0101693783	UNION 3/4" SL X 3/4" SL PVC	1	EA
17	0101673783	UNION 3/4" FNPT X 3/4" FNPT PVC	1	EA
18	0101343783	PLUG 3/4" MNPT PVC	2	EA
19	20200404010	BRACKET "L" MOUNTING FEET	4	EA
20	061172143016	SC HEX "A" 1/4" X 1" SS	8	EA
21	061100043000	WASHER FLAT OS 1/4" SS	8	EA
22	061060045000	NUT HEX 1/4-20 X 3/4" W/INSERT SS	8	EA
23	061161130028	SC PHIL OVAL 10-24 X 1 3/4" SS	6	EA
24	1453131700-02	VALVE BRACKET 3/4" SL, SET	3	EA
25	0312121969	TUBE 1/4" BLACK NYLON	2	FT
26	0204010869	ELB90 1/4" TUBE X 1/4" FNPT PLAST	2	EA
27	10181522CC	GAUGE -30-0-70 CBM 1/4" MNPT	2	EA
28	05180851CC	GAUGE BRACKET CBM SS	2	EA
29	05181434AA	HOSE CLAMP 3/4" SS	12	EA
30	4643070155	MEDIA GARNET 8-12 100# BAG	17	LB
31	4643020255	MEDIA SAND A1000 (100LB BAG)	25	LB
	14011317AR	VALVE 3-WAY BALL 3/4" SL	3	EA



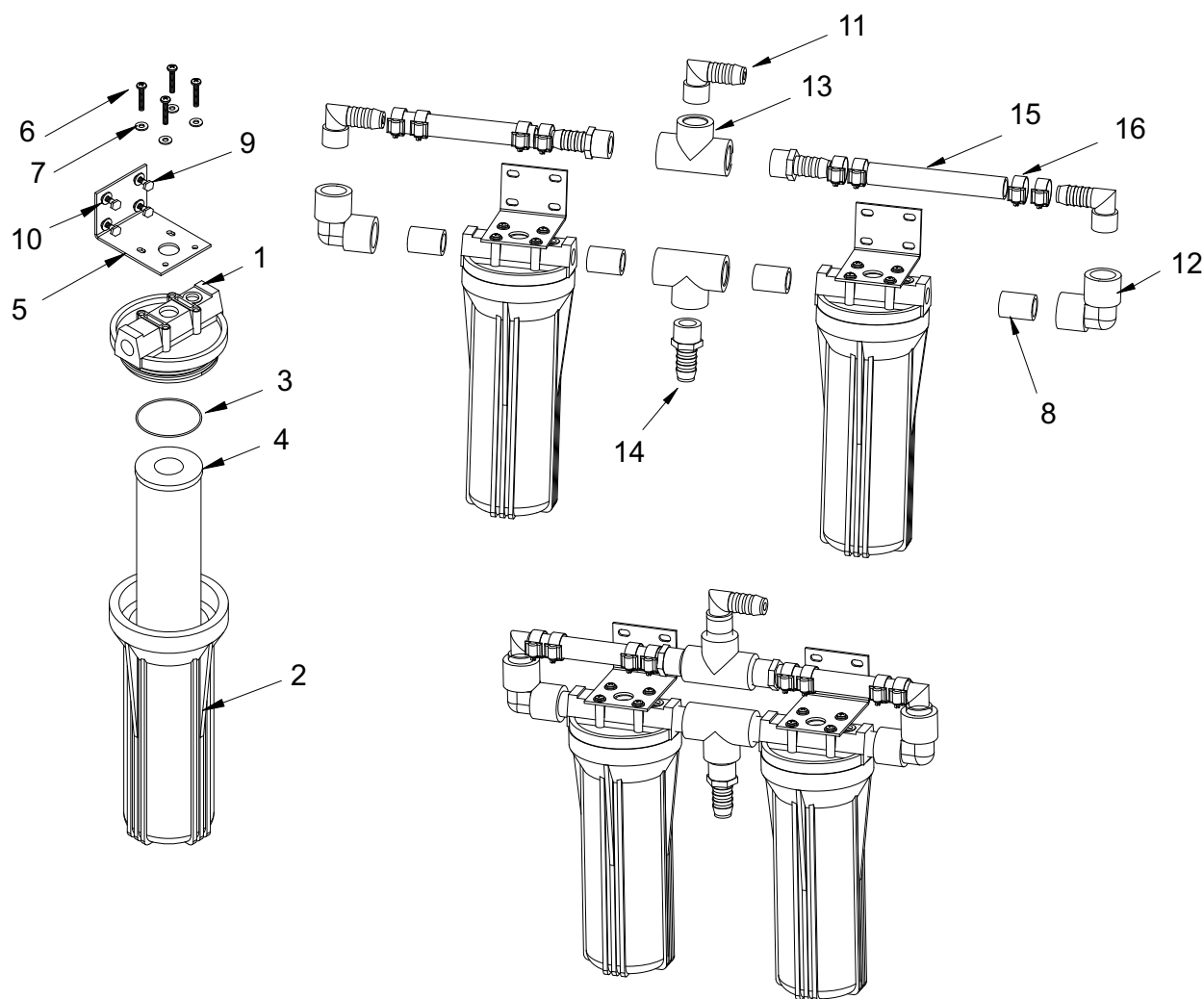
MULTI MEDIA FILTER PIPING:



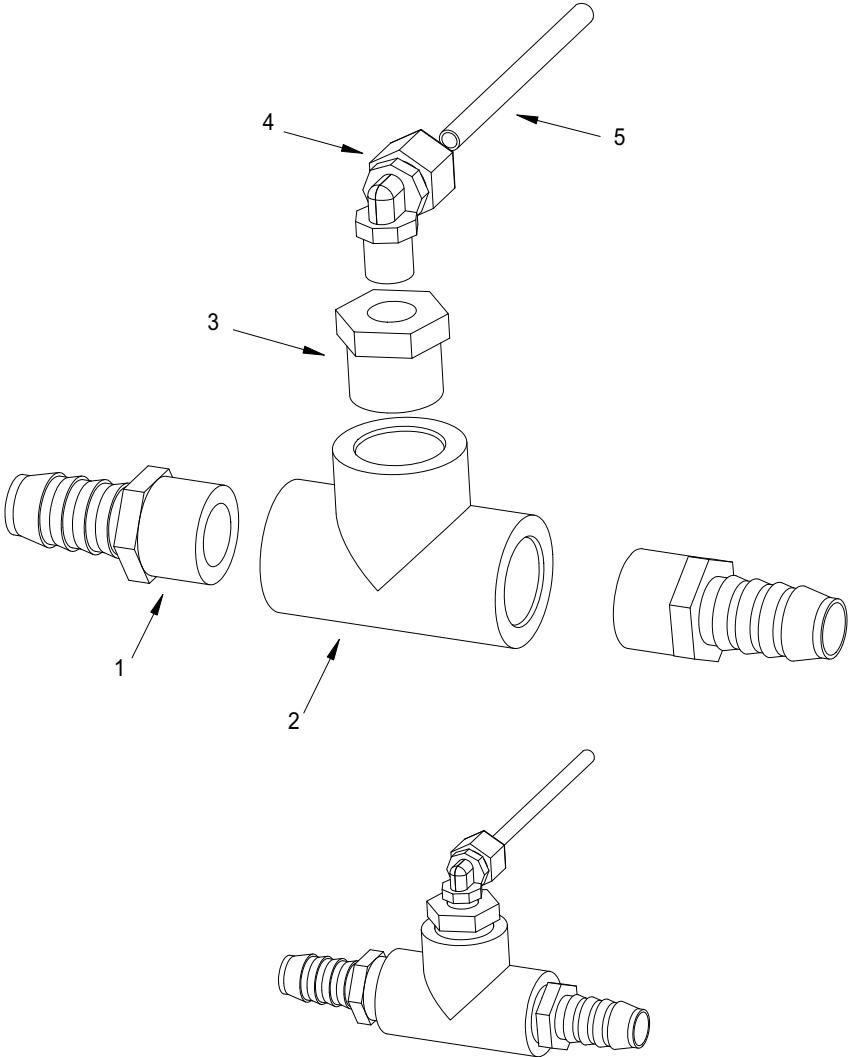
ITEM	PART NUMBER	DESCRIPTION	QTY	U/M
1-11	B008800001	PLANKTON FILTER ASSY-AW-AQM-AT SINGLE		
1-3	0713020473	FILTER HOUSING/LID 3/4" X 10"	1	EA
1		LID 10 INCH PREFILTER BLUE HOUSING		
2		BOWL 10 INCH PREFILTER BLUE HOUSING		
3	2614010473	O-RING 237 10 INCH PREFILTER BLUE HOUSING		
4	0805823578	ELEMENT PLANKTON	1	EA
5	20200402100	BRACKET PREFILTER/CHRCL/PLNKTN	1	EA
6	061170628016	SC PHIL PAN "A" 10 X 1" SS	4	EA
7	065080028000	WASHER FLAT #10 NYLON	4	EA
8	0101073783	ELB90 3/4" MPT X 3/4" BARB PVC	2	EA
9	061172143016	SC HEX "A" 1/4 X 1" SS	4	EA
10	061100043000	WASHER FLAT OS 1/4" SS	4	EA
11	05181434AA	HOSE CLAMP 3/4" SS	4	EA



ITEM	PART NUMBER	DESCRIPTION	QTY	U/M
1-16	B008300002	PLANKTON FILTER ASSY-AW-AQM-AT DOUBLE		
1-3	0713020473	FILTER HOUSING/LID 3/4" X 10"	2	EA
1		LID 10 INCH PREFILTER BLUE HOUSING		
2		BOWL 10 INCH PREFILTER BLUE HOUSING		
3	2614010473	O-RING 237 10 INCH PREFILTER BLUE HOUSING		
4	0805823578	ELEMENT PLANKTON	2	EA
5	20200402100	BRACKET PREFILTER/CHRCL/PLNKTN	2	EA
6	061170628016	SC PHIL PAN "A" 10 X 1" SS	8	EA
7	065080028000	WASHER FLAT #10 NYLON	8	EA
8	01013737CL	NIPPLE 3/4" NPT X CLOSE PVC	4	EA
9	061172143016	SC HEX "A" 1/4" X 1" SS	8	EA
10	061100043000	WASHER FLAT OS 1/4" SS	8	EA
11	0101073783	ELB90 3/4" MPT X 3/4" BARB PVC	3	EA
12	0101013783	ELB90 3/4" FPT X 3/4" FPT PVC	2	EA
13	0101423783	TEE 3/4" FT X 3/4" FT X 3/4" FT PVC	2	EA
14	0101653783	ADAP 3/4" MPT X 3/4 BARB PVC	3	EA
15	0328066666	HOSE CLEAR BRAID 3/4"	1.5	FT
16	05181434AA	HOSE CLAMP 3/4" SS	12	EA



ITEM	PART NUMBER	DESCRIPTION	QTY	U/M
1-5	P502130002	PRESSURE-PICKUP TEE ASSY		
1	0101653783	ADAP 3/4 MPT X 3/4 BARB PVC	2	EACH
2	0101423783	TEE 3/4 FT X 3/4 FT X 3/4 FT P	1	EACH
3	0101293483	RB 3/4 MT X 1/4 FT PVC	1	EACH
4	0204020869	ELB90 1/4 TUBE X 1/4 MPT PLAST	1	EACH
5	0312121969	TUBE 1/4 BLACK	20	FEET



PREFILTRATION CARTRIDGE FILTER ELEMENT WARNING:

Do not use third party Prefiltration Elements (Plankton Filter Elements, Prefilter Elements, Commercial Prefilter Elements, Oil/Water Separator Elements, Charcoal Filter Elements, Carbon Filter Elements, or pH Filter Cartridges). Use only Sea Recovery supplied Filter Elements or Cartridges. Third party prefiltration elements on the market do not properly fit into the Sea Recovery Filter Housings, the seams fall apart, and they will allow by-pass resulting in **EXTENSIVE AND EXPENSIVE DAMAGE TO THE HIGH PRESSURE PUMP AS WELL AS PREMATURE FOULING OF THE R.O. MEMBRANE ELEMENT.**

Damage caused to the Sea Recovery High Pressure Pump, R.O. Membrane Element, or any other component from the use of third party, non Sea Recovery supplied, filter elements is the responsibility and liability of the operator and is not covered by the Sea Recovery Warranty.

PREFILTER ELEMENT CAUTION:

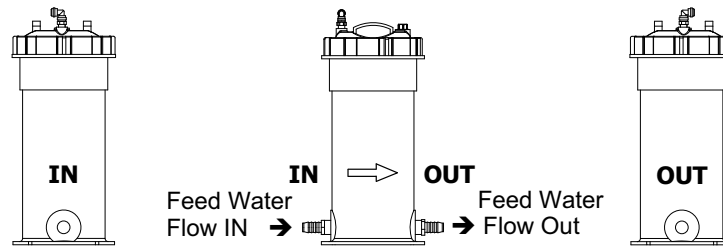
Do not use “string wound” or “fiber” type prefilter elements. These type of elements are designed for the Photographic Film Developing industry. When used in sea water they will plug up rapidly in 1/10th or less the time causing frequent shut down of the system and very frequent changing resulting in very high cost of maintenance.

CHARCOAL FILTER ELEMENT, CARBON FILTER ELEMENT, AND pH NEUTRALIZER FILTER CARTRIDGES WARNING:

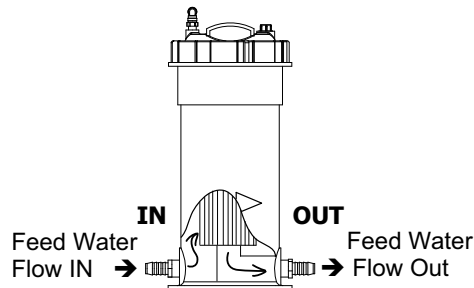
Do not use third party post filter elements. Sea Recovery post filter elements allow for a high flow of water at minimal pressure build-up. Third party post filter elements will cause extensive damage to the system due to blockage and subsequent pressure build up.

Damage caused to the Sea Recovery System from the use of third party, non Sea Recovery supplied, post filter elements is the responsibility and liability of the operator and is not covered by the Sea Recovery Warranty.

COMMERCIAL PREFILTER CONNECTION AND WATER FLOW

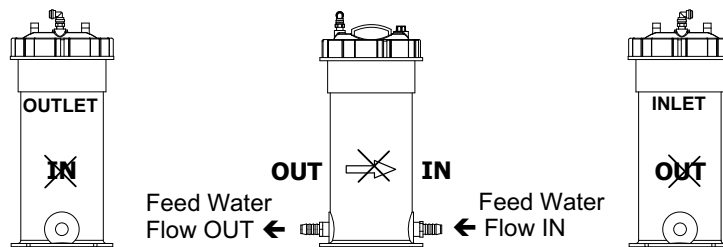


Commercial Prefilter is plumbed
as per the raised arrows and markings IN and OUT

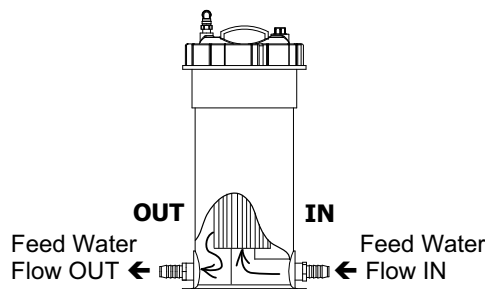


Feed Water Flow through the Commercial Prefilter Element
is from the OUTSIDE of the Element to the INSIDE CENTER of the Element

OIL/WATER SEPARATOR CONNECTION AND WATER FLOW

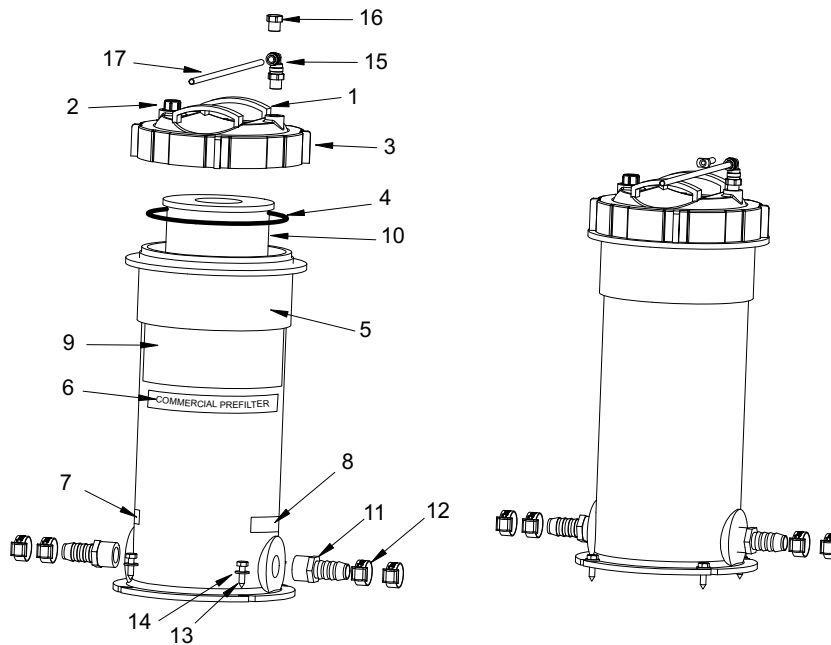


Oil/Water Separator utilizes the same housing as the Commercial Prefilter, however it is plumbed
OPPOSITE of the Commercial Prefilter and OPPOSITE of the raised arrows and markings IN and OUT
Separate Labels are placed on the Oil/Water Separator indicating correct INLET and OUTLET

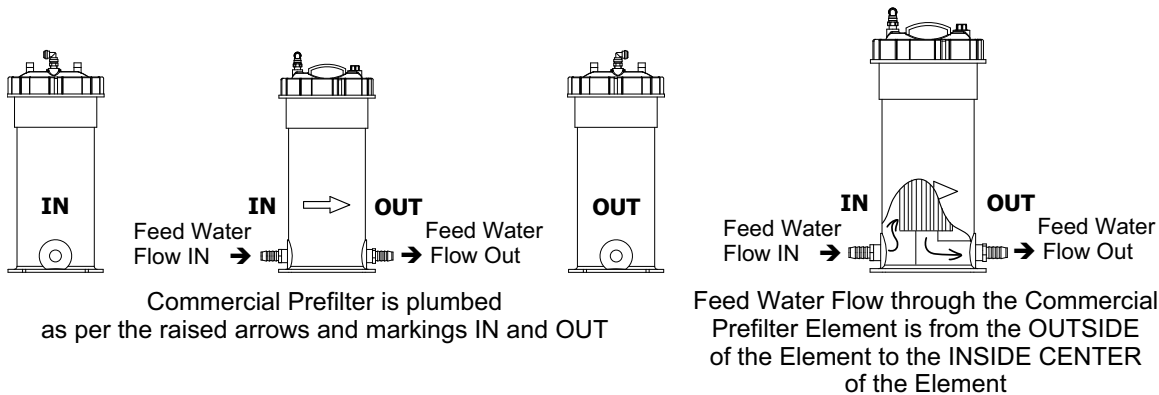


Feed Water Flow through the Oil/Water Separator Element
is from the INSIDE CENTER of the Element to the OUTSIDE of the element

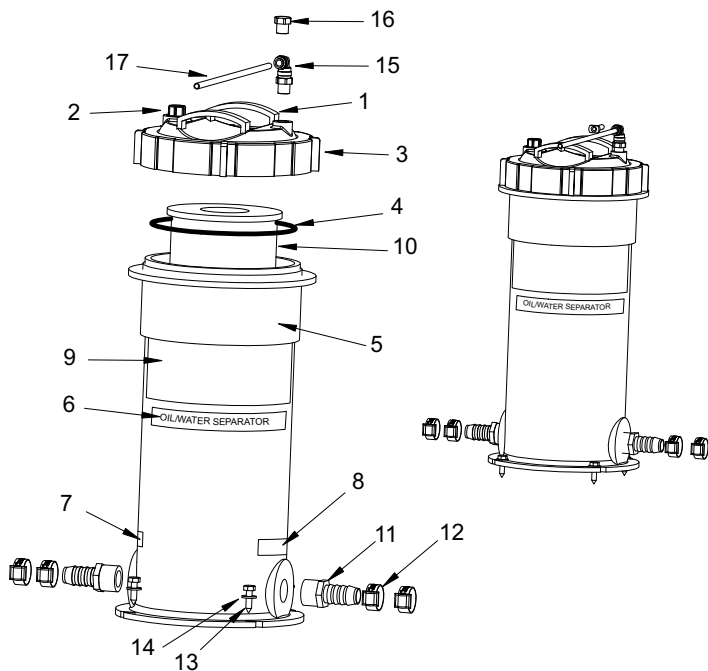
ITEM	PART NUMBER	DESCRIPTION	QTY	U/M
1-16	B109120001	COMMERCIAL PREFILTER ASSY 32.5 SQ FT		
1-9	07620310WA	FILTER HOUSING 32.5 SQFT >10/05	1	EA
1		LID FILTER HOUSING 32.5 SQ FT		
2	07620310WA-07	SAFETY AIR BLEED VALVE FLTR HOUSING 32.5	1	EA
3		LID LOCK RING FILTER HOUSING 32.5 SQ FT		
4	07620310WA-06	O-RING LID CPF/OWS 32.5 SQ FT		
5		BASE FILTER HOUSING 32.5 SQ FT		
6	22130102BE	LABEL COMM PRE FILTER	2	EA
7	2234011260	LABEL INLET(SRC BLUE)	1	EA
8	2234011360	LABEL OUTLET (SRC BLUE)	1	EA
9	2234010460	LABEL SEA RECOVERY CORP LARGE	2	EA
10	0801063357	ELEMENT CPFE AW 5 MIC 32.5 SQFT	1	EA
11	0101653783	ADAP 3/4" MPT X 3/4" BARB PVC	2	EA
12	05181434AA	HOSE CLAMP 3/4" SS	4	EA
13	061172143016	SC HEX "A" 1/4" X 1" SS	4	EA
14	061100043000	WASHER FLAT OS 1/4" SS	4	EA
15	0204020100	ELB90 1/4 TUBE JGX 1/4" MNPT	1	EA
16	0204990300	PLUG 1/4JG	1	EA
17	0312121969	TUBE 1/4" BLACK	15	FT



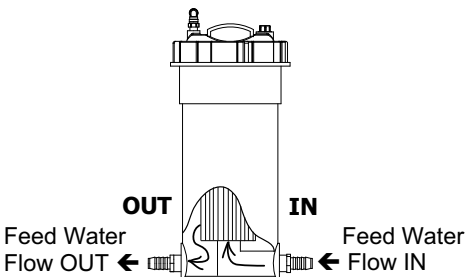
COMMERCIAL PREFILTER CONNECTION AND WATER FLOW



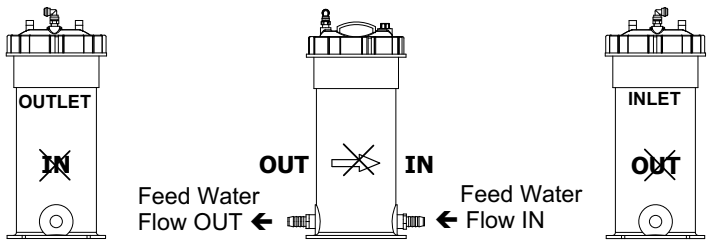
ITEM	PART NUMBER	DESCRIPTION	QTY
	U/M		
1-16	B111120001	OIL WATER SEPRATOR ASSY 32.5 SQ FT	
1-9	07620310WA	FILTER HOUSING 32.5 SQFT >10/05	1 EA
1		LID FILTER HOUSING 32.5 SQ FT	
2	07620310WA-07	SAFETY AIR BLEED VALVE FLTR HOUSING 32.5	1 EA
3		LID LOCK RING FILTER HOUSING 32.5 SQ FT	
4	07620310WA-06	O-RING LID CPF/OWS 32.5 SQ FT	
5		BASE FILTER HOUSING 32.5 SQ FT	
6	22130101BE	LABEL OIL WATER SEPERATOR	2 EA
7	2234011260	LABEL INLET(SRC BLUE)	1 EA
8	2234011360	LABEL OUTLET (SRC BLUE)	1 EA
9	2234010460	LABEL SEA RECOVERY CORP LARGE	2 EA
10	08020723KD	ELEMENT OWSE 32.5 SQ FT	1 EA
11	0101653783	ADAP 3/4" MPT X 3/4" BARB PVC	2 EA
12	05181434AA	HOSE CLAMP 3/4" SS	4 EA
13	061172143016	SC HEX "A" 1/4" X 1" SS	4 EA
14	061100043000	WASHER FLAT OS 1/4" SS	4 EA
15	0204020100	ELB90 1/4 TUBE JGX 1/4" MNPT	1 EA
16	0204990300	PLUG 1/4JG	1 EA
17	0312121969	TUBE 1/4" BLACK	15 FT



**OIL/WATER SEPARATOR
CONNECTION & WATER FLOW**

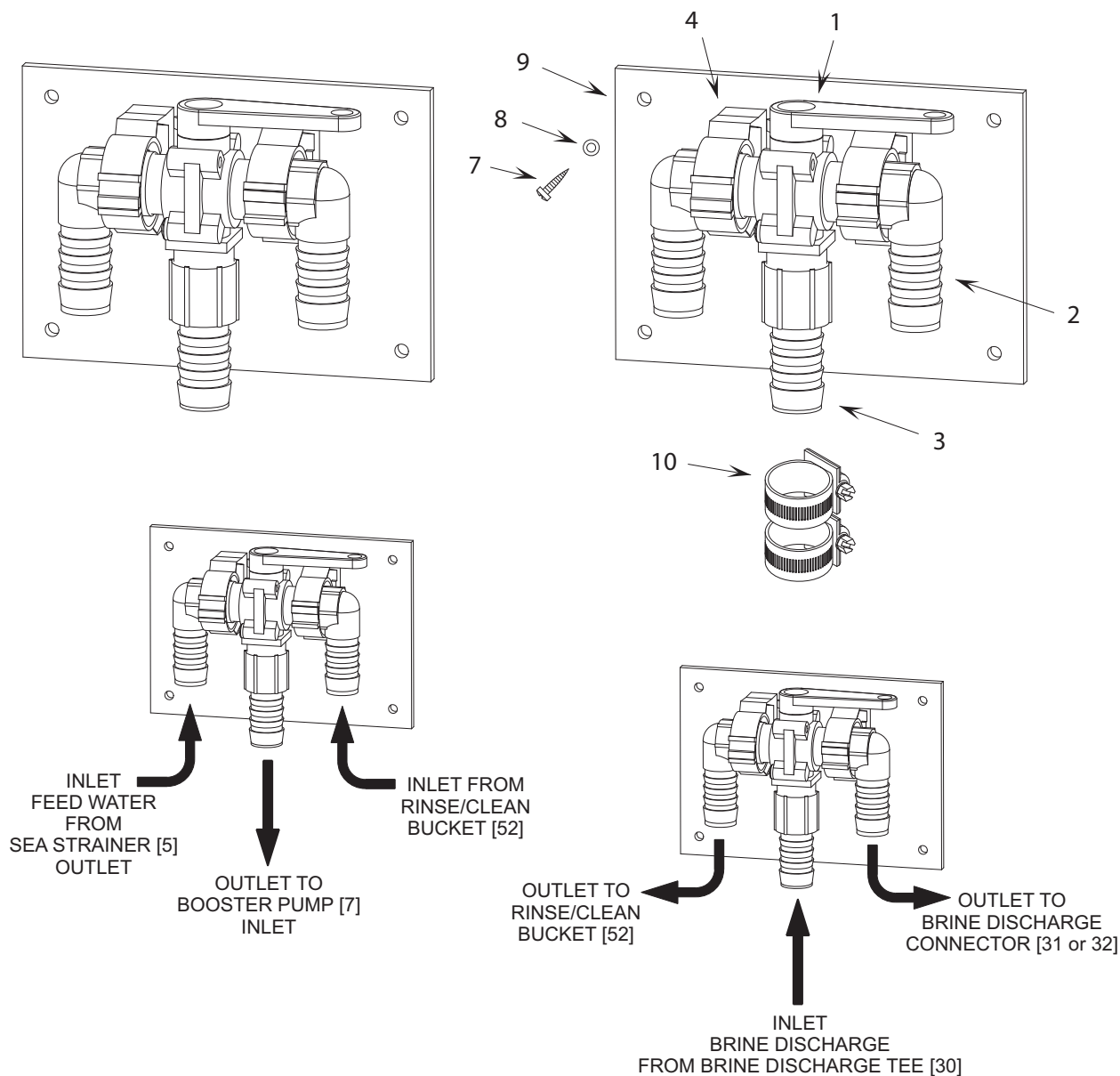


Feed Water Flow through the
Oil/Water Separator Element
is from the INSIDE CENTER
of the Element to the
OUTSIDE of the element



Oil/Water Separator utilizes the same housing as the Commercial Prefilter, however it is plumbed
OPPOSITE of the Commercial Prefilter and OPPOSITE of the raised arrows and markings IN and OUT
Separate Labels are placed on the Oil/Water Separator indicating correct INLET and OUTLET

ITEM	PART NUMBER	DESCRIPTION	QTY	U/M
1-11	B591120001	CLEAN AND RINSE KIT		
1	14011334AR	VALVE 3-WAY BALL 3/4" MPT	2	EA
2	0101063783	ELB90 3/4" FPT X 3/4" BARB PVC	4	EA
3	0101613783	ADAP 3/4" FPT X 3/4" BARB PVC	2	EA
4	0501164200	PIPE SUPPORT 1 1/8"	4	EA
5	061060026000	NUT HEX 8-32 W/INSERT SS	4	EA
6	061161626012	SC PHIL FLAT 8-32 X 3/4" SS	4	EA
7	061170628016	SC PHIL PAN "A" 10 X 1" SS	8	EA
8	065080028000	WASHER FLAT #10 NYLON	8	EA
9	20200404040	BRACKET CLEAN & RINSE KIT AS	2	EA
10	05181434AA	HOSE CLAMP 3/4" SS	12	EA
11	0328066666	HOSE CLEAR BRAID 3/4"	20	FT

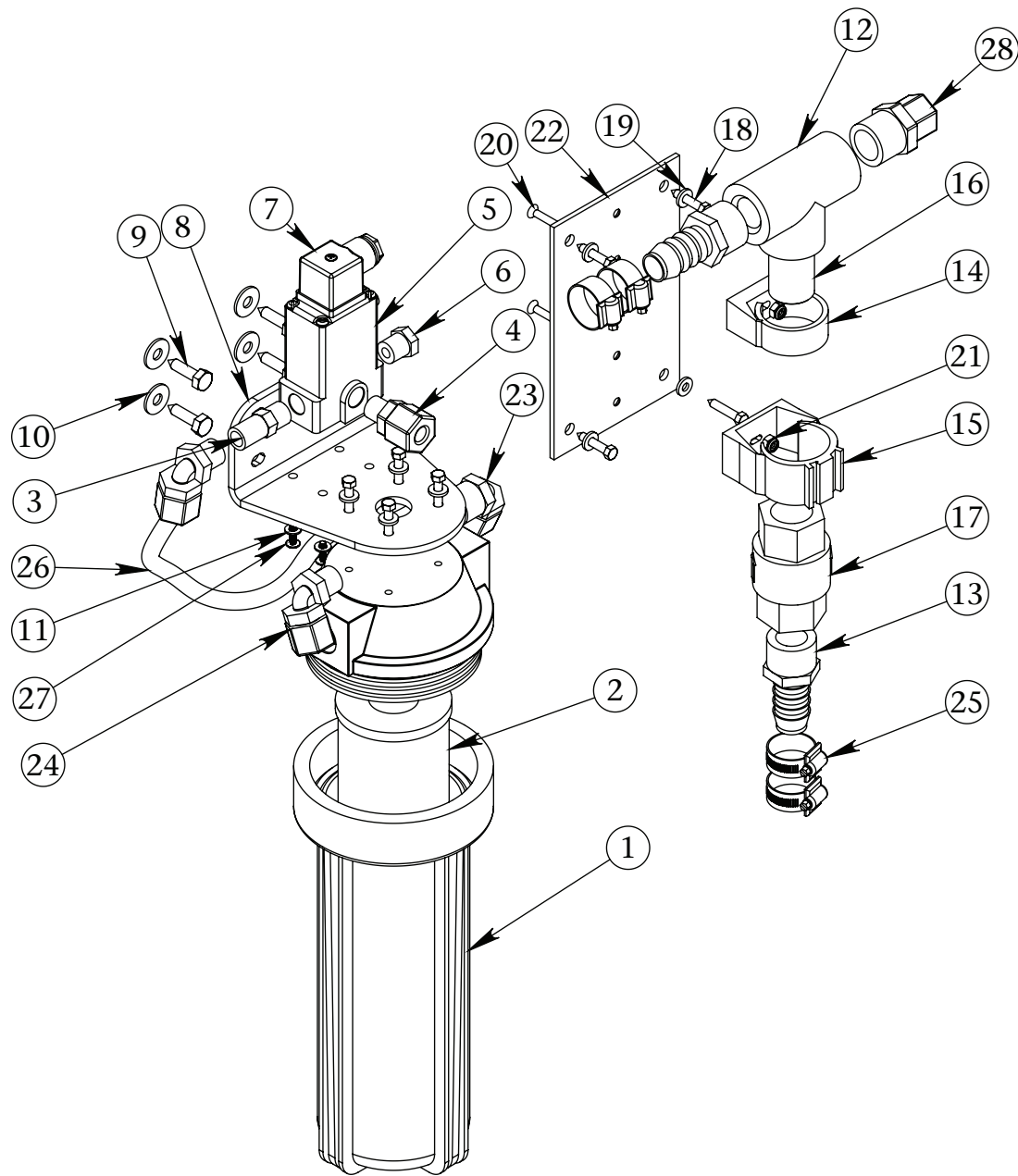


FRESH WATER FLUSH (.50 INCH) B598000008

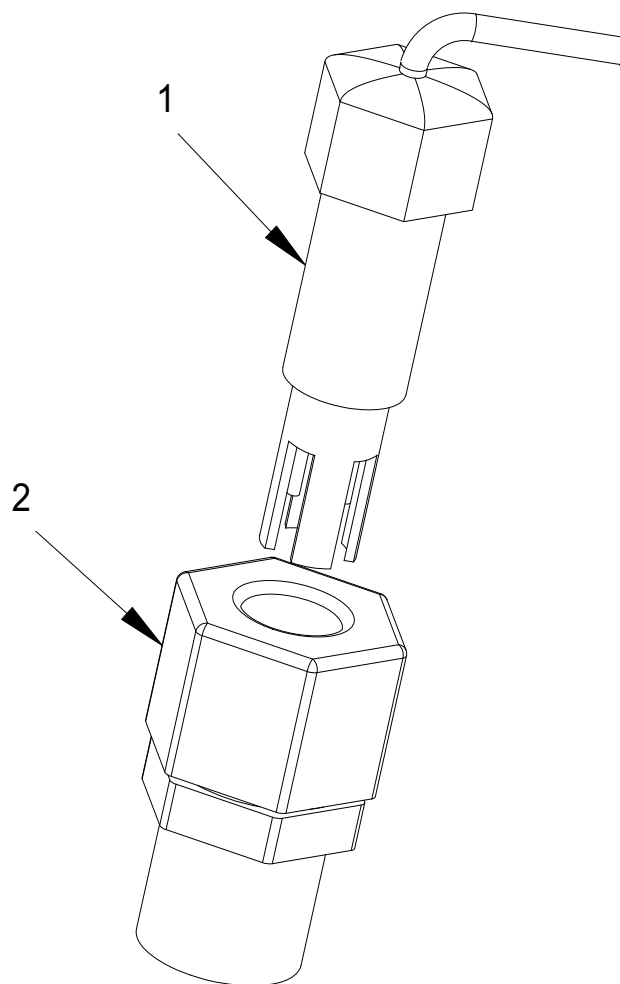
ITEM	PART NUMBER	DESCRIPTION	U/M	QTY
1	0713020873	FILTER HOUSING 1/2" X 10	EACH	1
2	0803004773	CHARCOAL FILTER 10 IN	EACH	1
3	14172105AT	VALVE CHECK .25 MNPT SS	EACH	1
4	0204091769	CONN 3/8 TUBE X 1/4 MPT PLASTIC	EACH	1
5	1401095998	VALVE SOLENOID 12VDC AED/CSFE	EACH	1
6	0101340883	PLUG 1/4 MPT PVC	EACH	1
7	3131680298	PLUG CONNECTOR DIN 3-PIN	EACH	1
8	20200402102	SINGLE FILTER BRACKET	EACH	1
9	061172143016	SC HEX "A" 1/4 X 1.0 SS	EACH	4
10	061100043000	WASHER FLAT OS 1/4"SS	EACH	4
11	065080023000	WASHER FLAT #8 NYLON	EACH	4
12	0101423783	TEE .75 FNPT x .75 FNPT x .75 FNPT PVC	EACH	1
13	0101423783	ADAP 3/4 MPT X 3/4 BARB PVC	EACH	2
14	0501164200	PIPE SUPPORT 1 1/8" #36	EACH	1
15	0501164500	PIPE SUPPORT 1 1/4"	EACH	1
16	01013737CL	NIPPLE .75 NPT X CLOSE PVC	EACH	1
17	14012118AR	VALVE CHECK .75 FNPT WITH VITO	EACH	1
18	061170628016	SC PHIL PAN "A" 10 X 1 SS	EACH	8
19	065080028000	WASHER FLAT #10 NYLON	EACH	8
20	061161626012	SC PHIL FLAT 8-32 X 3/4 SS	EACH	2
21	061060026000	NUT HEX 8-32 W/INSERT SS	EACH	2
22	2020040002	BRACKET CHECK VALVE FWF	EACH	1
23	0204021969	ELB90 3/8 TUBE X 1/2 MPT PLAST	EACH	1
24	0204011769	ELB90 .375 TUBE x .25 FNPT PLASTIC	EACH	2
25	05181432AA	HOSE CLAMP 1/2" SS	EACH	4
26	0312123569	TUBE .375 BLACK	FEET	15
27	061170623008	SC PHIL PAN "B" #8 X 1/2" SS	EACH	4
28	0204092069	CONN 3/8 TUBE X 3/4 MPT PLASTIC	EACH	1

Refer to illustration on page 09-22

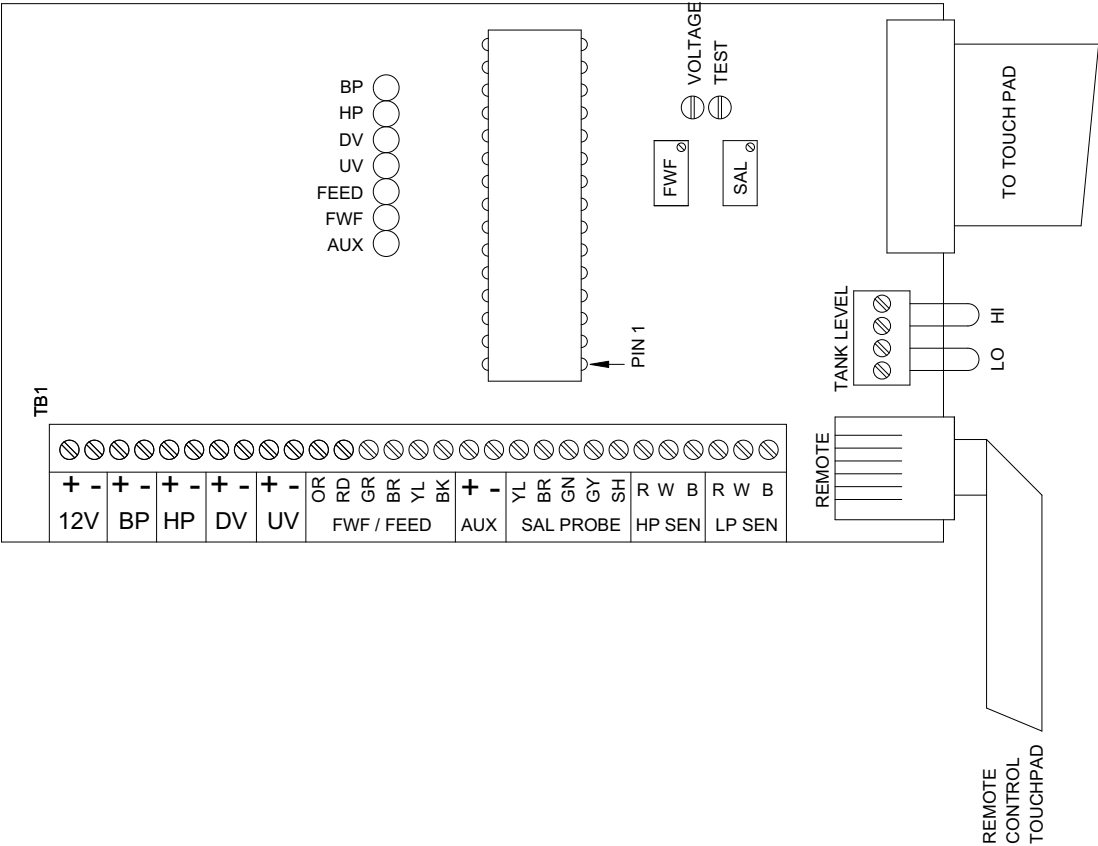
FRESH WATER FLUSH (.50 INCH) B598000008 - Illustration



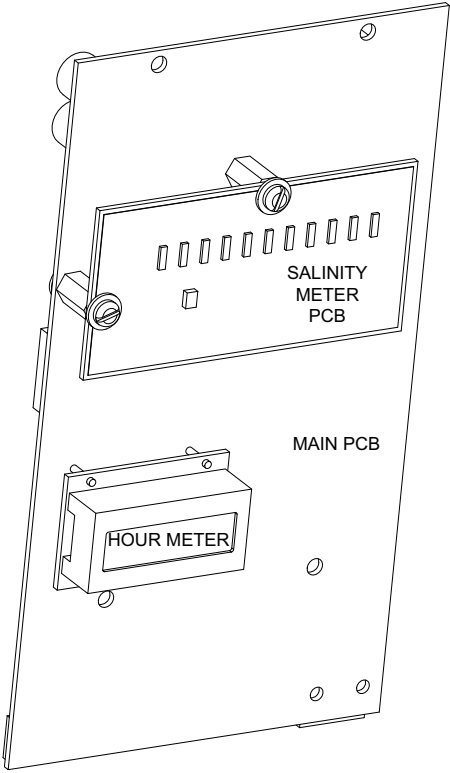
ITEM	PART NUMBER	DESCRIPTION	QTY	U/M
1-2	B51108001	SALINITY PROBE ASSY AQM	1	EACH
1	31314203HA	SALINITY PROBE W-TEMP SENSOR	1	EACH
2	0204092569	CONN 1/2 TUBE X 1/2 MNPT PLASTIC	1	EACH



PCB MAIN ASSY AW II PART NUMBER B596800012

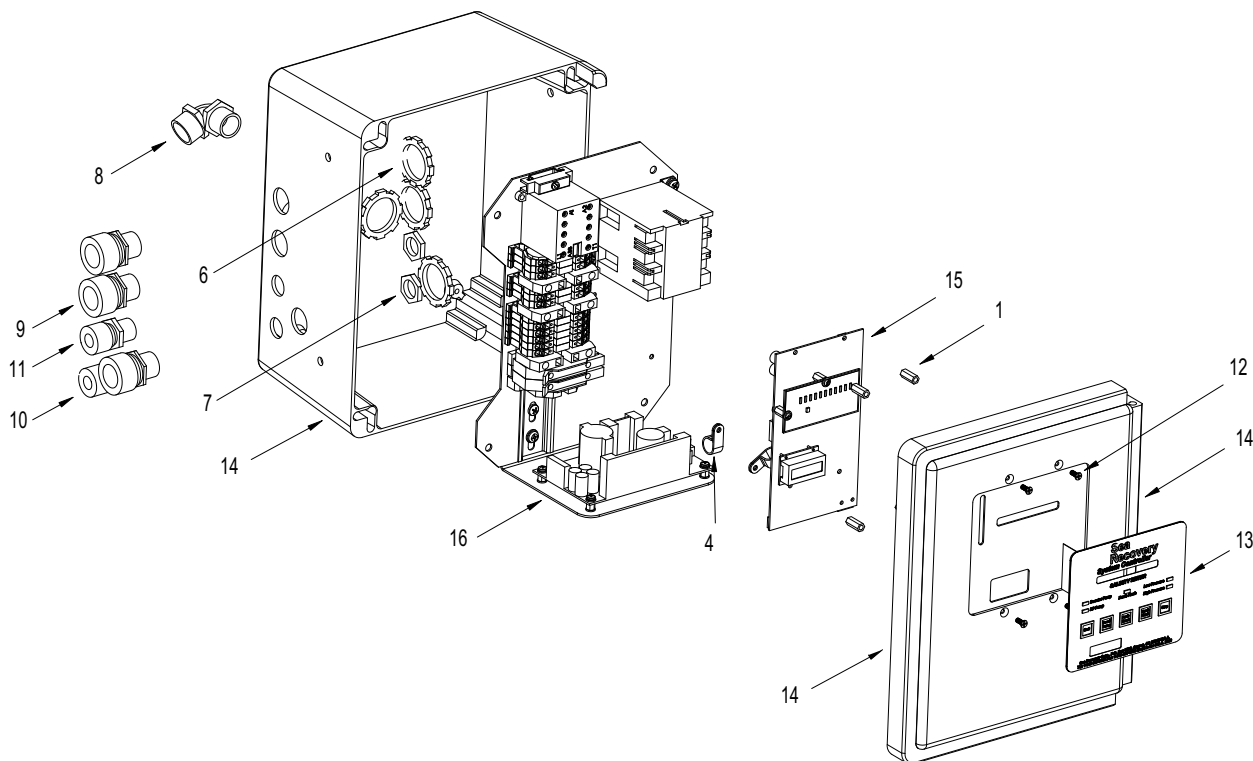


PCB MAIN ASSEMBLY
PART NUMBER B596800012



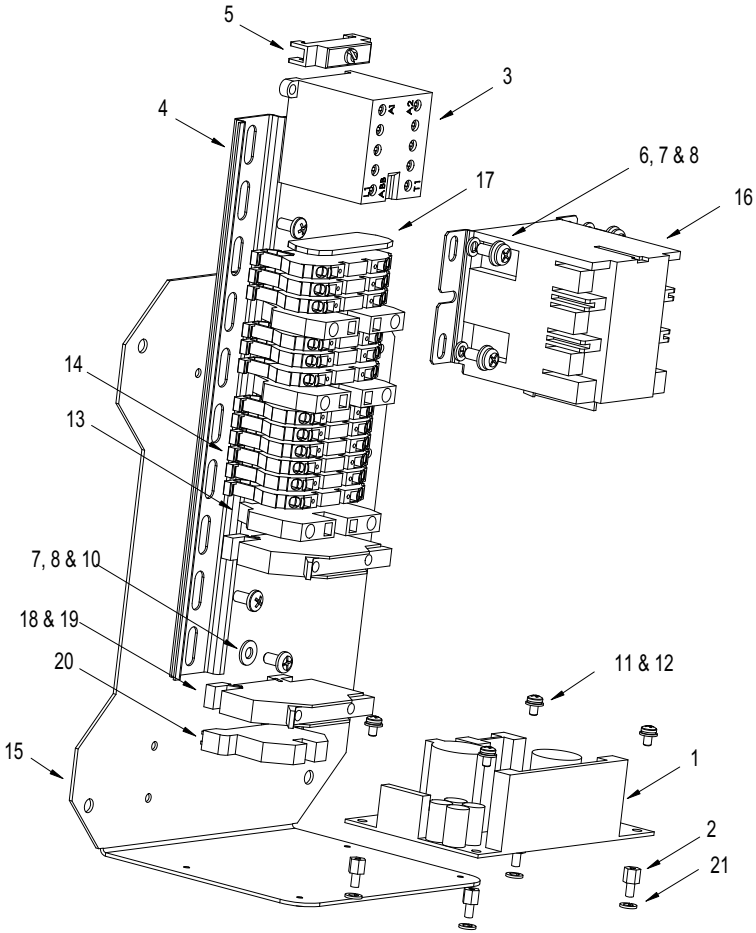
SINGLE PHASE OPERATING POWER

ITEM	PART NUMBER	DESCRIPTION	U/M	QTY
1 - 16	B595800008	CONTROLLER AW2 SINGLE PHASE		
1	067262820010	STANDOFF HEX #6-32 X .625 F X F	EACH	4
2	31312001DK	BUMP ON BLACK PAD	EACH	1
3	061160620006	SC PHIL PAN "A" #6 X 3/8 SS	EACH	2
4	0512130400	WIRE CLAMP .50 NYLON	EACH	2
5	0501130100	WIRE CLAMP AW (INSIDE CONTROLLER)	EACH	1
6	063200066000	NUT LOCK .50 STEEL	EACH	4
7	063200066000	NUT LOCK .38 STEEL	EACH	2
8	1920023632	STRAIN RELIEF 90 CG90-6250	EACH	1
9	1920020732	STRAIN RELIEF CG 6250	EACH	3
10	1920026532	STRAIN RELIEF CG-3138 STR	EACH	1
11	1920020432	STRAIN RELIEF CG-3150	EACH	1
12	061162020006	SC PHIL FLAT 6-32 X 3/8 SS	EACH	4
13	31315602CJ	TOUCH PAD MAIN	EACH	1
14	3131221300	ENCLOSURE AW	EACH	1
15	B596800012	PCB MAIN ASSEMBLY	EACH	1
16	B619110002	CONTROLLER CHASSIS ASSY AW-SF	EACH	1



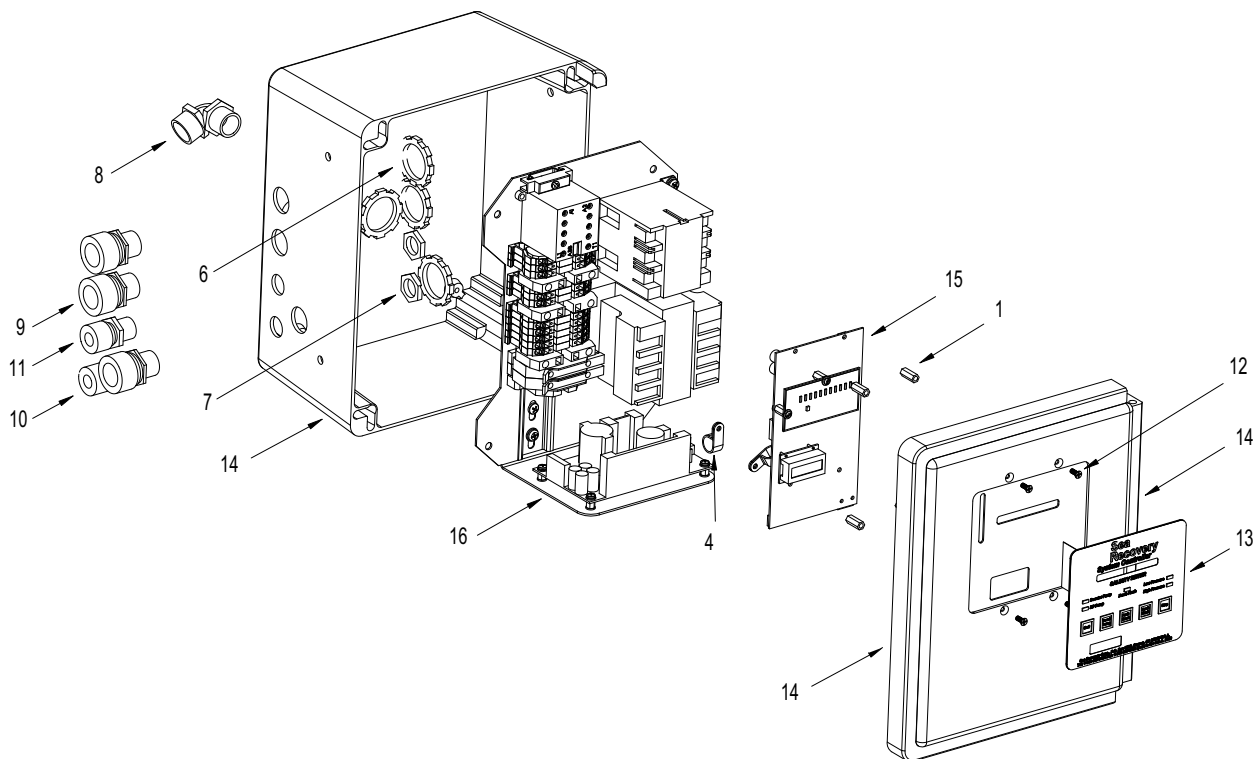
SINGLE PHASE OPERATING POWER

ITEM	PART NUMBER	DESCRIPTION	U/M	QTY
1-21	B619110002	CONTROLLER CHASSIS ASSY AW II SINGLE PHASE		
1	31314301CW	POWER SUPPLY 12V DC	EACH	1
2	067272720004	Hex Standoff 6-32 x 1/4" M F	EACH	4
3	31310110BF	CONTRACTOR 9A AUX	EACH	1
4	3131170147	CHANNEL DIN 35mm RAIL X 10.0LG	EACH	1
5	3131190347	END ANCHOR	EACH	1
6	061160631008	SC PHIL PAN #10-32 X 5/8 SS	EACH	4
7	061120028000	WASHER SPLIT LOCK #10 BRASS	EACH	7
8	061080028000	WASHER FLAT #10 SS	EACH	7
9	061160631006	SC PHIL PAN 10-32 X 3/8 SS	EACH	1
10	061160631005	SC PHIL PAN 10-32 X 5/16 SS	EACH	3
11	061120018000	WASHER SPLIT LOCK #6	EACH	4
12	061160620005	SC PHIL PAN #6-32 X .25 Special	EACH	4
13	31311523DM	TERMINAL 8 AWG DIN GREEN	EACH	3
14	31311508BY	TERMINAL BLOCK DIN GREY	EACH	12
15	3131231700	CHASSIS PLATE AW	EACH	1
16	31310603BF	CONTACTOR 30A AW AFTER 12-99 12VDC	EACH	1
17	31311508BY-1	TERMINAL BLOCK END SECTION AW	EACH	1
18	3131310400	FUSE HOLDER	EACH	2
19	3131301500	FUSE QUICK BLOW 2A	EACH	2
20	31311601BY	TERMINAL STOP GREY	EACH	1
21		WASHER STAR LOCK #6	EACH	4



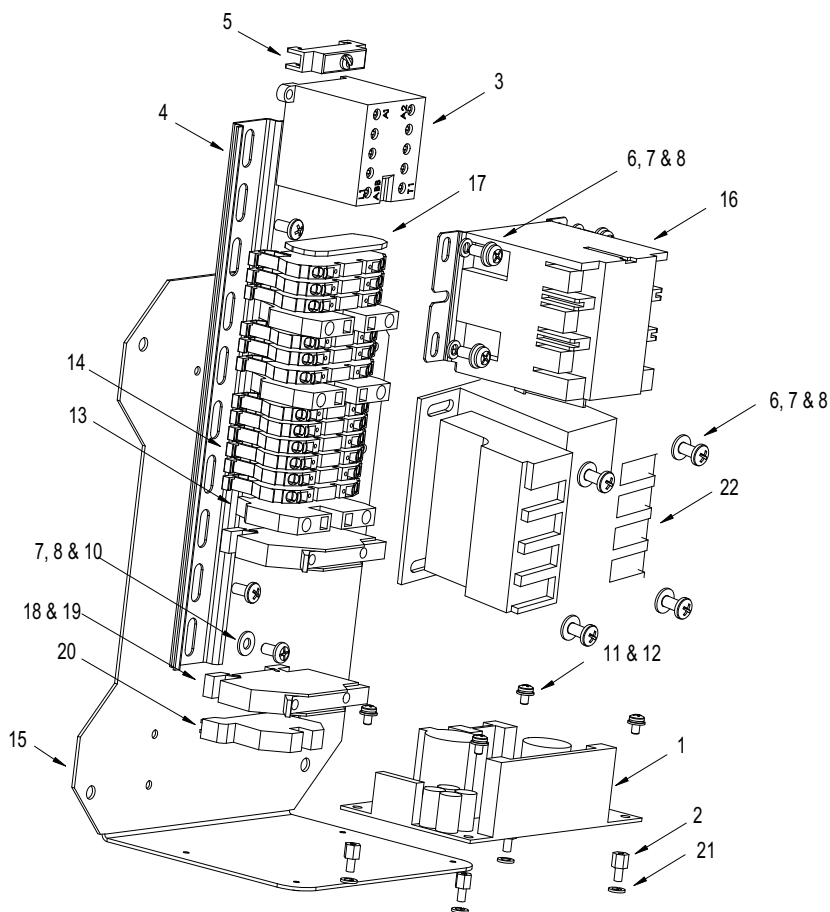
THREE PHASE OPERATING POWER

ITEM	PART NUMBER	DESCRIPTION	U/M	QTY
1 - 16	B595800009	CONTROLLER AW2 3 PHASE		
1	067262820010	STANDOFF HEX #6-32 X .625 F X F	EACH	4
2	31312001DK	BUMP ON BLACK PAD	EACH	1
3	061160620006	SC PHIL PAN "A" #6 X 3/8 SS	EACH	2
4	0512130400	WIRE CLAMP .50 NYLON	EACH	2
5	0501130100	WIRE CLAMP AW (INSIDE CONTROLLER)	EACH	1
6	063200066000	NUT LOCK .50 STEEL	EACH	4
7	063200066000	NUT LOCK .38 STEEL	EACH	2
8	1920023632	STRAIN RELIEF 90 CG90-6250	EACH	1
9	1920020732	STRAIN RELIEF CG 6250	EACH	3
10	1920026532	STRAIN RELIEF CG-3138 STR	EACH	1
11	1920020432	STRAIN RELIEF CG-3150	EACH	1
12	061162020006	SC PHIL FLAT 6-32 X 3/8 SS	EACH	4
13	31315602CJ	TOUCH PAD MAIN	EACH	1
14	3131221300	ENCLOSURE AW	EACH	1
15	B596800012	PCB MAIN ASSEMBLY	EACH	1
16	B619110003	CONTROLLER CHASSIS ASSY AW-SF 3 PHASE	EACH	1



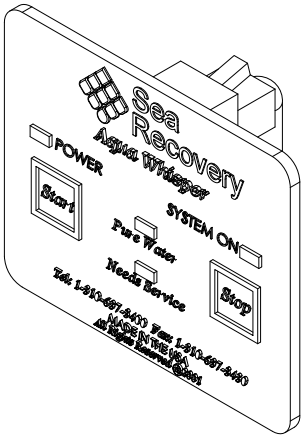
THREE PHASE OPERATING POWER

ITEM	PART NUMBER	DESCRIPTION	U/M	QTY
1-21	B619110003	CONTROLLER CHASSIS ASSY AW II THREE PHASE		
1	31314301CW	POWER SUPPLY 12V DC	EACH	1
2	067272720004	Hex Standoff 6-32 x 1/4" M F	EACH	4
3	31310110BF	CONTRACTOR 9A AUX	EACH	1
4	3131170147	CHANNEL DIN 35mm RAIL X 10.0LG	EACH	1
5	3131190347	END ANCHOR	EACH	1
6	061160631008	SC PHIL PAN #10-32 X 5/8 SS	EACH	8
7	061120028000	WASHER SPLIT LOCK #10 BRASS	EACH	11
8	061080028000	WASHER FLAT #10 SS	EACH	11
9	061160631006	SC PHIL PAN 10-32 X 3/8 SS	EACH	1
10	061160631005	SC PHIL PAN 10-32 X 5/16 SS	EACH	3
11	061120018000	WASHER SPLIT LOCK #6	EACH	4
12	061160620005	SC PHIL PAN #6-32 X .25 Special	EACH	4
13	31311523DM	TERMINAL 8 AWG DIN GREEN	EACH	3
14	31311508BY	TERMINAL BLOCK DIN GREY	EACH	12
15	3131231700	CHASSIS PLATE AW	EACH	1
16	31310603BF	CONTACTOR 30A AW AFTER 12-99 12VDC	EACH	1
17	31311508BY-1	TERMINAL BLOCK END SECTION AW	EACH	1
18	3131310400	FUSE HOLDER	EACH	2
19	3131301500	FUSE QUICK BLOW 2A	EACH	2
20	31311601BY	TERMINAL STOP GREY	EACH	1
21		WASHER STAR LOCK #6	EACH	4
22	3131131100	TRANSFORMER 3 PHASE AW AFTER 2000	EACH	1

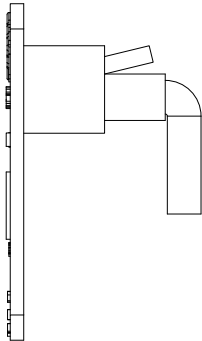


ITEM	PART NUMBER	DESCRIPTION
1	B61122003	REMOTE AQUA WHISPER II

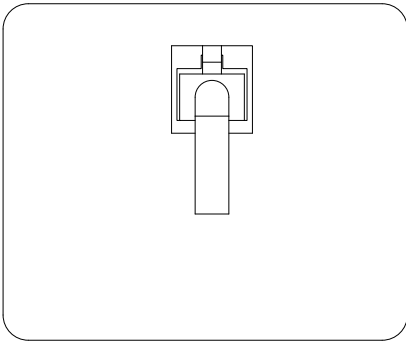
REMOTE TOUCH PAD PART NUMBER B61122003



FRONT VIEW

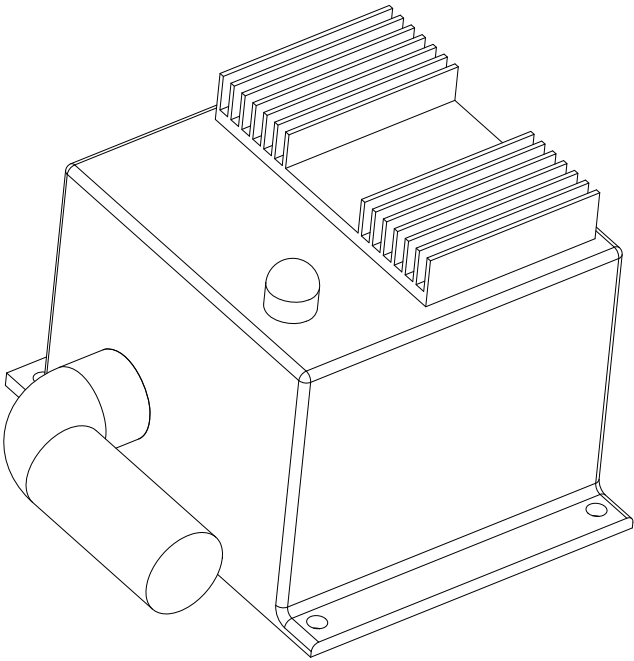


RIGHT END VIEW



REAR VIEW

ITEM	PART NUMBER	DESCRIPTION	QTY	U/M
1	B596800006	SOFT START ASSY AW	1	EACH



SPECIFIC FOR ONLY THE
COMPACT STYLE

PREFILTRATION CARTRIDGE FILTER ELEMENT WARNING:

Do not use third party Prefiltration Elements. Use only Sea Recovery supplied replacement Filter Elements. Third party prefiltration elements on the market do not properly fit into the Sea Recovery Filter Housings, the seams fall apart, and they will allow by-pass resulting in **EXTENSIVE AND EXPENSIVE DAMAGE TO THE HIGH PRESSURE PUMP AS WELL AS PREMATURE FOULING OF THE R.O. MEMBRANE ELEMENT.**

Damage caused to the Sea Recovery High Pressure Pump, R.O. Membrane Element, or any other component from the use of third party, non Sea Recovery supplied, filter elements is the responsibility and liability of the operator or maintenance technician and is not covered by the Sea Recovery Warranty.

PREFILTER ELEMENT CAUTION:

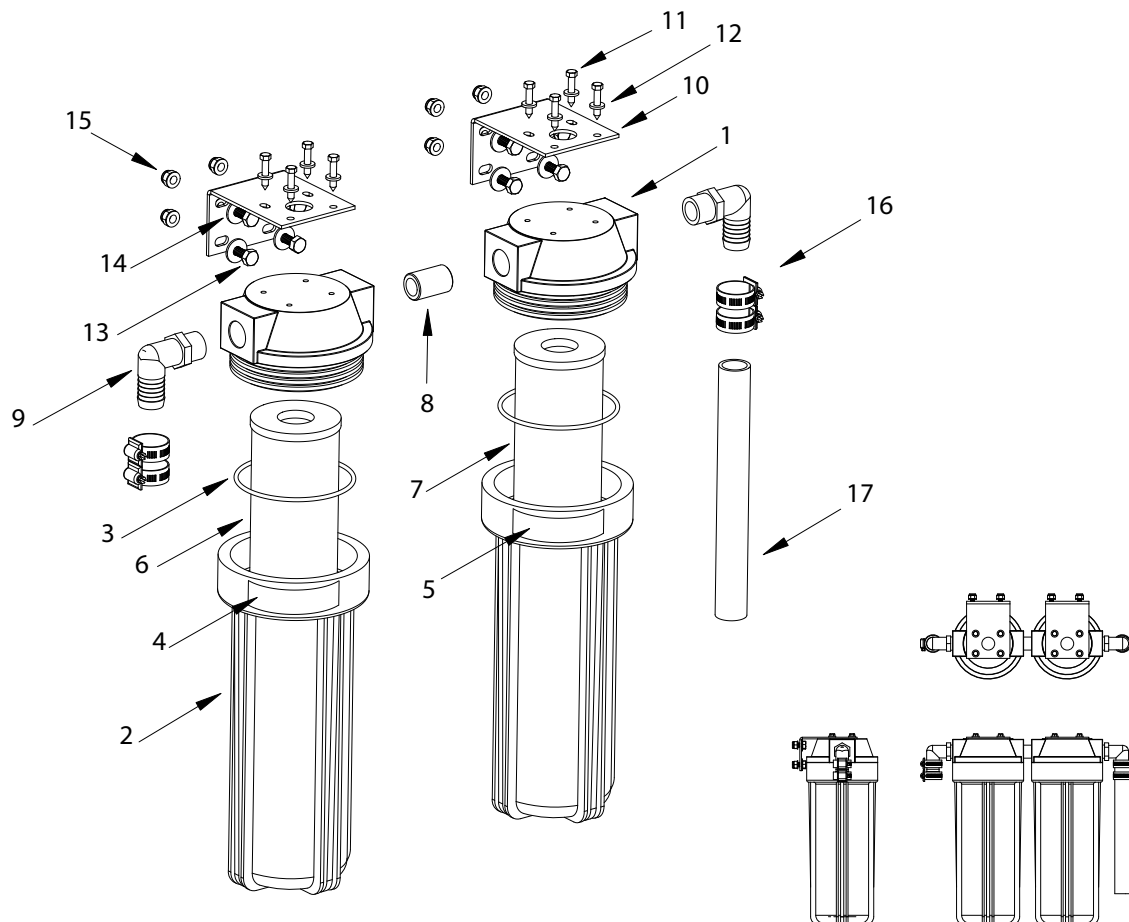
Do not use “string wound” or “fiber” type prefilter elements. These type of elements are designed for the Photographic Film Developing industry. When used in sea water they will plug up rapidly in 1/10th or less the time causing frequent shut down of the system and very frequent changing resulting in very high cost of maintenance.

SPECIFIC TO THE AQUA WHISPER II COMPACT STYLE ONLY:

ITEM	PART NUMBER	DESCRIPTION	U/M	QTY
1-17	B108800001	PREFILTER ASSY AWC		
1-3	0713020873	FLITER HOUSING 1/2 X 10 INCH	EACH	2
1		LID FILTER HOUSING 1/2 X 10 INCH		
2		BOWL FILTER HOUSING 1/2 X 10 INCH		
3	2614010473	O-RING 237 10 INCH PREFILTER BLUE HOUSING		
4	2234012360	LABEL 25 MICRON PREFILTER -1	EACH	1
5	2234012460	LABEL 5 MICRON PREFILTER -2	EACH	1
6	0801130257	ELEMENT PREFILTER 10-25	EACH	1
7	0801060157	ELEMENT PREFILTER 10-05	EACH	1
8	01013725CL	NIPPLE 1/2 NPT X CLOSE PVC	EACH	1
9	0112072600	ELB90 1/2 MPT X 3/4 BARB NYLON	EACH	2
10	20200402100	BRACKET PREFILTER CHARCOAL - PLANKTON	EACH	2
11	061170628016	SC PHIL PAN "a" 10 X 1 SS	EACH	8
12	065080028000	WASHER FLAT #10 NYLON	EACH	8
13	061142150016	BOLT HEX 1/4-20 X 5/8" SS	EACH	8
14	061100043000	WASHER FLAT OS 1/4" SS	EACH	8
15	061060045000	NUT HEX 1/4-20 W/INSERT SS	EACH	8
16	05181434AA	HOSE CLAMP 3/4" SS	EACH	4
17	0328066666	HOSE CLEAR BRAID 3/4" ID	FEET	A/R

FILTER ELEMENT WARNING: Do not use third party Prefiltration Elements (Plankton Filter Elements, Prefilter Elements, Commercial Prefilter Elements, or Oil/Water Separator Elements). Use only Sea Recovery supplied Prefiltration Elements. Third party prefiltration elements on the market do not properly fit into the Sea Recovery Filter Housings, the seams fall apart, and they will allow by-pass resulting in **EXTENSIVE AND EXPENSIVE DAMAGE TO THE HIGH PRESSURE PUMP AS WELL AS PREMATURE FOULING OF THE R.O. MEMBRANE ELEMENT.** Damage caused to the Sea Recovery High Pressure Pump, R.O. Membrane Element, or any other component from the use of third party, non Sea Recovery supplied, filter elements is the responsibility and liability of the operator or maintenance technician and is not covered by the Sea Recovery Warranty.

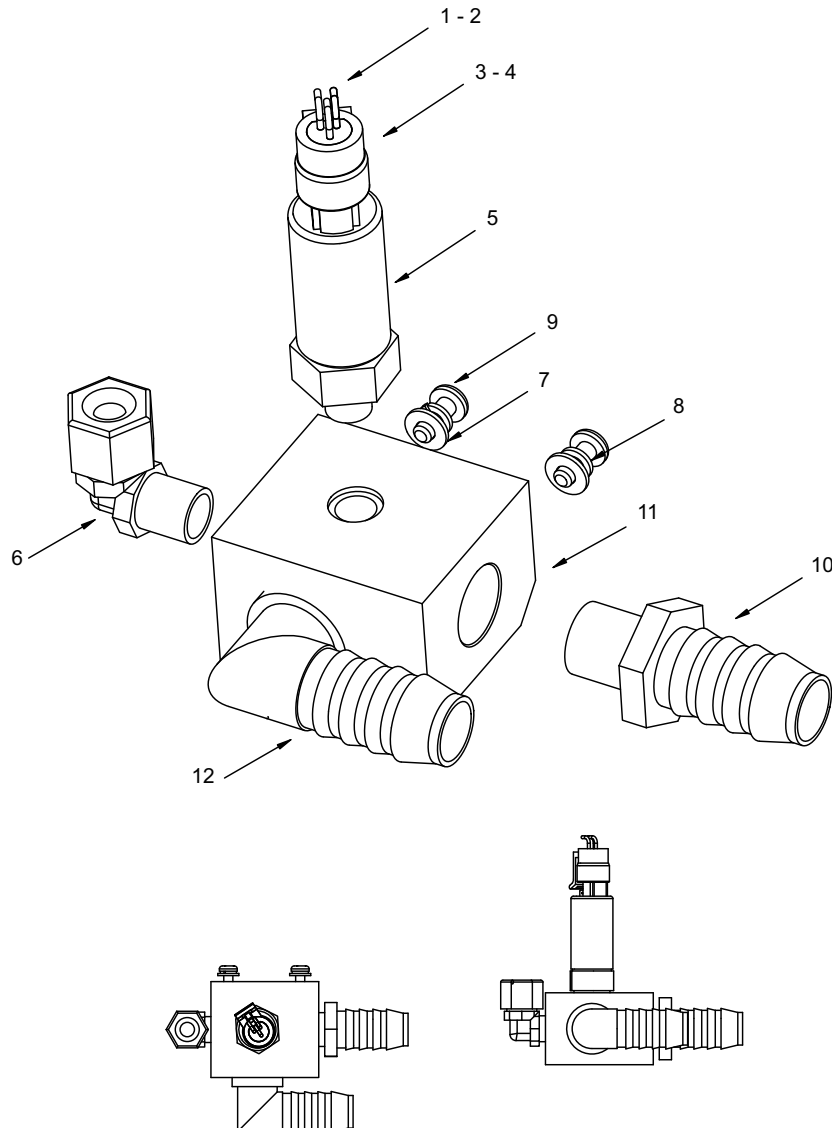
FILTER ELEMENT CAUTION: Do not use "string wound" or "fiber" type prefilter elements. These type of elements are designed for the Photographic Film Developing industry. When used in sea water they will plug up rapidly in 1/10th or less the time causing frequent shut down of the system and very frequent changing resulting in very high cost of maintenance.



SPECIFIC TO THE AQUA WHISPER II COMPACT STYLE ONLY:

ITEM	PART NUMBER	DESCRIPTION	U/M	QTY
1-12	P502910002	MANIFOLD LP ASSY AWC		
1	4942230504	WIRE 24/3 WHITE JACKET	FEET	6
2	3131164300	WIRE MARKER 1" 12 - 10 AWG	EACH	1
3	31318212CS	PIN PRESSURE TRANSDUCER PLUG	EACH	3
4	31311012CS	PLUG PRESSURE TRANSDUCER	EACH	1
5	2317100200	TRANSDUCER 0-200 PSI .437 SAE	EACH	1
6	0204020869	ELB90 1/4 TUBE X 1/4 MPT PLASTIC	EACH	1
7	061080028000	WASHER FLAT #10 SS	EACH	2
8	061120028000	WASHER SPLIT LOCK #10 SS	EACH	2
9	061160631008	SC PHIL PAN #10-32 X 5/8 SS	EACH	2
10	0101652683	ADAP 1/2 MNPT X 3/4 BARB PVC	EACH	1
11	5301090600	MANIFOLD LP AWC PVC	EACH	1
12	0101073783	ELB90 3/4 MPT X 3/4 BARB PVC	EACH	1

Note: This **MANIFOLD LP ASSY AWC** is installed inside the Aqua Whisper II Compact Frame and picks up pressure for the Low Pressure Transducer [20] after all prefiltration and just prior to the High Pressure Pump Inlet.



HIGH PRESSURE PUMP WARNING:

Two similar pumps are commercially available. One has a lower water flow rate, the other has a higher water flow rate than the Sea Recovery High Pressure Pump.

The commercially available **lower water flow rated pump** will cause:

- a. Poor quality Product Water.
- b. Low Product Water Flow.
- b. Excessive operating pressure as the System attempts to adjust pressure to achieve rated Product Water Flow.
- b. Immediate fouling of the Sea Recovery Aqua Whisper II R.O. Membrane Elements resulting in unrecoverable damage to them.

The commercially available **higher water flow rated pump** will cause:

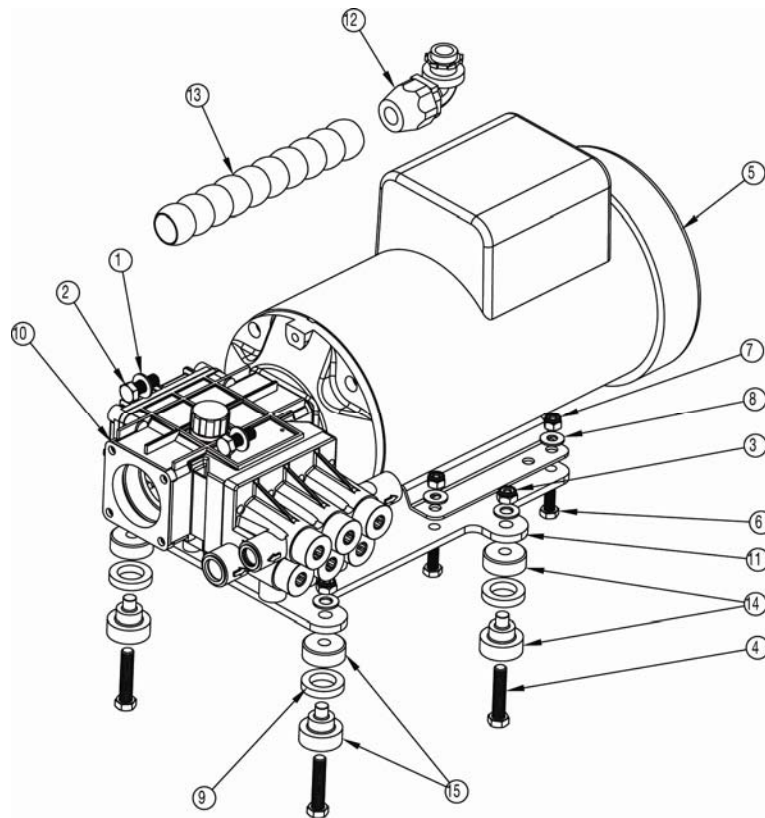
- a. Low feed water pressure into the high pressure pump.
- b. Line pressure loss of feed water resulting in continual system shut down.
- c. Cavitation to the high pressure pump resulting in premature failure of the pump.
- d. Extensive Line Pressure Build-Up in the High Pressure Hoses and Manifolds.
- d. Telescoping damage of the R.O. Membrane Elements due to excessive feed flow across them.
- e. Over heating of the High Pressure Pump Electric Motor due to excessive load.

NEVER REPLACE THE SEA RECOVERY HIGH PRESSURE PUMP WITH A THIRD PARTY, NON SEA RECOVERY SUPPLIED, HIGH PRESSURE PUMP. THE SEA RECOVERY AQUA WHISPER II HIGH PRESSURE PUMP IS NOT AVAILABLE THROUGH ANY SOURCE OTHER THAN SEA RECOVERY and SEA RECOVERY DEALERS. WHEN REPAIRING OR REPLACING THE HIGH PRESSURE PUMP ENSURE THAT THE MARINE DEALER HAS OBTAINED THE REPAIR PARTS OR THE PUMP FROM SEA RECOVERY.

DAMAGE CAUSED TO THE SEA RECOVERY SYSTEM RESULTING FROM THE USE OF NON SUPPLIED SEA RECOVERY PARTS OR COMPONENTS IS THE RESPONSIBILITY AND LIABILITY OF THE MARINE DEALER THAT SUPPLIED THE PUMP OR PARTS AND THE OPERATOR AND IS NOT COVERED BY THE SEA RECOVERY WARRANTY.

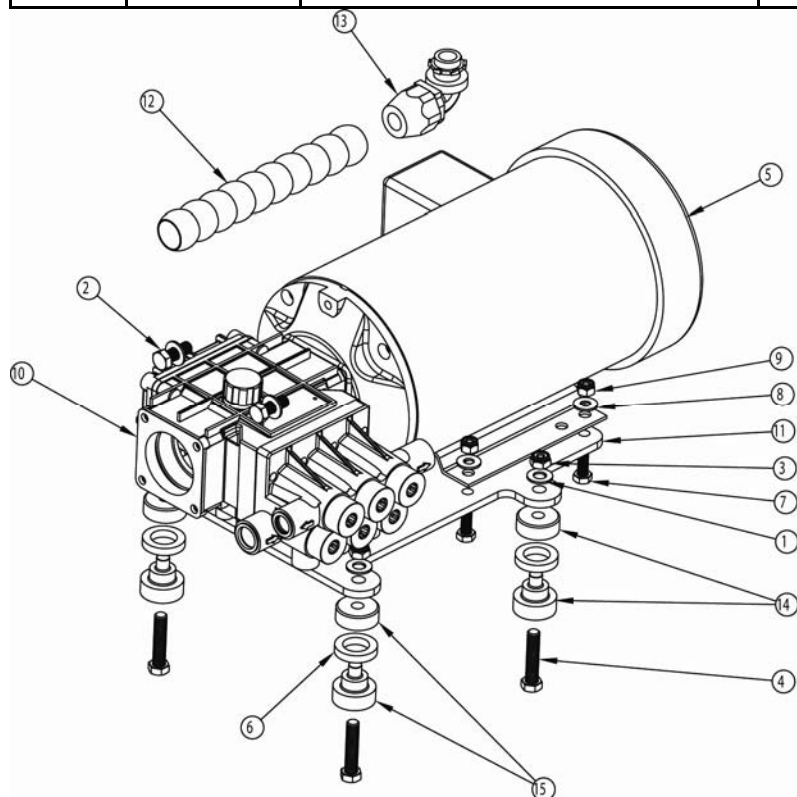
SPECIFIC TO THE AQUA WHISPER II COMPACT STYLE ONLY: (STANDARD)
HP PUMP & MOTOR ASSY-SINGLE PHASE-B156930003

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	061080056000	WASHER FLAT 3/8" SS	8
2	061142157016	BOLT HEX 3/8-16 X 1 SS	4
3	061060057000	NUT HEX 3/8-16 W-INSERT SS	4
4	061142157028	BOLT HEX 3/8-16 X 1 3/4 SS	4
5	15AE261912	MOTOR 3/2.5 HP 115/230 1PH	1
6	061142150012	BOLT HEX 5/16-18 X 3/4 SS	4
7	061060050000	HEX NUT 5/16-18 W/INSERT SS	4
8	061100049000	WASHER FLAT OS 5/16" SS	4
9	2020043902	SPACER, MOTOR MOUNT AQM II	4
10	12180513CO	HP PUMP-GP NSWCC 4.2 RH	1
11	20200239002	PLATE, GP MOTOR MOUNT PLATE AQWC II	1
12	1920016590	STRAIN RELIEF 90, .50 BLK W-NUT	1
13	4928402800	CONDUIT .50 FLEX BLK	1
14	2115031700	RUBBER MOUNT 90LB AQM	2
15	2115031020	RUBBER MOUNT 40LB AQMII	2



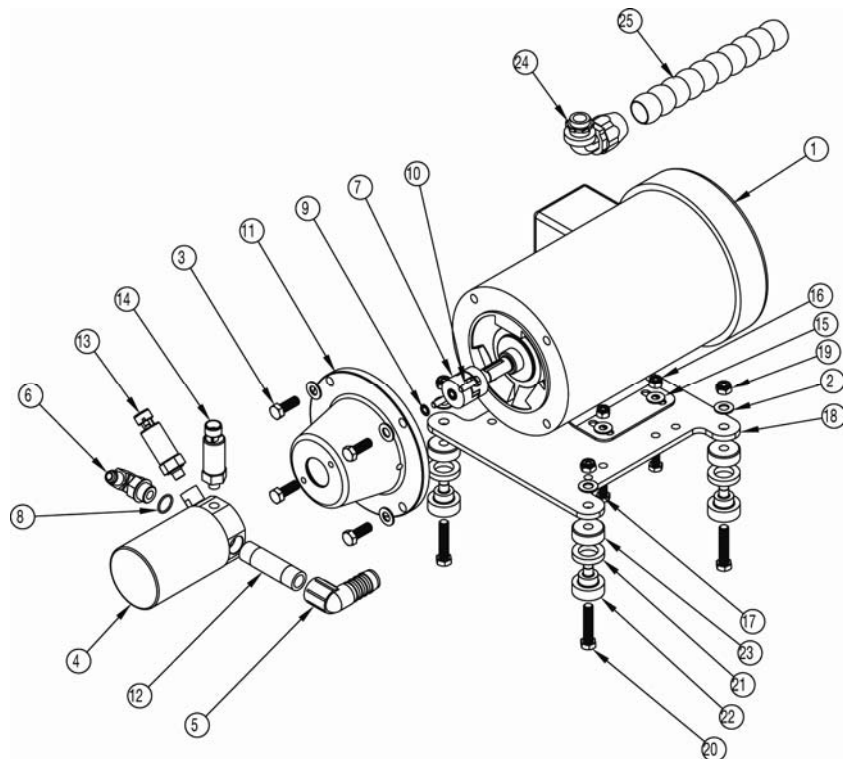
SPECIFIC TO THE AQUA WHISPER II COMPACT STYLE ONLY: (STANDARD)
HP PUMP & MOTOR ASSY-3 PHASE 50/60Hz- B156930004/5

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	061080056000	WASHER FLAT 3/8" SS	8
2	061142157016	BOLT HEX 3/8-16 X 1 SS	4
3	061060057000	NUT HEX 3/8-16 W-INSERT SS	4
4	061142157028	BOLT HEX 3/8-16 X 1 3/4 SS	4
5	15AF241012	MOTOR 3 HP 220/380 -50/3PH	1
6	2020043902	SPACER, MOTOR MOUNT AQM II	4
7	061142150012	BOLT HEX 5/16-18 X 3/4 SS	4
8	061100049000	WASHER FLAT OS 5/16" SS	4
9	061060050000	HEX NUT 5/16-18 W/INSERT SS	4
10	12180513CO	HP PUMP-GP NSWCC 4.2 RH	1
11	20200239002	PLATE, GP MOTOR MOUNT PLATE AQWC II	1
12	4928402800	CONDUIT .50 FLEX BLK	1
13	1920016590	STRAIN RELIEF 90, .50 BLK W-NUT	1
14	2115031700	RUBBER MOUNT 90LB AQM	2
15	2115031020	RUBBER MOUNT 40LB AQMII	2



SPECIFIC TO THE AQUA WHISPER II COMPACT STYLE ONLY: (OPTIONAL)

HIGH PRESSURE PUMP AND MOTOR ASSEMBLY THREE PHASE ALTERNATING CURRENT 200-220/380 VAC 50 Hz, 3 PHASE AND 208-230/460 VAC, 60 Hz, 3 PHASE



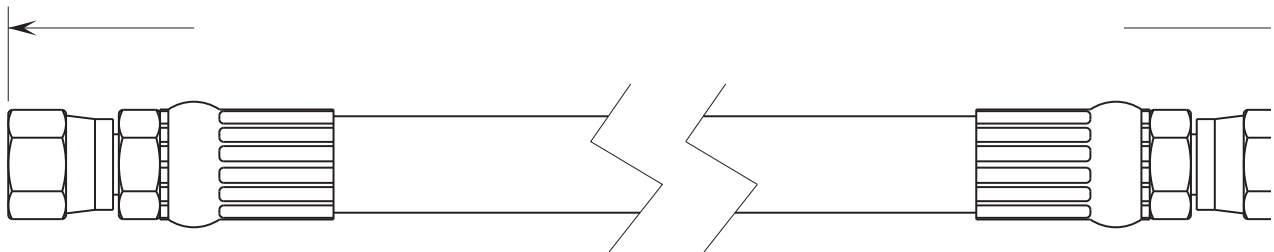
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	15AF271910	MOTOR 3/2.5 HP 3 PH 50/6	1
2	061080056000	WASHER FLAT 3/8" SS	8
3	061142157016	BOLT HEX 3/8-16 X 1 SS	4
4	12572405DS	HPRA PUMP 4.37 GPM V2	1
5	0101062683	ELB90 .50 FNPT X .75 BARB PVC	1
6	1317021869	ELB90 -6 FLARE X 3/4 UNF SS	1
7	12207602RW	COUPLER TX1	1
8	353033002A	O-RING 017	1
9	061120091000	WASHER SPLIT LOCK M6 SS	2
10	061142191174	HEX BOLT M6 X 20MM SS	2
11	1220770103	BELL HOUSING AQ/AW 3PH	1
12	0117372530	NIPPLE 1/2NPT X 3.0 LG SS	1
13	2317100300	TRANSDUCER 0-2000 PSI 7/16" SAE	1
14	2317100200	TRANSDUCER 0-200 PSI 7/16" SAE	1
15	061100049000	WASHER FLAT OS 5/16" SS	4
16	061060050000	HEX NUT 5/16-18 W/INSERT SS	4
17	061142150012	BOLT HEX 5/16-18 X 3/4 SS	4
18	20200239000	PLATE, MOTOR MOUNT,	1
19	061060057000	NUT HEX 3/8-16 W-INSERT SS	4
20	061142157028	BOLT HEX 3/8-16 X 1 3/4 SS	4
21	-	(NOT USED)	
22	2115031020-1	RUBBER MOTOR MOUNT 40LB.	4
23	2115031020-2	RUBBER MOTOR MOUNT 40LB.	4
24	1920016590	STRAIN RELIEF 90, .50 BLK W-NUT	1
25	4928402800	CONDUIT .50 FLEX BLK	1

SPECIFIC TO THE AQUA WHISPER II COMPACT STYLE ONLY:

HIGH PRESSURE HOSE ASSEMBLY

PART NUMBER	DESCRIPTION	LENGTH	PORT
B390800017	HOSE HP ASSY AWC-II 450-1	14 3/4" / 375mm	INLET
B390800018	HOSE HP ASSY AWC-II 450-1	29 1/4" / 743mm	OUTLET
B390800019	HOSE HP ASSY AWC-II 700-1	15 1/2" / 394mm	INLET
B390800020	HOSE HP ASSY AWC-II 700-1	32 1/2" / 826mm	OUTLET
B390800021	HOSE HP ASSY AWC-II 900-1	18 1/4" / 464mm	INLET
B390800022	HOSE HP ASSY AWC-II 900-1	38 1/2" / 978mm	OUTLET
B390800023	HOSE HP ASSY AWC-II 900-2	15 3/4" / 400mm	INLET
B390800024	HOSE HP ASSY AWC-II 900-2	23 1/2" / 597mm	OUTLET
B390800025	HOSE HP ASSY AWC-II 1400-2	15 1/2" / 394mm	INLET
B390800026	HOSE HP ASSY AWC-II 1400-2	23" / 584mm	OUTLET
B390800005	HOSE HP ASSY AWC-II 1800-2	18 7/8" / 479mm	INLET
B390800027	HOSE HP ASSY AWC-II 1800-2	25" / 635mm	OUTLET

SPECIFY PART NUMBER AND DESCRIPTION OF SPECIFIC HIGH PRESSURE HOSE ASSEMBLY
OR IF A SPECIAL LENGTH IS REQUIRED, SPECIFY MEASURED OVERALL LENGTH: FITTING TO FITTING



OVERALL LENGTH IS + / - 1/4" (6mm)

SPECIFIC TO THE AQUA WHISPER II COMPACT STYLE ONLY:

SINGLE REVERSE OSMOSIS MEMBRANE/VESSEL ASSEMBLY

AQUA WHISPER II MODEL AND STYLE PART NUMBER DESCRIPTION

AQUA WHISPER II 450-1 COMPACT B198000020 MEMBRANE RACK 450-1 AQMC & AQTC

AQUA WHISPER II 700-1 COMPACT B198000021 MEMBRANE RACK 700-1 AQMC & AQTC

AQUA WHISPER II 900-1 COMPACT B198000022 MEMBRANE RACK 900-1 AQMC & AQTC

SINGLE REVERSE OSMOSIS MEMBRANE/VESSEL ASSY FOR AQUA WHISPER II COMPACT STYLE:

ITEM	PART NUMBER	DESCRIPTION	QTY	U/M
1-33	B198000020	MEMBRANE RACK 450-1 AQMC & AQTC	1	EACH
OR				
1-33	B198000021	MEMBRANE RACK 700-1 AQMC & AQTC	1	EACH
OR				
1-33	B198000022	MEMBRANE RACK 900-1 AQMC & AQTC	1	EACH
1	061060045000	NUT HEX 1/4-20 W/INSERT SS	2	EACH
2	061100043000	WASHER FLAT OS 1/4" SS	4	EACH
3	061142145016	BOLT HEX 1/4-20 X 1 SS	2	EACH
4	0117410800	NIPPLE HP MVA AW	2	EACH
5	2614017900	O-RING 115 INTERCONNECTAW	4	EACH
6	2453502400	END PLUG SINGLE 3" AW	1	EACH
7	2453512400	END PLUG DUAL 3" AW	1	EACH
8	20201030000	SEGMENT RING AW (SET)	2	EACH
9	0520210600	RETAINER PORT MVA AW	2	EACH
10	061162345012	SC SOC CAP 1/4-20 X 3/4 SS	6	EACH
11	0101370815	NIPPLE 1/4 NPT X 1 1/2 PVC	1	EACH
12	0204010869	ELB90 1/4 TUBE X 1/4 FPT PLAST	1	EACH
13	2614010100	O-RING 116 PRODUCTAS/AW	2	EACH
14	2614014900	O-RING 230 BRINE 3" END PLUG	4	EACH
15	2234011360	LABEL OUTLET (SRC BLUE)	1	EACH
16	2234011260	LABEL INLET(SRC BLUE)	1	EACH
17	2220010660	LABEL MEMBRANE SERIAL NO. SRC	1	EACH
18	0312121969	TUBE 1/4 BLACK	1.5	FEET
19	05202401GR	BRACKET MVA (AL) U CLAMP AW	2	EACH
20	0520051800	MVA RACK, AW SERIES >9/01	2	EACH
21	061161845012	SC ALLEN FLAT 1/4-20 X 3/4 SS	4	EACH
22	2632180426	DECOFELT 1/8 X 1 1/4 BLK ADH B	0.5	FEET
23	1317011769	ELB90 -6 FLARE X 1/4 FPT SS	2	EACH
24	0204990200	PLUG 3/8 JQ	1	EACH
25	0204690100	REDUCER 3/8 X1/4 JQ	1	EACH

FOR AQUA WHISPER II 450-1:

26	B390120001	HOSE HP ASSY AQMC 450-1 17.75" INLET	1	EACH
27	B390120002	HOSE HP ASSY AQMC 450-1 12" OUTLET	1	EACH
28	2408132500	VESSEL HIGH PRESSURE 450GPD AW	1	EACH
29-30	2724011233	MEMBRANE 450GPD AW W/ BRINE SEAL	1	EACH
30	2614050433	BRINE SEAL 3"		

FOR AQUA WHISPER II 700-1:

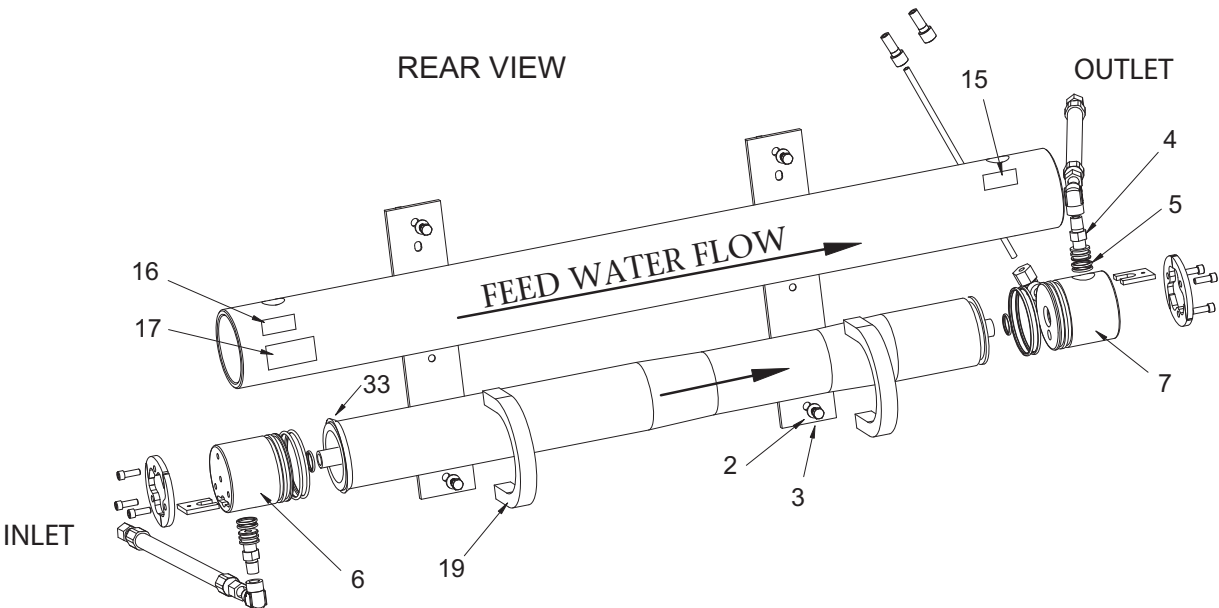
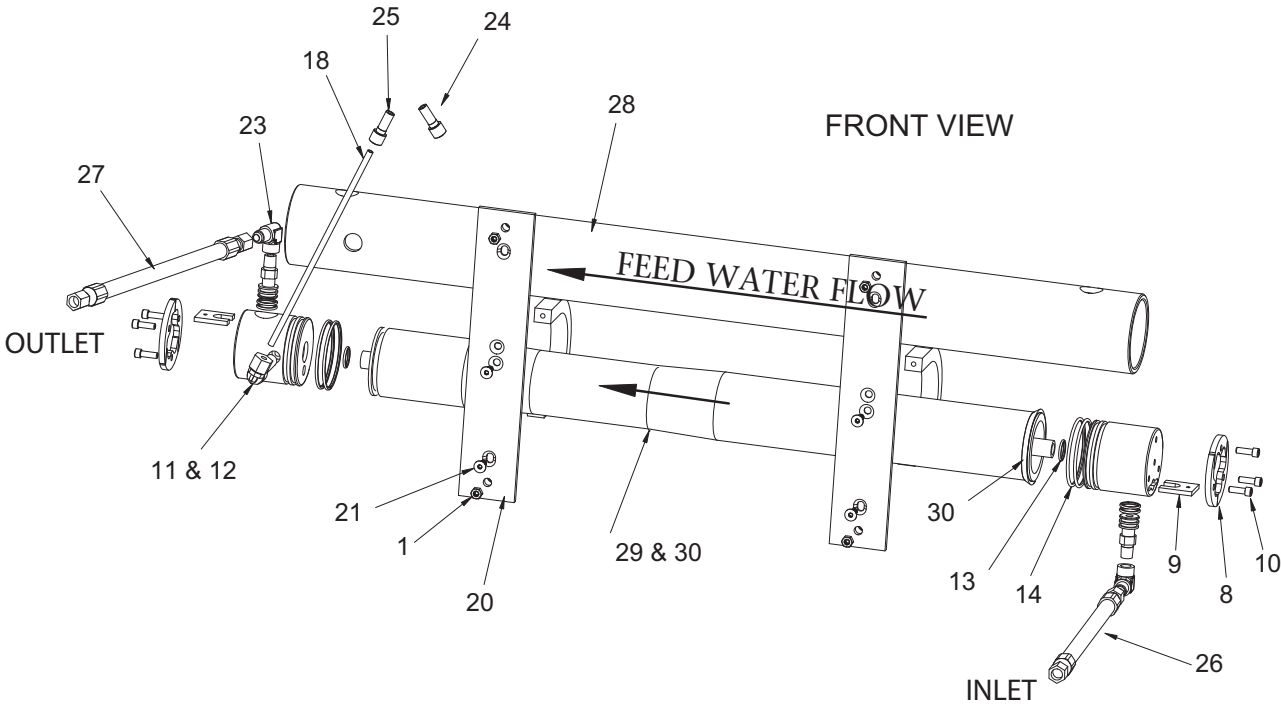
26	B390120003	HOSE HP ASSY AQMC 700-1 19.75" INLET	1	EACH
27	B390120004	HOSE HP ASSY AQMC 700-1 14.25" OUTLET	1	EACH
28	2408132500-01	VESSEL HIGH PRESSURE 700GPD AW	1	EACH
29-30	2724011333	MEMBRANE 700GPD AW W/ BRINE SEAL	1	EACH
30	2614050433	BRINE SEAL 3"		

FOR AQUA WHISPER II 900-1:

26	B390120005	HOSE HP ASSY AQMC 900-1 23.75" INLET	1	EACH
27	B390120006	HOSE HP ASSY AQMC 900-1 17.75" OUTLET	1	EACH
28	2408132500-02	VESSEL HIGH PRESSURE 900GPD AW	1	EACH
29-30	2724011433	MEMBRANE 900GPD AW W/ BRINE SEAL	1	EACH
30	2614050433	BRINE SEAL 3"		

SINGLE REVERSE OSMOSIS MEMBRANE/VESSEL ASSEMBLY ILLUSTRATED FOR AQUA TOUCH COMPACT STYLE:		
AQUA TOUCH MODEL AND STYLE	PART NUMBER	DESCRIPTION
AQUA TOUCH 450-1 COMPACT	B198000020	MEMBRANE RACK 450-1 AQMC & AQTC
AQUA TOUCH 700-1 COMPACT	B198000021	MEMBRANE RACK 700-1 AQMC & AQTC
AQUA TOUCH 900-1 COMPACT	B198000022	MEMBRANE RACK 900-1 AQMC & AQTC

AQUA TOUCH MODEL AND STYLE	PART NUMBER	DESCRIPTION
AQUA TOUCH 450-1 COMPACT	B198000020	MEMBRANE RACK 450-1 AQMC & AQTC
AQUA TOUCH 700-1 COMPACT	B198000021	MEMBRANE RACK 700-1 AQMC & AQTC
AQUA TOUCH 900-1 COMPACT	B198000022	MEMBRANE RACK 900-1 AQMC & AQTC



SPECIFIC TO THE AQUA WHISPER II COMPACT STYLE ONLY:**DOUBLE REVERSE OSMOSIS MEMBRANE/VESSEL ASSEMBLY FOR AQUA WHISPER II COMPACT STYLE:**

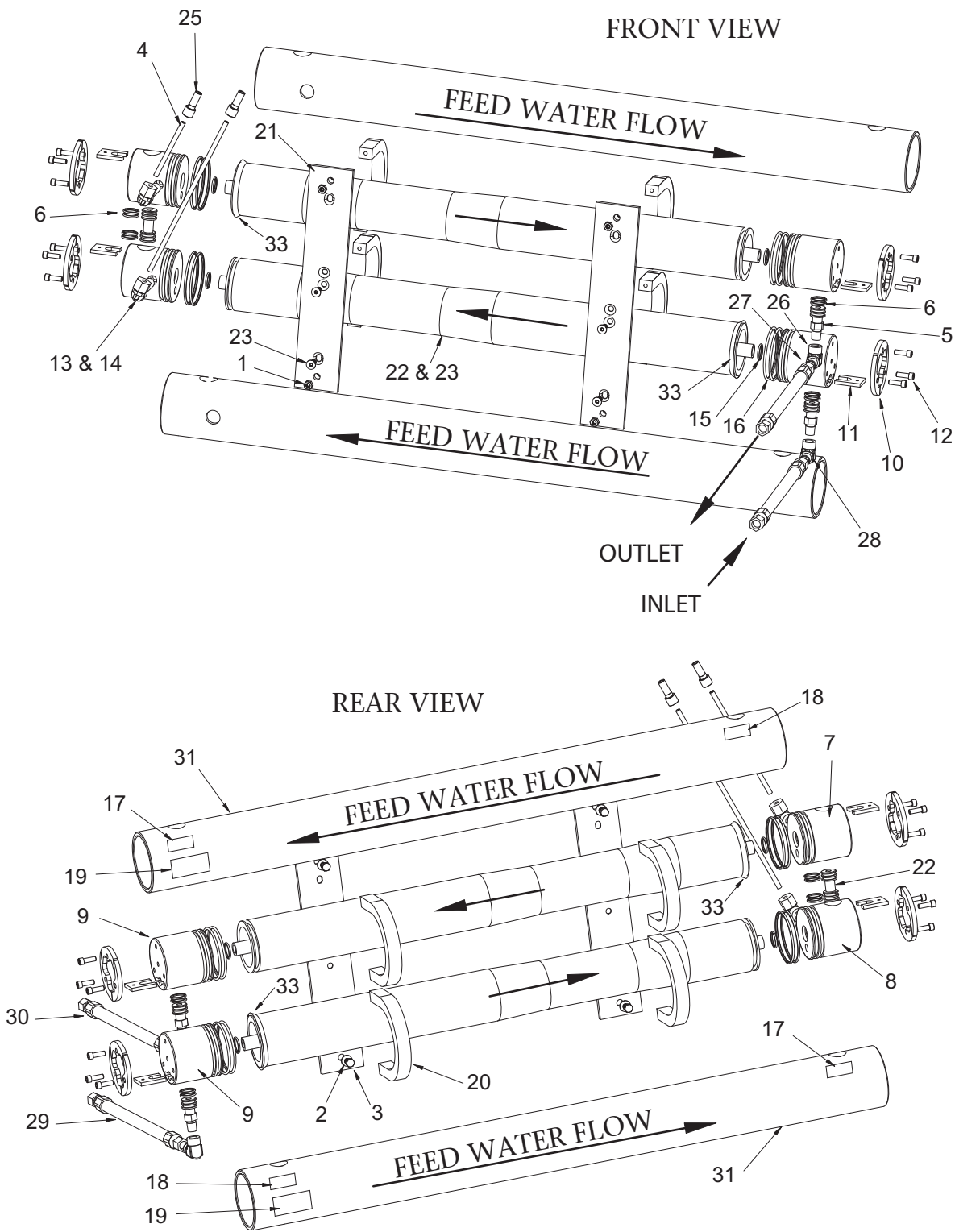
AQUA WHISPER II MODEL AND STYLE	PART NUMBER	DESCRIPTION
AQUA WHISPER II 900-2 COMPACT	B198000023	MEMBRANE RACK 900-2 AQMC & AQTC
AQUA WHISPER II 1400-2 COMPACT	B198000024	MEMBRANE RACK 1400-2 AQMC & AQTC
AQUA WHISPER II 1800-2 COMPACT	B198000025	MEMBRANE RACK 1800-2 AQMC & AQTC

REFER TO ILLUSTRATION ON FOLLOWING PAGE "DOUBLE REVERSE OSMOSIS MEMBRANE/VESSEL ASSEMBLY"

ITEM	PART NUMBER	DESCRIPTION	QTY	U/M
1-33	B198000023	MEMBRANE RACK 900-2 AQMC & AQTC	1	EACH
OR				
1-33	B198000024	MEMBRANE RACK 1400-2 AQMC & AQTC	1	EACH
OR				
1-33	B198000025	MEMBRANE RACK 1800-2 AQMC & AQTC	1	EACH
1	061060045000	NUT HEX 1/4-20 W/INSERT SS	2	EACH
2	061100043000	WASHER FLAT OS 1/4"SS	4	EACH
3	061142145016	BOLT HEX 1/4-20 X 1 SS	2	EACH
4	0312121969	TUBE 1/4 BLACK	4	FEET
5	0117410800	NIPPLE HP MVA AW	2	EACH
6	2614017900	O-RING 115 INTERCONNECTAW	8	EACH
7	H36160522400	END PLUG 3" DUAL, HORIZON SEAF	1	EACH
8	2453512400	END PLUG DUAL 3" AW	1	EACH
9	2453502400	END PLUG SINGLE 3" AW	2	EACH
10	20201030000	SEGMENT RING AW (SET)	4	EACH
11	0520210600	RETAINER PORT MVA AW	4	EACH
12	061162345012	SC SOC CAP 1/4-20 X 3/4 SS	12	EACH
13	0101370815	NIPPLE 1/4 NPT X 1 1/2 PVC	2	EACH
14	0204010869	ELB90 1/4 TUBE X 1/4 FPT PLAST	2	EACH
15	2614010100	O-RING 116 PRODUCTAS/AW	4	EACH
16	2614014900	O-RING 230 BRINE 3" END PLUG	8	EACH
17	2234011360	LABEL OUTLET (SRC BLUE)	2	EACH
18	2234011260	LABEL INLET(SRC BLUE)	2	EACH
19	2220010660	LABEL MEMBRANE SERIAL NO. SRC	2	EACH
20	05202401GR	BRACKET MVA (AL) U CLAMP AW	4	EACH
21	0520051800	MVA RACK, AW SERIES >9/01	2	EACH
22	2417430800	INTERCONNECT MVA SS AW	1	EACH
23	061161845012	SC ALLEN FLAT 1/4-20 X 3/4 SS	8	EACH
24	2632180426	DECOFELT 1/8 X 1 1/4 BLK ADH B	1	FEET
25	0204690100	REDUCER 3/8 X1/4 JQ	2	EACH
26	0117010869	ELB90 1/4 FPT X 1/4 FPT SS	1	EACH
27	1317061769	ELB45 -6 FLARE X 1/4 MPT SS	1	EACH
28	1317011769	ELB90 -6 FLARE X 1/4 FPT SS	1	EACH
FOR AQUA WHISPER II 900-2:				
29	B390120007	HOSE HP ASSY AQMC 900-2 17.75" INLET	1	EACH
30	B390120008	HOSE HP ASSY AQMC 900-2 28.75" OUTLET	1	EACH
31	2408132500	VESSEL HIGH PRESSURE 450GPD AW	2	EACH
32-33	2724011233	MEMBRANE 450GPD AW W/ BRINE SEAL	2	EACH
33	2614050433	BRINE SEAL 3"		
FOR AQUA WHISPER II 1400-2:				
29	B390120009	HOSE HP ASSY AQMC 1400-2 19.75 INLET	1	EACH
30	B390120000	HOSE HP ASSY AQMC 1400-2 30.75 OUTLET	1	EACH
31	2408132500-01	VESSEL HIGH PRESSURE 700GPD AW	2	EACH
32-33	2724011333	MEMBRANE 700GPD AW W/ BRINE SEAL	2	EACH
33	2614050433	BRINE SEAL 3"		
FOR AQUA WHISPER II 1800-2:				
29	B390120011	HOSE HP ASSY AQMC 1800-2 23.75 INLET	1	EACH
30	B390120012	HOSE HP ASSY AQMC 1800-2 35.25 OUTLET	1	EACH
31	2408132500-02	VESSEL HIGH PRESSURE 900GPD AW	2	EACH
32-33	2724011433	MEMBRANE 900GPD AW W/ BRINE SEAL	2	EACH
33	2614050433	BRINE SEAL 3"		

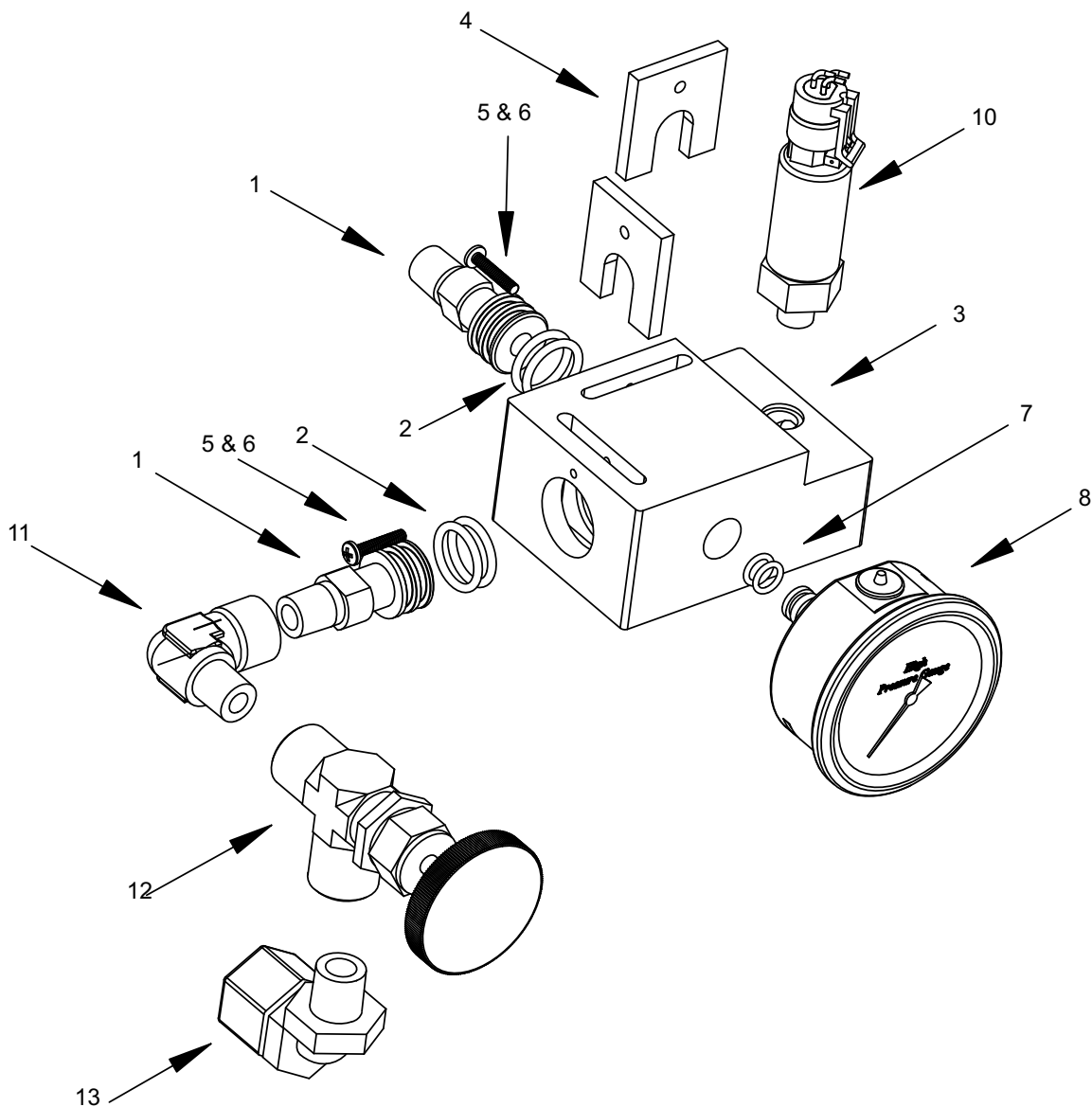
DOUBLE REVERSE OSMOSIS MEMBRANE/VESSEL ASSEMBLY
ILLUSTRATED FOR AQUA TOUCH COMPACT STYLE:

AQUA TOUCH MODEL AND STYLE	PART NUMBER	DESCRIPTION
AQUA TOUCH 900-2 COMPACT	B198000023	MEMBRANE RACK 900-2 AQMC & AQTC
AQUA TOUCH 1400-2 COMPACT	B198000024	MEMBRANE RACK 1400-2 AQMC & AQTC
AQUA TOUCH 1800-2 COMPACT	B198000025	MEMBRANE RACK 1800-2 AQMC & AQTC



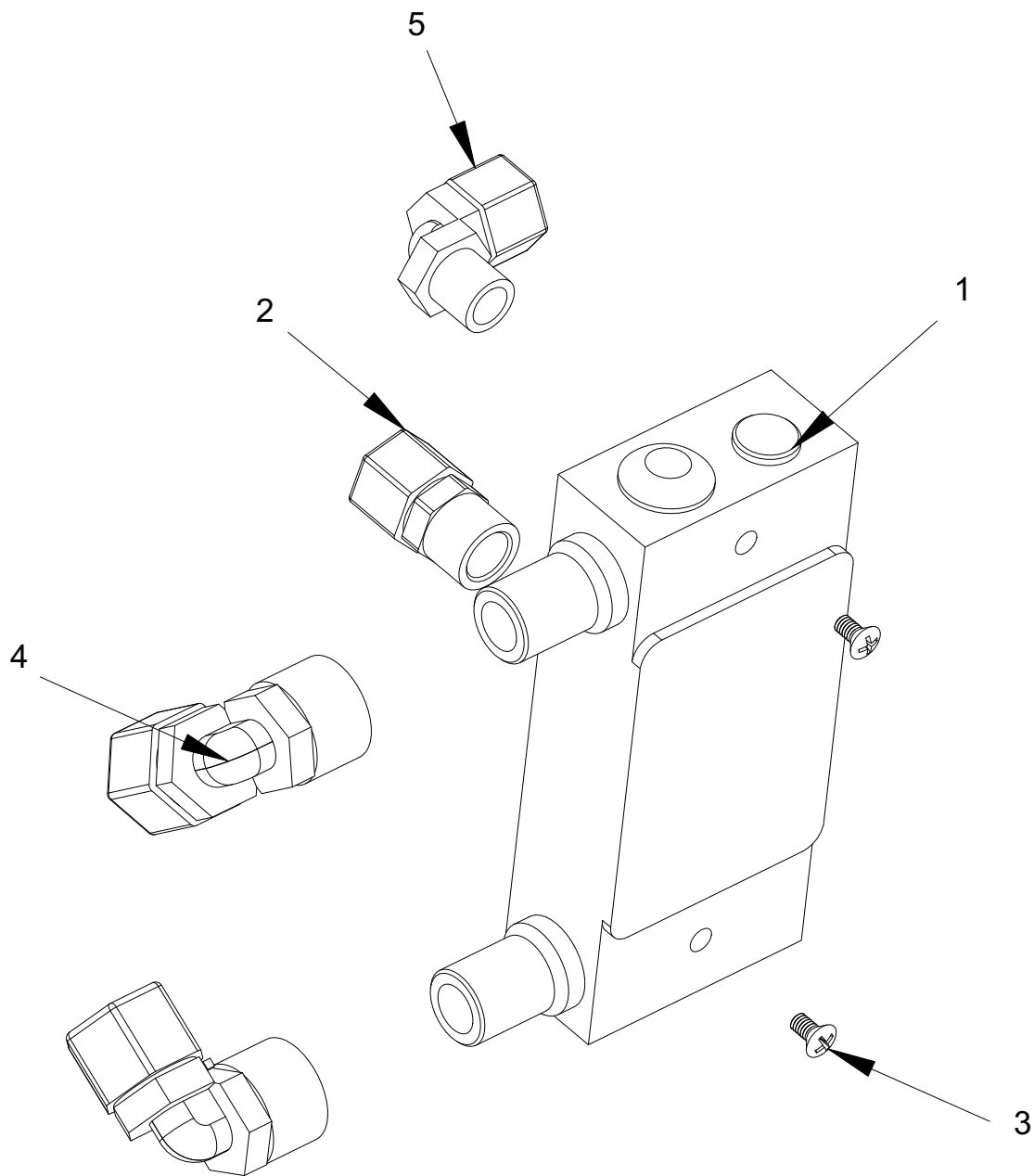
SPECIFIC TO THE AQUA WHISPER II COMPACT STYLE ONLY:

ITEM	PART NUMBER	DESCRIPTION	QTY	U/M
1-3	P502910001	MANIFOLD HP ASSY AWC		
1	0117410800	NIPPLE HP MVA AW	EACH	2
2	2614017900	O-RING 115 INTERCONNECT AW	EACH	4
3	5301090700	MANIFOLD HP AW	EACH	1
4	0520210600	RETAINER PORT MVA AW	EACH	2
5	061170618109	SC PHIL PAN A #6 X 3/4 " SS	EACH	2
6	061080081000	WASHER FLAT 3/4 SS	EACH	1
7	2614015800	O-RING 011 GAUGE PRES SWITCH	EACH	2
8	10181421CC	GAUGE 0-1400 CBM O-RING SEAL	EACH	1
9	05180851CC	BRACKET GAUGE CBM	EACH	1 NOT SHOWN
10	2317100300	TRANSDUCER 0-2000 PSI 7/16" SAE	EACH	1
11	0117230869	ELB90 ST 1/4 MPT X 1/4 FPT SS	EACH	1
12	1417017896	VALVE PRESS REGULATOR-AS	EACH	1
13	0204022369	ELB90 1/2 TUBE X 1/4 MPT PLASTIC	EACH	1



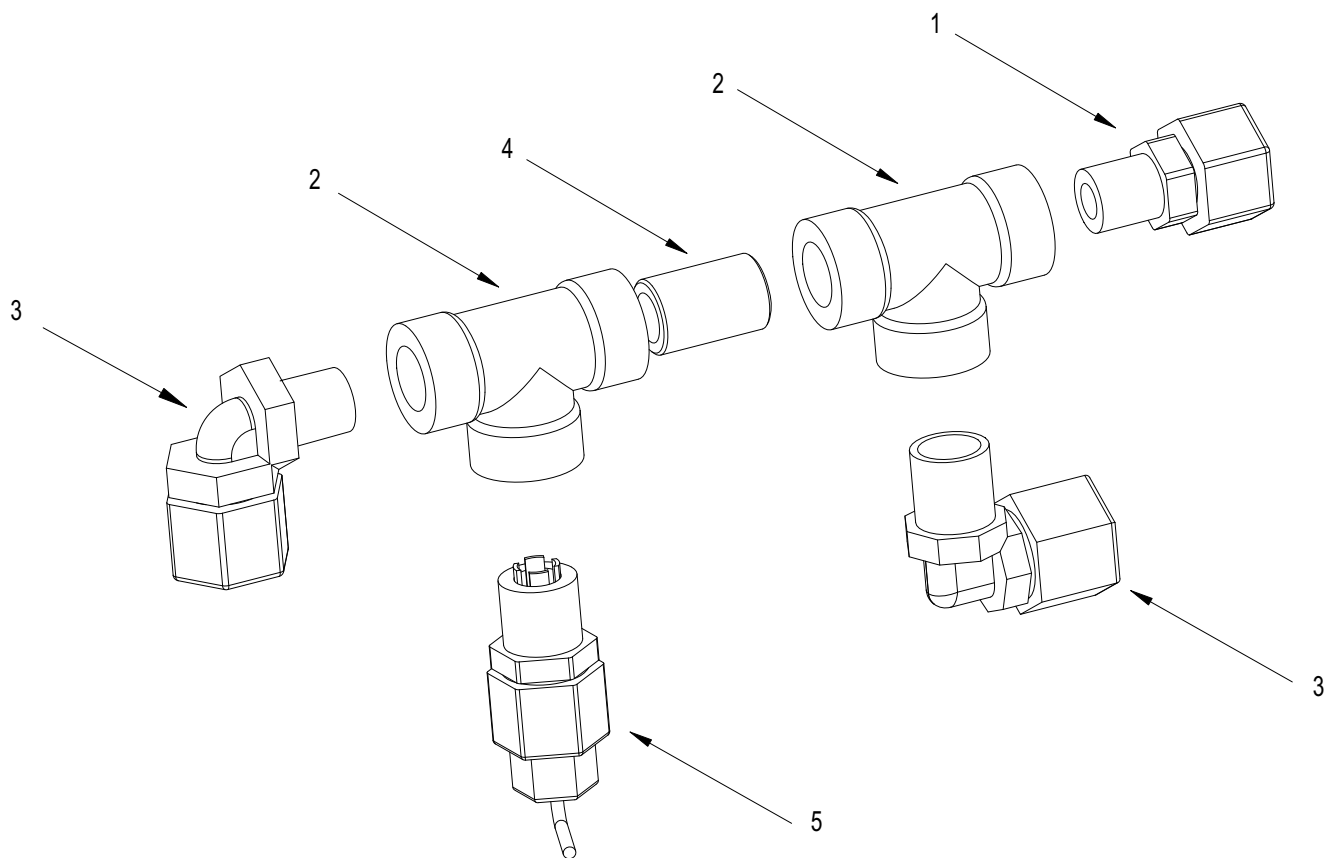
SPECIFIC TO THE AQUA WHISPER II COMPACT STYLE ONLY:

ITEM	PART NUMBER	DESCRIPTION	U/M	QTY
1-5	P510900007	FLOW METER ASSY AWC		
1	1109111200	BRINE & PRODUCT FLOW METER AW	EACH	1
2	0204021769	CONN 3/8 TUBE X 1/4 FNPT	EACH	1
3	061161130020	SC PHIL OVAL 10-24 X 3/8" SS	EACH	2
4	0204012569	ELB90 1/2 TUBE X 1/2 FNPT PLASTIC	EACH	2
5	0204011769	ELB90 3/8 TUBE X 1/4 FNPT PLastic	EACH	1



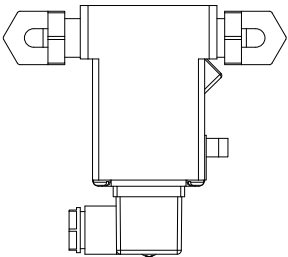
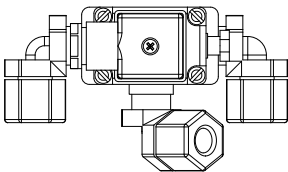
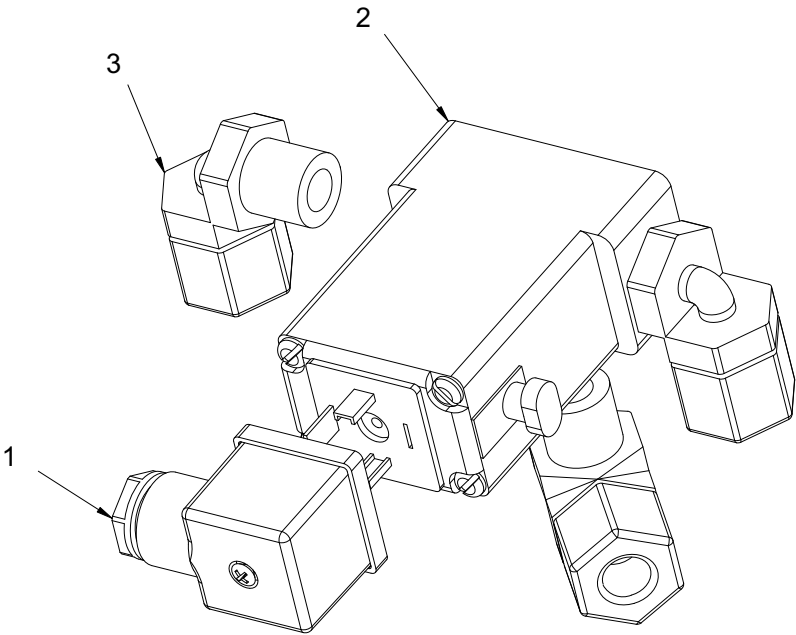
SPECIFIC TO THE AQUA WHISPER II COMPACT STYLE ONLY:

ITEM	PART NUMBER	DESCRIPTION	U/M	QTY
1-5	B511910001	PRODUCT MANIFOLD ASSY AW		
1		CONN 3/8 TUBE X 1/2 MNPT PLASTIC	EACH	1
2	0101422583	TEE 1/2 FNPT X 1/2 FNPT X 1/2 FNPT PVC	EACH	2
3	0204021969	ELB 90 3/8 TUBE X 1/2 MNPT PLASTIC	EACH	2
4	01013725CL	NIPPLE 1/2 NPT X CLOSE PVC	EACH	1
5	B511080003	SALINITY PROBE ASSY	EACH	1

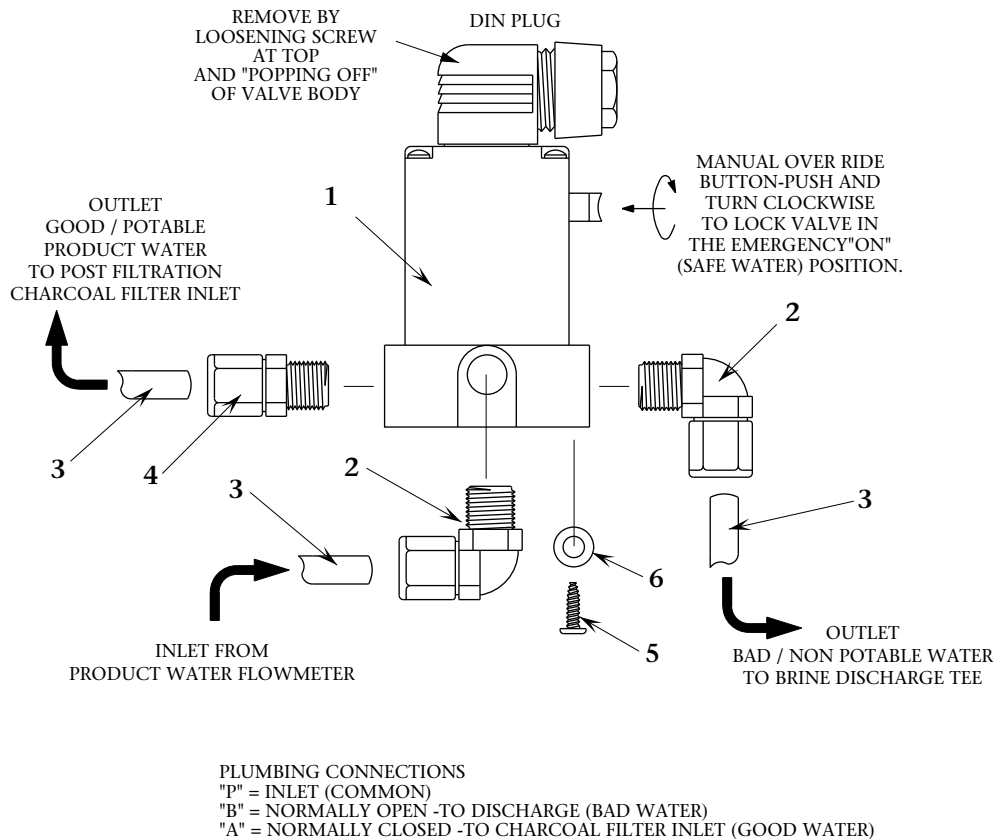
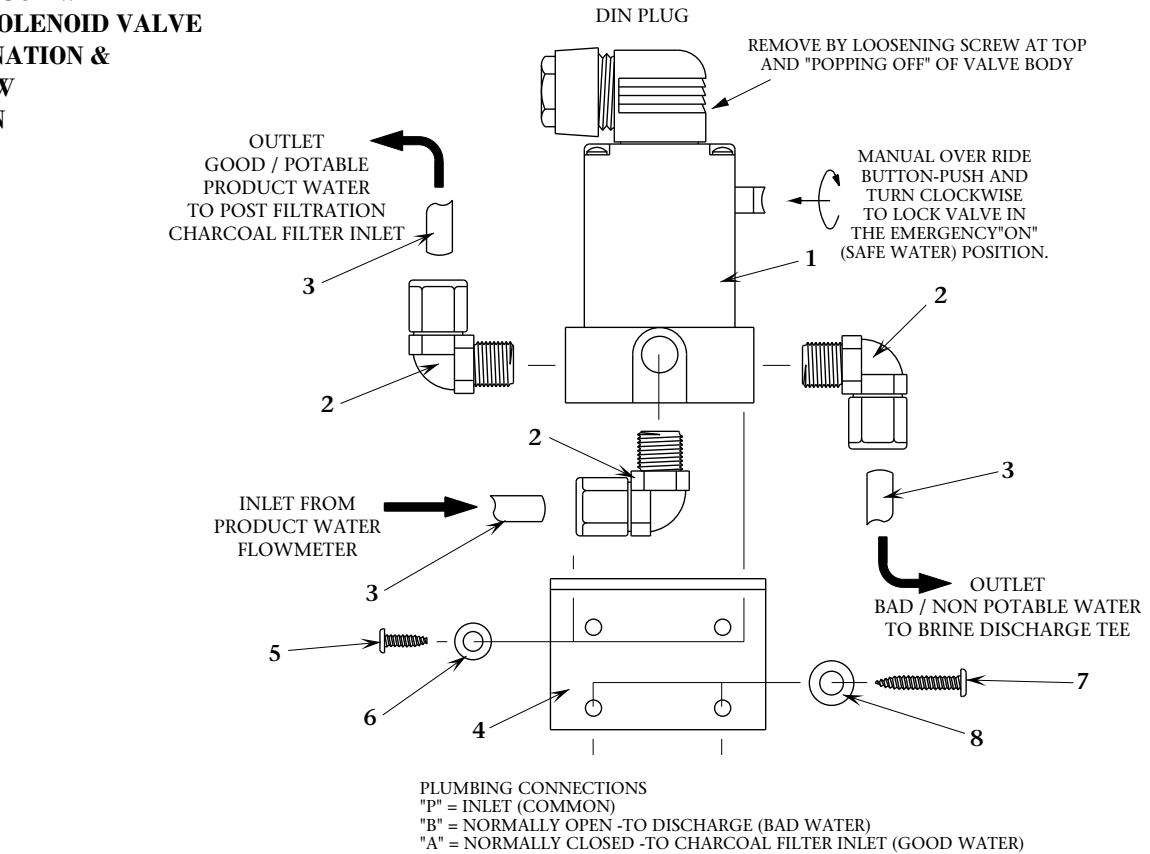


SPECIFIC TO THE AQUA WHISPER II COMPACT STYLE ONLY:

ITEM	PART NUMBER	DESCRIPTION	U/M	QTY
1-3	P516910001	DIVERSION VALVE ASSY		
1	3131680100	PLUG CONNECTOR DIN 4 COND	EACH	1
2	1401095998	VALVE SOLENOID 12 VDC	EACH	1
3	0204021769	ELB90 3/8 TUBE X 1/4 MNPT PLASTIC	EACH	3



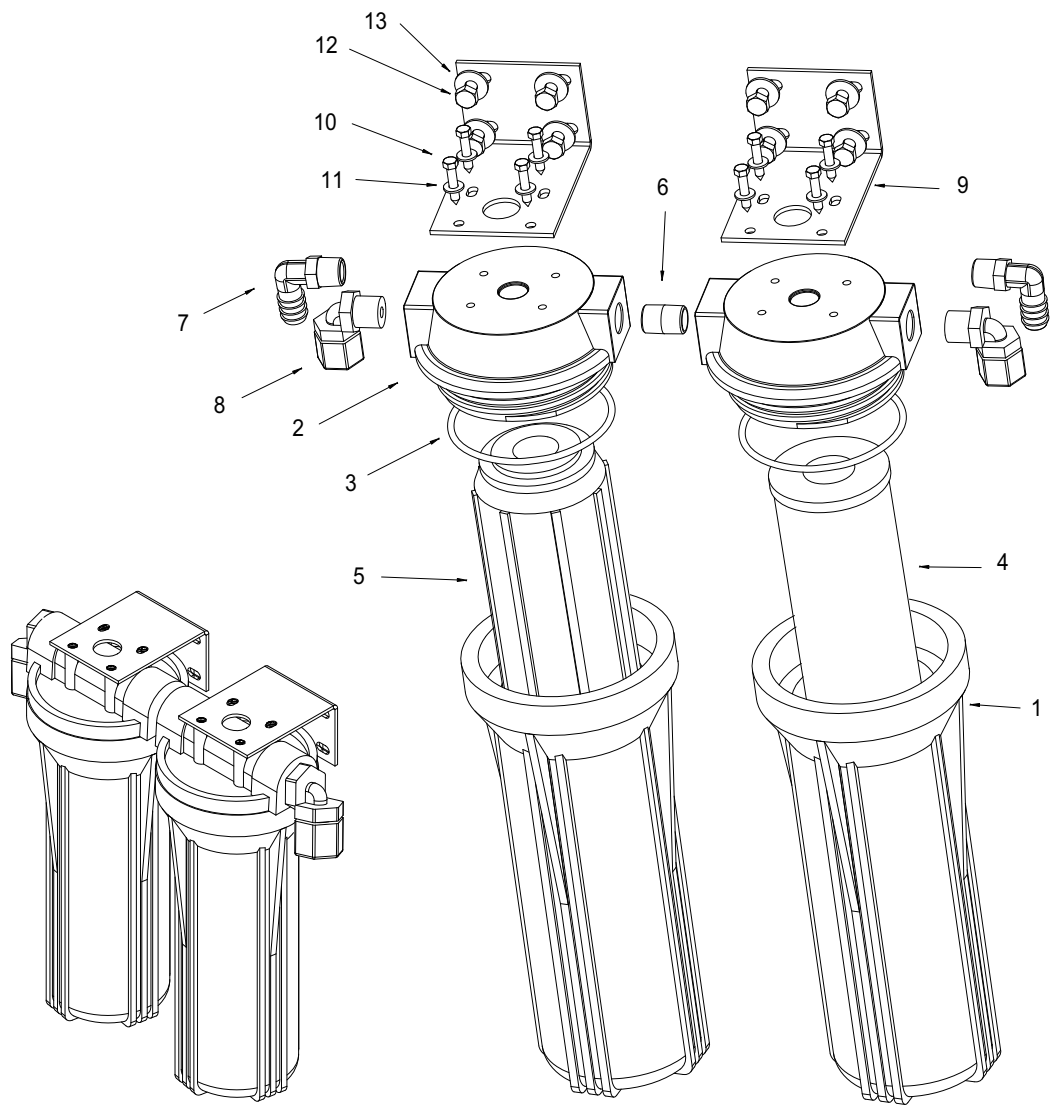
3-WAY PRODUCT WATER DIVERSION SOLENOID VALVE PORT DESIGNATION & WATER FLOW DESCRIPTION



SPECIFIC TO THE AQUA WHISPER II COMPACT STYLE ONLY:

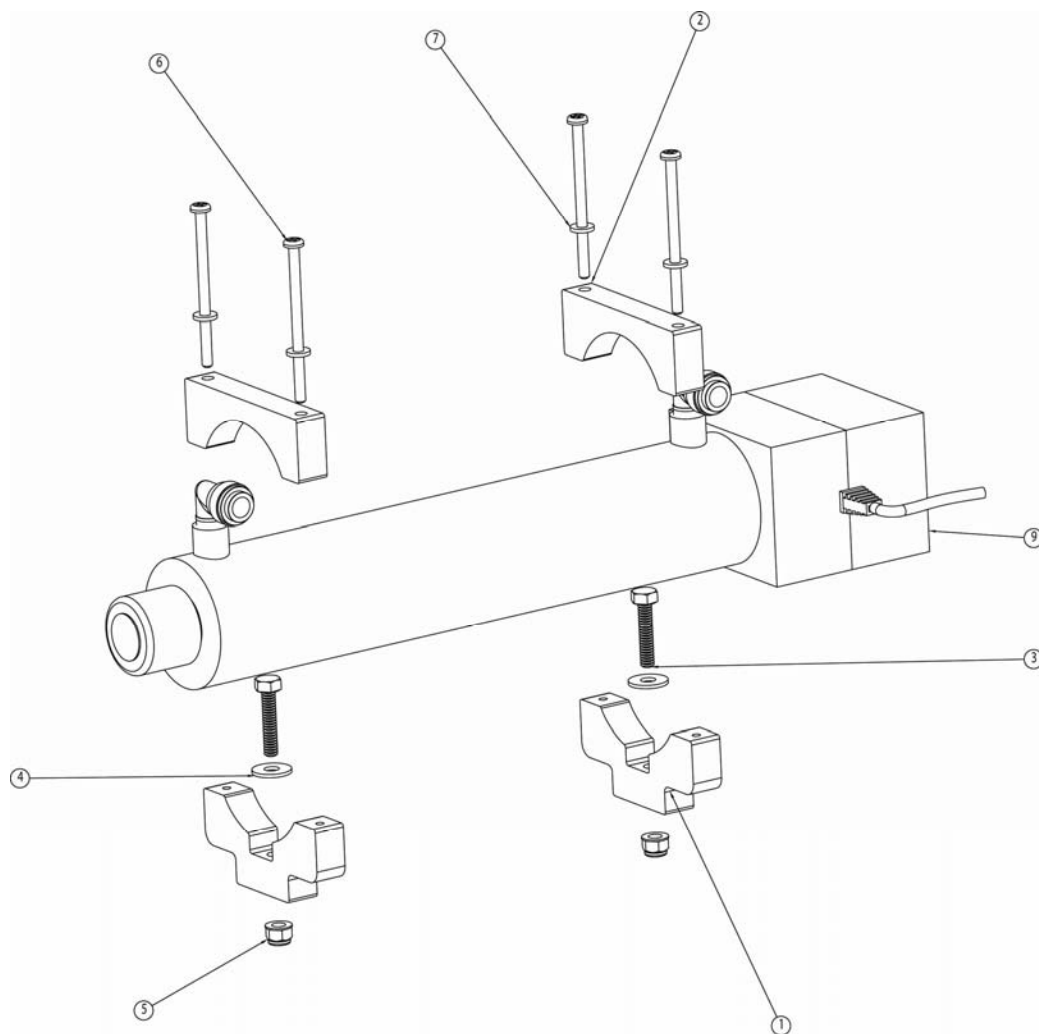
SHOWN CONNECTED TOGETHER, MAY ALSO BE ASSEMBLED AND MOUNTED SEPARATELY

ITEM	PART NUMBER	DESCRIPTION	QTY	U/M
1 - 13	B114130001	POSTFILTER DUAL AQMM		
1 - 3	0713020573	FILTER HOUSING/LID 3/8 X 10	2	EACH
1		BOWL PREFILTER HOUSING 10"		
2		LID PREFILTER HOUSING 10"		
3	2614010473	O-RING PREFILTER 10"		
4	0803004773	ELEMENT CHARCOAL 10"	1	EACH
5	08251950AS	ELEMENT PH 9 3/4"	1	EACH
6	01013718CL	NIPPLE 3/8 NPT X CLOSE PVC	1	EACH
7	0112071900	ELB90 3/8 X 1/2 BARB NYLON	2	EACH
8	0204021869	ELB90 3/8 TUBE X 3/8 MPT PLAST	2	EACH
9	20200402100	BRACKET PREFILTER/CHRCL/PLNKTN	2	EACH
10	061170628016	SC PHIL PAN "A" 10 X 1 SS	8	EACH
11	061080028000	WASHER FLAT #10 SS	8	EACH
12	061172143016	SC HEX "A" 1/4 X 1 SS	8	EACH
13	061100043000	WASHER FLAT OS 1/4" SS	8	EACH



UV STERILIZER

Item No.	Part No.	Description	Qty
1	20010418002A	Valve Bracket Clean/Rinse Kit	2
2	20010418001A	Bracket Mount Saddle UV-AW Top	2
3	061142150016	Bolt Hex 1/4-20X1 1/4 SS	2
4	061100043000	Washer Flat OS 1/4 SS	2
5	065070045000	Nut Locking 1/4-20 Flanged Nylon	2
6	061160630048	SC Phil Pan 10-24X3 SS	4
7	065080028000	Washer Flat #10 Nylon	4
8	2632180426	Decofelt .125x1.25 Blk	1
9	B5262000CV	UV Sterilizer	1



SPECIFIC FOR ONLY THE
MODULAR STYLE

PREFILTRATION CARTRIDGE FILTER ELEMENT WARNING:

Do not use third party Prefiltration Elements (Plankton Filter Elements, Prefilter Elements, Commercial Prefilter Elements, or Oil/Water Separator Elements). Use only Sea Recovery supplied Prefiltration Elements. Third party prefiltration elements on the market do not properly fit into the Sea Recovery Filter Housings, the seams fall apart, and they will allow by-pass resulting in **EXTENSIVE AND EXPENSIVE DAMAGE TO THE HIGH PRESSURE PUMP AS WELL AS PREMATURE FOULING OF THE R.O. MEMBRANE ELEMENT.**

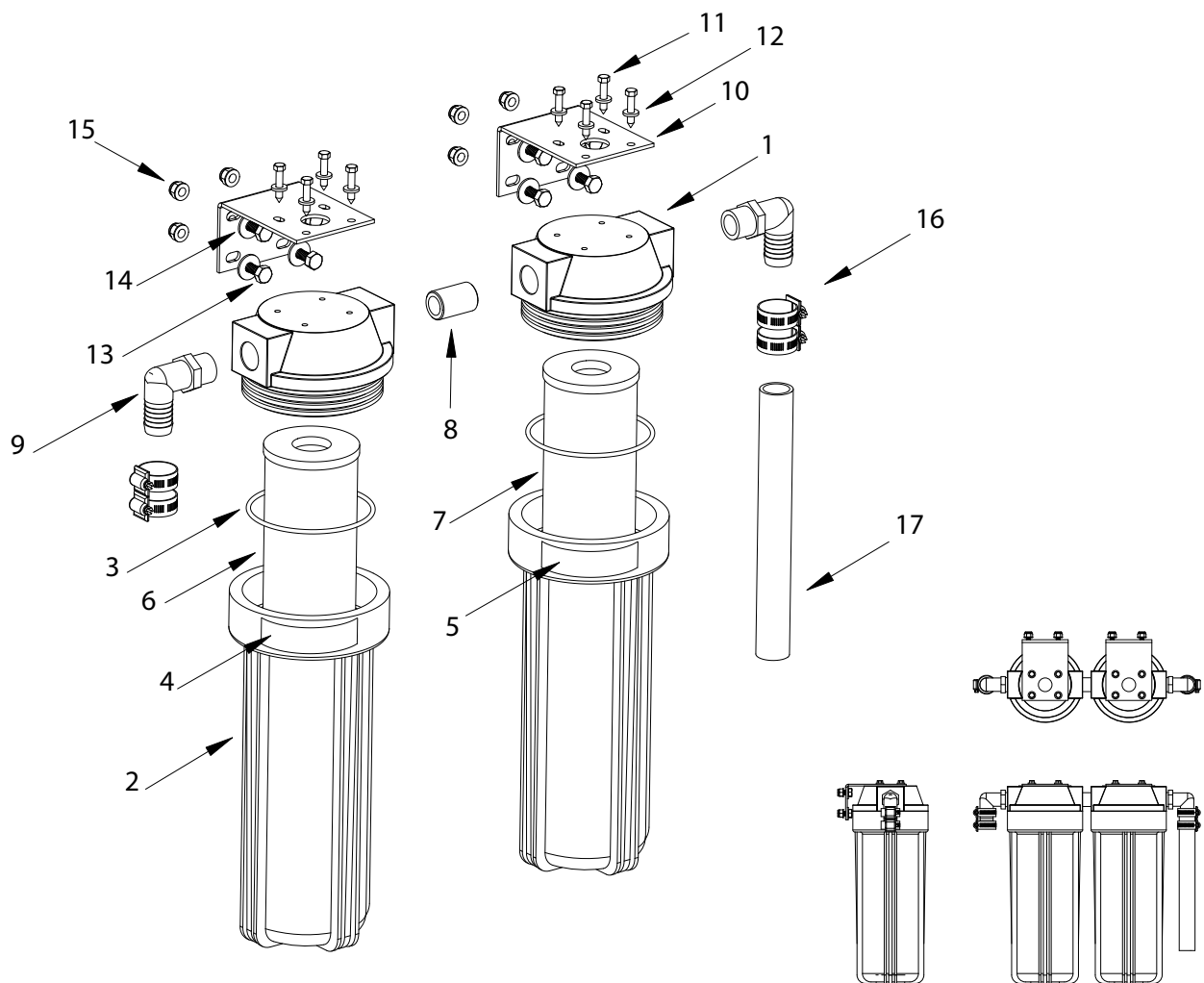
Damage caused to the Sea Recovery High Pressure Pump, R.O. Membrane Element, or any other component from the use of third party, non Sea Recovery supplied, filter elements is the responsibility and liability of the service technician and operator and is not covered by the Sea Recovery Warranty.

FILTER ELEMENT CAUTION:

Do not use “string wound” or “fiber” type prefilter elements. These type of elements are designed for the Photographic Film Developing industry. When used in sea water they will plug up rapidly in 1/10th or less the time causing frequent shut down of the system and very frequent changing resulting in very high cost of maintenance.

SPECIFIC TO AQUA WHISPER II MODULAR STYLE:

ITEM	PART NUMBER	DESCRIPTION	U/M	QTY
1-17	B108800002	PREFILTER ASSY AWC		
1-3	0713020873	FLITER HOUSING 1/2 X 10 INCH	EACH	2
1		LID FILTER HOUSING 1/2 X 10 INCH		
2		BOWL FILTER HOUSING 1/2 X 10 INCH		
3	2614010473	O-RING 237 10 INCH PREFILTER BLUE HOUSING		
4	2234012360	LABEL 25 MICRON PREFILTER -1	EACH	1
5	2234012460	LABEL 5 MICRON PREFILTER -2	EACH	1
6	0801130257	ELEMENT PREFILTER 10-25	EACH	1
7	0801060157	ELEMENT PREFILTER 10-05	EACH	1
8	01013725CL	NIPPLE 1/2 NPT X CLOSE PVC	EACH	1
9	0112072600	ELB90 1/2 MPT X 3/4 BARB NYLON	EACH	2
10	20200402100	BRACKET PREFILTER CHARCOAL - PLANKTONE	EACH	2
11	061170628016	SC PHIL PAN "A" 10 X 1 SS	EACH	8
12	065080028000	WASHER FLAT #10 NYLON	EACH	8
13	061172143016	SC HEX "A" 1/4 X 1.0 SS	EACH	8
14	061100043000	WASHER FLAT OS 1/4" SS	EACH	8
15	061060045000	NUT HEX 1/4-20 W/INSERT SS	EACH	8
16	05181434AA	HOSE CLAMP 3/4" SS	EACH	4
17	0328066666	HOSE CLEAR BRAID 3/4" ID	FEET	A/R



HIGH PRESSURE PUMP WARNING:

Two similar pumps are commercially available. One has a lower water flow rate, the other has a higher water flow rate than the Sea Recovery High Pressure Pump.

The commercially available **lower water flow rated pump** will cause:

- a. Poor quality Product Water.
- b. Low Product Water Flow.
- b. Excessive operating pressure as the System attempts to adjust pressure to achieve rated Product Water Flow.
- b. Immediate fouling of the Sea Recovery Aqua Whisper II R.O. Membrane Elements resulting in unrecoverable damage to them.

The commercially available **higher water flow rated pump** will cause:

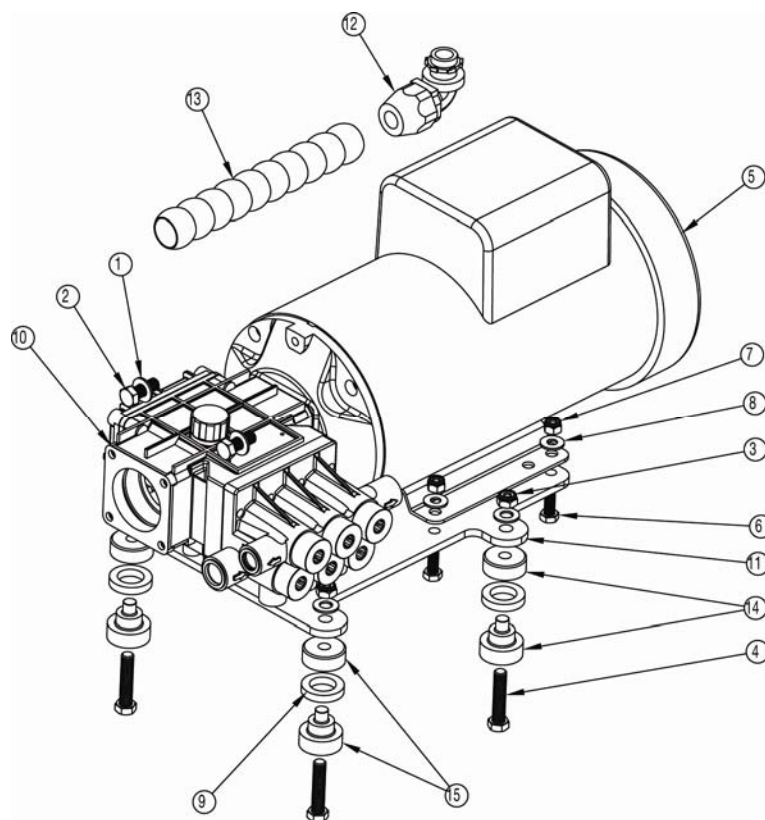
- a. Low feed water pressure into the high pressure pump.
- b. Line pressure loss of feed water resulting in continual system shut down.
- c. Cavitation to the high pressure pump resulting in premature failure of the pump.
- d. Extensive Line Pressure Build-Up in the High Pressure Hoses and Manifolds.
- d. Telescoping damage of the R.O. Membrane Elements due to excessive feed flow across them.
- e. Over heating of the High Pressure Pump Electric Motor due to excessive load.

NEVER REPLACE THE SEA RECOVERY HIGH PRESSURE PUMP WITH A THIRD PARTY, NON SEA RECOVERY SUPPLIED, HIGH PRESSURE PUMP. THE SEA RECOVERY AQUA WHISPER II HIGH PRESSURE PUMP IS NOT AVAILABLE THROUGH ANY SOURCE OTHER THAN SEA RECOVERY and SEA RECOVERY DEALERS. WHEN REPAIRING OR REPLACING THE HIGH PRESSURE PUMP ENSURE THAT THE MARINE DEALER HAS OBTAINED THE REPAIR PARTS OR THE PUMP FROM SEA RECOVERY.

DAMAGE CAUSED TO THE SEA RECOVERY SYSTEM RESULTING FROM THE USE OF NON SUPPLIED SEA RECOVERY PARTS OR COMPONENTS IS THE RESPONSIBILITY AND LIABILITY OF THE MARINE DEALER THAT SUPPLIED THE PUMP OR PARTS, THE SERVICE TECHNICIAN THAT INSTALLED THE PUMP OR PARTS, AND THE OPERATOR AND IS NOT COVERED BY THE SEA RECOVERY WARRANTY.

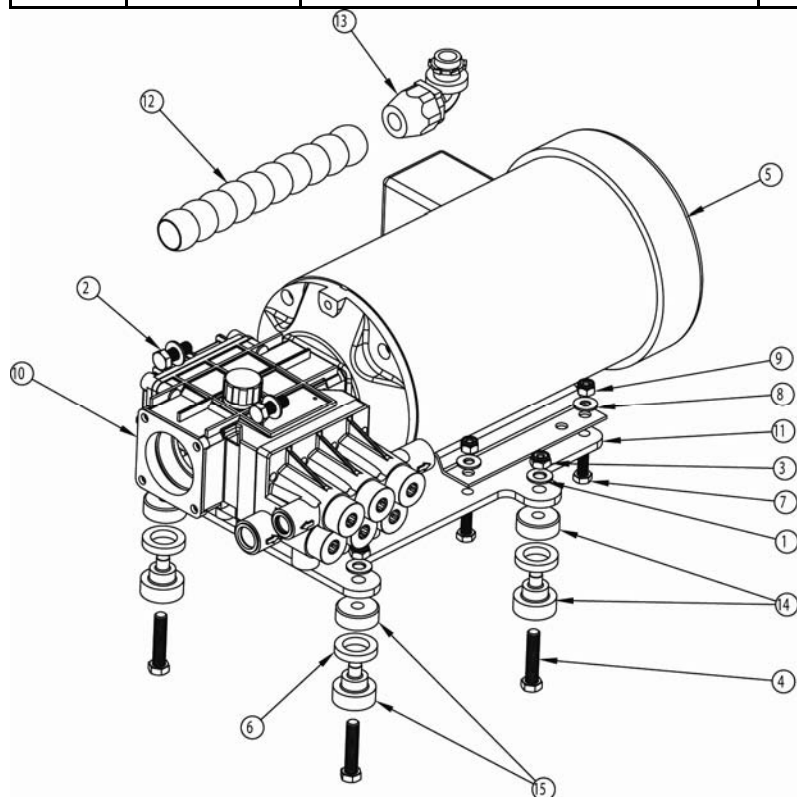
SPECIFIC TO THE AQUA WHISPER II COMPACT STYLE ONLY: (STANDARD)
HP PUMP ASSY-SINGLE PHASE-B156930003

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	061080056000	WASHER FLAT 3/8" SS	8
2	061142157016	BOLT HEX 3/8-16 X 1 SS	4
3	061060057000	NUT HEX 3/8-16 W-INSERT SS	4
4	061142157028	BOLT HEX 3/8-16 X 1 3/4 SS	4
5	15AE261912	MOTOR 3/2.5 HP 115/230 1PH	1
6	061142150012	BOLT HEX 5/16-18 X 3/4 SS	4
7	061060050000	HEX NUT 5/16-18 W/INSERT SS	4
8	061100049000	WASHER FLAT OS 5/16" SS	4
9	2020043902	SPACER, MOTOR MOUNT AQM II	4
10	12180513CO	HP PUMP-GP NSWCC 4.2 RH	1
11	20200239002	PLATE, GP MOTOR MOUNT PLATE AQWC II	1
12	1920016590	STRAIN RELIEF 90, .50 BLK W-NUT	1
13	4928402800	CONDUIT .50 FLEX BLK	1
14	2115031700	RUBBER MOUNT 90LB AQM	2
15	2115031020	RUBBER MOUNT 40LB AQMII	2

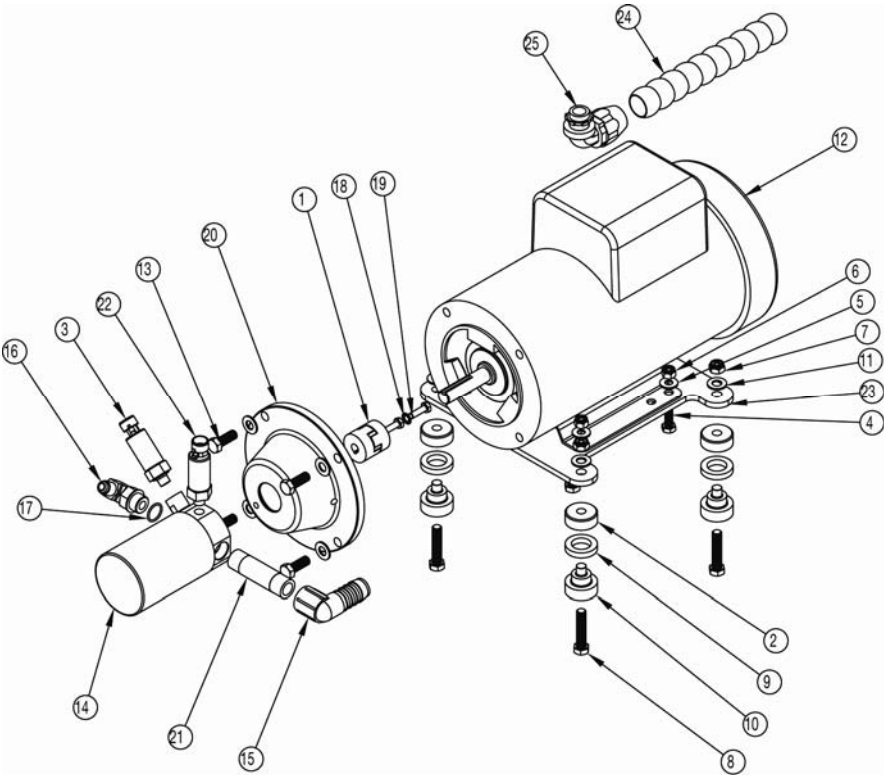


SPECIFIC TO THE AQUA WHISPER II COMPACT STYLE ONLY: (STANDARD)**HP PUMP ASSY-3 PHASE 50/60Hz- B156930004/5**

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	061080056000	WASHER FLAT 3/8" SS	8
2	061142157016	BOLT HEX 3/8-16 X 1 SS	4
3	061060057000	NUT HEX 3/8-16 W-INSERT SS	4
4	061142157028	BOLT HEX 3/8-16 X 1 3/4 SS	4
5	15AF241012	MOTOR 3 HP 220/380 -50/3PH	1
6	2020043902	SPACER, MOTOR MOUNT AQM II	4
7	061142150012	BOLT HEX 5/16-18 X 3/4 SS	4
8	061100049000	WASHER FLAT OS 5/16" SS	4
9	061060050000	HEX NUT 5/16-18 W/INSERT SS	4
10	12180513CO	HP PUMP-GP NSWCC 4.2 RH	1
11	20200239002	PLATE, GP MOTOR MOUNT PLATE AQWC II	1
12	4928402800	CONDUIT .50 FLEX BLK	1
13	1920016590	STRAIN RELIEF 90, .50 BLK W-NUT	1
14	2115031700	RUBBER MOUNT 90LB AQM	2
15	2115031020	RUBBER MOUNT 40LB AQMII	2



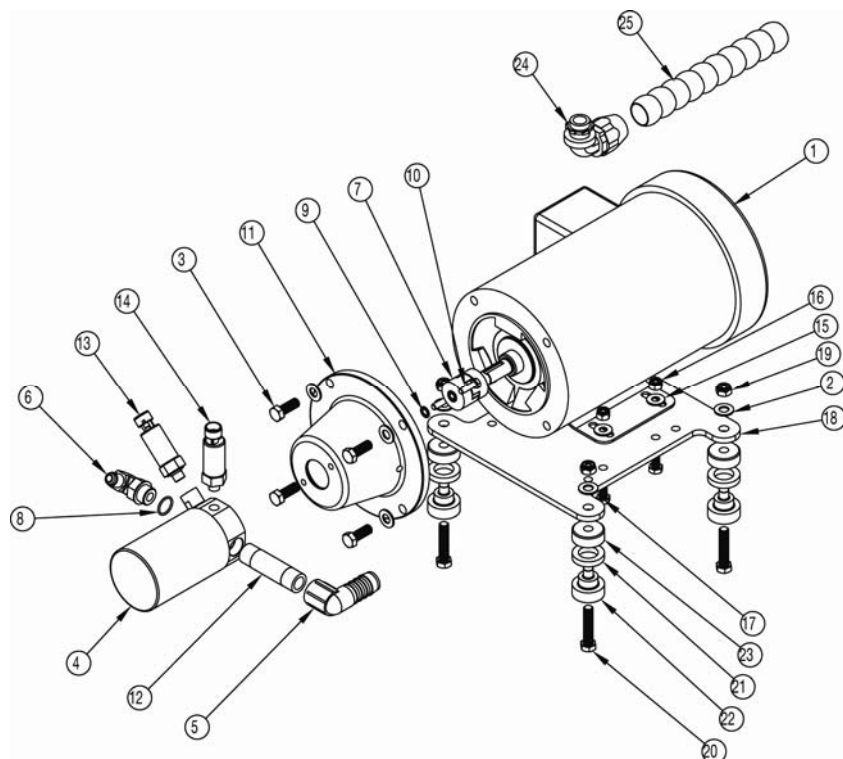
SPECIFIC TO THE AQUA WHISPER II COMPACT STYLE ONLY: (OPTIONAL)
HIGH PRESSURE PUMP AND MOTOR ASSEMBLY SINGLE PHASE ALTERNATING CURRENT 100/220 VAC 50 Hz,
SINGLE PHASE & 115/230 VAC, 60 Hz, SINGLE PHASE



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	12207602RW	COUPLER TX1	1
2	2115031020-2	RUBBER MOTOR MOUNT 40LB. I	4
3	2317100300	TRANSDUCER 0-2000 PSI 7/16" SAE	1
4	061142150012	BOLT HEX 5/16-18 X 3/4 SS	4
5	061100049000	WASHER FLAT OS 5/16" SS	4
6	061060050000	HEX NUT 5/16-18 W/INSERT SS	4
7	061060057000	NUT HEX 3/8-16 W-INSERT SS	4
8	061142157028	BOLT HEX 3/8-16 X 1 3/4 SS	4
9	-	(NOT USED)	
10	2115031020-1	RUBBER MOTOR MOUNT 40LB.	4
11	061080056000	WASHER FLAT 3/8" SS	8
12	15AE261912	MOTOR 3/2.5 HP 115/230 1PH	1
13	061142157016	BOLT HEX 3/8-16 X 1 SS	4
14	12572405DS	HPRA PUMP 4.37 GPM V2	1
15	0101062683	ELB90 .50 FNPT X .75 BARB PVC	1
16	1317021869	ELB90 -6 FLARE X 3/4 UNF SS	1
17	353033002A	O-RING 017	1
18	061120091000	WASHER SPLIT LOCK M6 SS	1
19	061142191174	HEX BOLT M6 X 20MM SS	2
20	1220770101	BELL HOUSING AQ/AW 1PH	1
21	0117372530	NIPPLE 1/2NPT X 3.0 LG SS	1
22	2317100200	TRANSDUCER 0-200 PSI 7/16" SAE	1
23	20200239000	PLATE, MOTOR MOUNT,	1
24	4928402800	CONDUIT .50 FLEX BLK	1
25	1920016590	STRAIN RELIEF 90, .50 BLK W-NUT	1

SPECIFIC TO THE AQUA WHISPER II COMPACT STYLE ONLY: (OPTIONAL)

HIGH PRESSURE PUMP AND MOTOR ASSEMBLY THREE PHASE ALTERNATING CURRENT 200-220/380 VAC 50 Hz, 3 PHASE AND 208-230/460 VAC, 60 Hz, 3 PHASE



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	15AF271910	MOTOR 3/2.5 HP 3 PH 50/6	1
2	061080056000	WASHER FLAT 3/8" SS	8
3	061142157016	BOLT HEX 3/8-16 X 1 SS	4
4	12572405DS	HPRA PUMP 4.37 GPM V2	1
5	0101062683	ELB90 .50 FNPT X .75 BARB PVC	1
6	1317021869	ELB90 -6 FLARE X 3/4 UNF SS	1
7	12207602RW	COUPLER TX1	1
8	353033002A	O-RING 017	1
9	061120091000	WASHER SPLIT LOCK M6 SS	2
10	061142191174	HEX BOLT M6 X 20MM SS	2
11	1220770103	BELL HOUSING AQ/AW 3PH	1
12	0117372530	NIPPLE 1/2NPT X 3.0 LG SS	1
13	2317100300	TRANSDUCER 0-2000 PSI 7/16" SAE	1
14	2317100200	TRANSDUCER 0-200 PSI 7/16" SAE	1
15	061100049000	WASHER FLAT OS 5/16" SS	4
16	061060050000	HEX NUT 5/16-18 W/INSERT SS	4
17	061142150012	BOLT HEX 5/16-18 X 3/4 SS	4
18	20200239000	PLATE, MOTOR MOUNT,	1
19	061060057000	NUT HEX 3/8-16 W-INSERT SS	4
20	061142157028	BOLT HEX 3/8-16 X 1 3/4 SS	4
21	-	(NOT USED)	
22	2115031020-1	RUBBER MOTOR MOUNT 40LB.	4
23	2115031020-2	RUBBER MOTOR MOUNT 40LB.	4
24	1920016590	STRAIN RELIEF 90, .50 BLK W-NUT	1
25	4928402800	CONDUIT .50 FLEX BLK	1

SPECIFIC TO AQUA WHISPER II MODULAR STYLE**SINGLE REVERSE OSMOSIS MEMBRANE/VESSEL ASSEMBLY**

ITEM	PART NUMBER	DESCRIPTION	QTY	U/M
1-30	B198000010	MEMBRANE RACK 450-1 AW/AQMM/AQTM	1	EACH
	OR			
1-30	B198000012	MEMBRANE RACK 700-1 AW/AQMM/AQTM	1	EACH
	OR			
1-30	B198000011	MEMBRANE RACK 900-1 AW/AQMM/AQTM	1	EACH
1	NOT USED			
2	061100043000	WASHER FLAT OS 1/4" SS	4	EACH
3	061181445020	SC LAG 1/4 X 1 1/4 SS	4	EACH
4	0117410800	NIPPLE HP MVA AW	2	EACH
5	2614017900	O-RING 115 INTERCONNECTAW	4	EACH
6	2453502400	END PLUG SINGLE 3" AW	1	EACH
7	2453512400	END PLUG DUAL 3" AW	1	EACH
8	20201030000	SEGMENT RING AW (SET)	2	EACH
9	0520210600	RETAINER PORT MVA AW	2	EACH
10	061162345012	SC SOC CAP 1/4-20 X 3/4 SS	6	EACH
11	0101370815	NIPPLE 1/4 NPT X 1 1/2 PVC	1	EACH
12	0204010869	ELB90 1/4 TUBE X 1/4 FPT PLAST	1	EACH
13	2614010100	O-RING 116 PRODUCTAS/AW	2	EACH
14	2614014900	O-RING 230 BRINE 3" END PLUG	4	EACH
15	2234011360	LABEL OUTLET (SRC BLUE)	1	EACH
16	2234011260	LABEL INLET(SRC BLUE)	1	EACH
17	2220010660	LABEL MEMBRANE SERIAL NO. SRC	1	EACH
18	0312121969	TUBE 1/4 BLACK	1.5	FEET
19	05202401GR	BRACKET MVA (AL) U CLAMP AW	2	EACH
20	0520051800	MVA RACK, AW SERIES >9/01	2	EACH
21	061161845012	SC ALLEN FLAT 1/4-20 X 3/4 SS	4	EACH
22	2632180426	DECOFELT 1/8 X 1 1/4 BLK ADH B	0.5	FEET
23	1317011769	ELB90 -6 FLARE X 1/4 FPT SS	2	EACH
24	0204990200	PLUG 3/8 JQ	1	EACH
25	0204690100	REDUCER 3/8 X1/4 JQ	1	EACH
26 - 27	B390800012	HOSE HP ASSY AW 75" TOTAL LENGTH	2	EACH
SPECIAL HIGH PRESSURE HOSE LENGTHS ARE AVAILABLE THROUGH SEA RECOVERY				

FOR AQUA WHISPER II 450-1:

28	2408132500	VESSEL HIGH PRESSURE 450GPD AW	1	EACH
29-30	2724011233	MEMBRANE 450GPD AW W/ BRINE SEAL	1	EACH
30	2614050433	BRINE SEAL 3"		

FOR AQUA WHISPER II 700-1:

28	2408132500-01	VESSEL HIGH PRESSURE 700GPD AW	1	EACH
29-30	2724011333	MEMBRANE 700GPD AW W/ BRINE SEAL	1	EACH
30	2614050433	BRINE SEAL 3"		

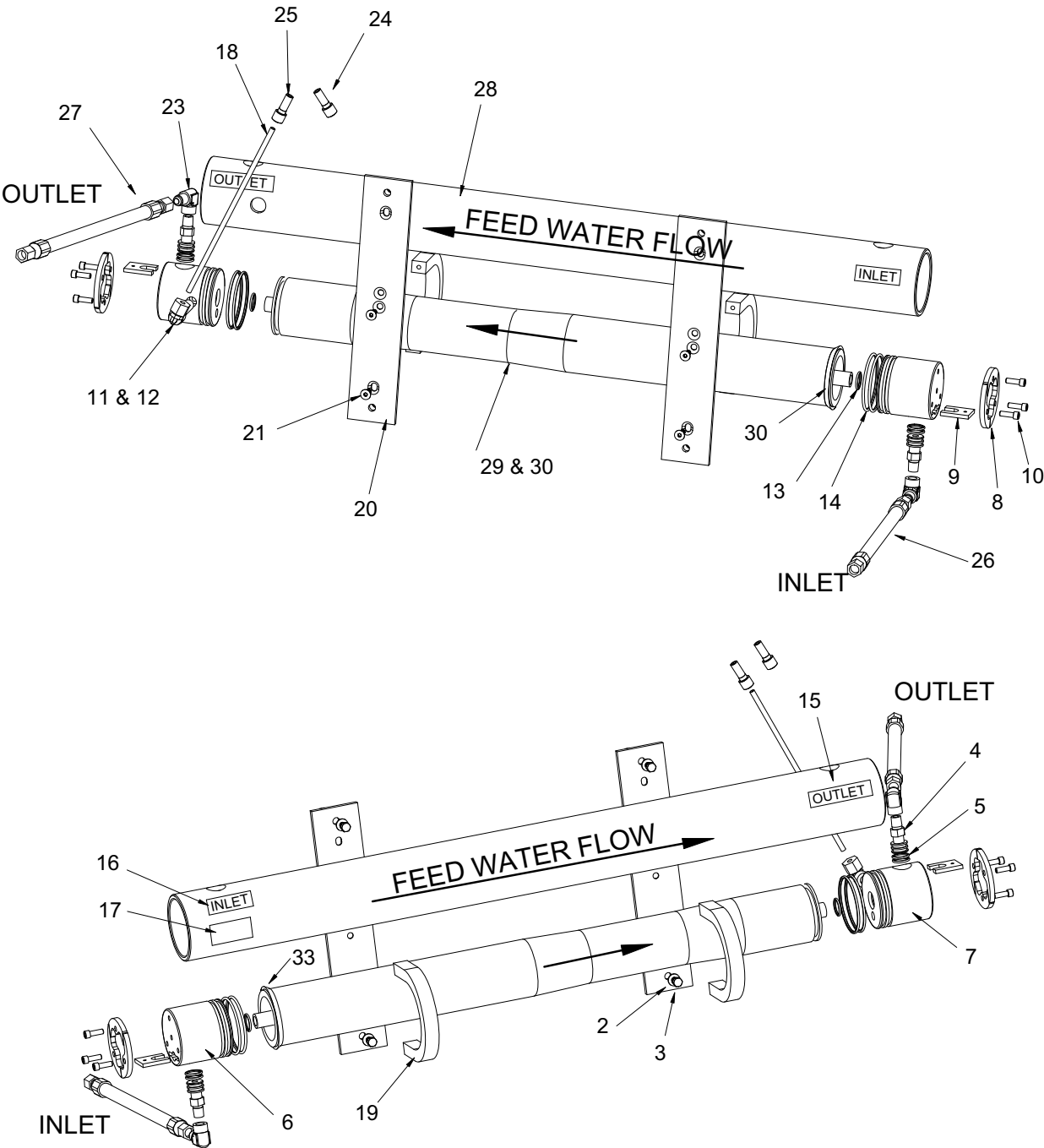
FOR AQUA WHISPER II 900-1:

28	2408132500-02	VESSEL HIGH PRESSURE 900GPD AW	1	EACH
29-30	2724011433	MEMBRANE 900GPD AW W/ BRINE SEAL	1	EACH
30	2614050433	BRINE SEAL 3"		

AQUA MATIC MODULAR STYLE:

SINGLE REVERSE OSMOSIS MEMBRANE/VESSEL ASSEMBLY

AQUA MATIC MODEL AND STYLE	PART NUMBER	DESCRIPTION
AQUA MATIC 450-1 MODULAR	B198000010	MEMBRANE RACK 450-1 AW/AQMM
AQUA MATIC 700-1 MODULAR	B198000012	MEMBRANE RACK 700-1 AW/AQMM
AQUA MATIC 900-1 MODULAR	B198000011	MEMBRANE RACK 900-1 AW/AQMM

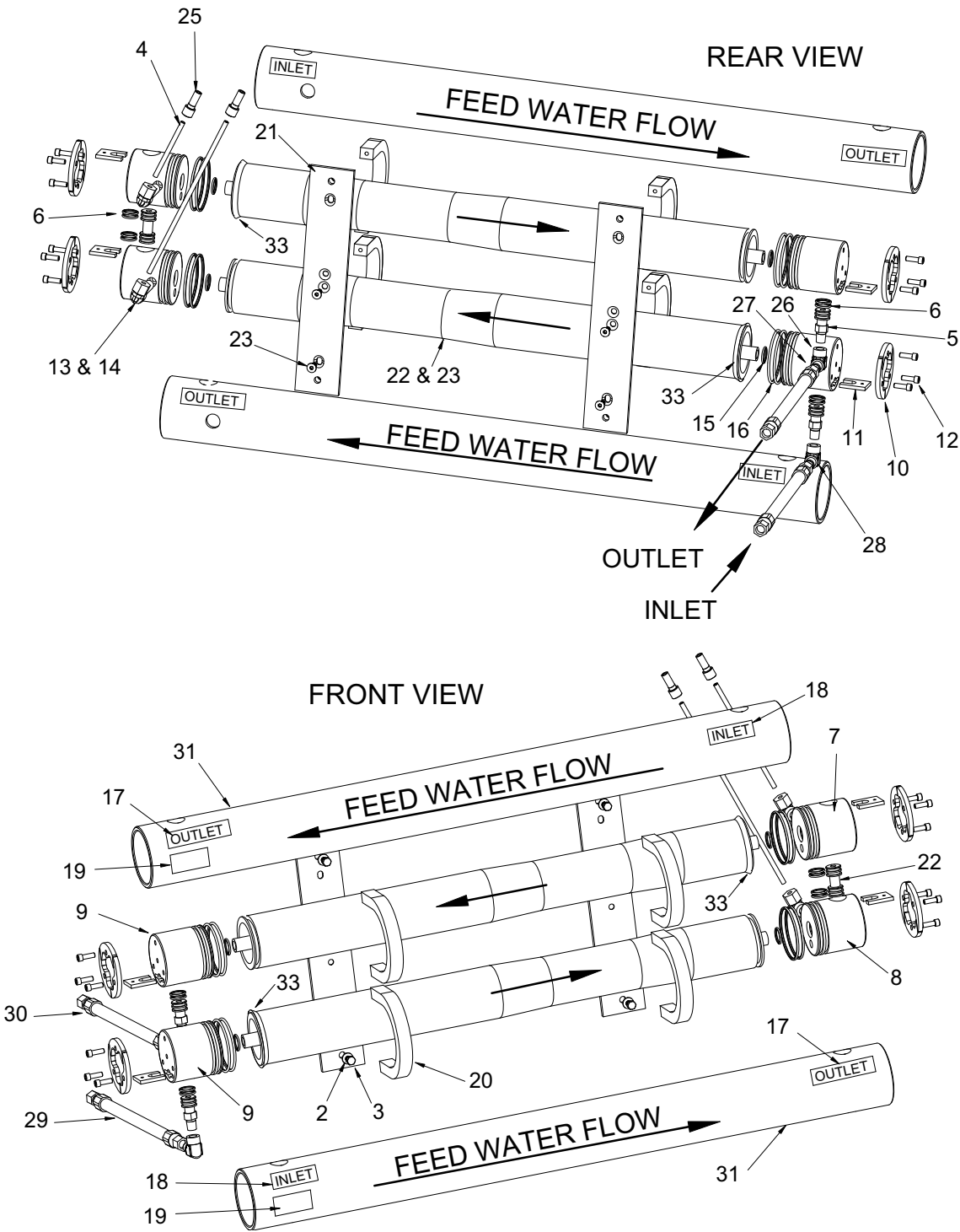


SPECIFIC TO AQUA WHISPER II MODULAR STYLE:**DOUBLE REVERSE OSMOSIS MEMBRANE/VESSEL ASSEMBLY**

ITEM	PART NUMBER	DESCRIPTION	QTY	U/M
1-33	B198000009	MEMBRANE RACK 900-2 AW/AQMM/AQTM	1	EACH
	OR			
1-33	B198000007	MEMBRANE RACK 1400-2 AW/AQMM/AQTM	1	EACH
	OR			
1-33	B198000008	MEMBRANE RACK 1800-2 AW/AQMM/AQTM	1	EACH
1	NOT USED			
2	061100043000	WASHER FLAT OS 1/4"SS	4	EACH
3	061181445020	SC LAG 1/4 X 1 1/4 SS	4	EACH
4	0312121969	TUBE 1/4 BLACK	4	FEET
5	0117410800	NIPPLE HP MVA AW	2	EACH
6	2614017900	O-RING 115 INTERCONNECTAW	8	EACH
7	H36160522400	END PLUG 3" DUAL, HORIZON SEAF	1	EACH
8	2453512400	END PLUG DUAL 3" AW	1	EACH
9	2453502400	END PLUG SINGLE 3" AW	2	EACH
10	20201030000	SEGMENT RING AW (SET)	4	EACH
11	0520210600	RETAINER PORT MVA AW	4	EACH
12	061162345012	SC SOC CAP 1/4-20 X 3/4 SS	12	EACH
13	0101370815	NIPPLE 1/4 NPT X 1 1/2 PVC	2	EACH
14	0204010869	ELB90 1/4 TUBE X 1/4 FPT PLAST	2	EACH
15	2614010100	O-RING 116 PRODUCTAS/AW	4	EACH
16	2614014900	O-RING 230 BRINE 3" END PLUG	8	EACH
17	2234011360	LABEL OUTLET (SRC BLUE)	2	EACH
18	2234011260	LABEL INLET(SRC BLUE)	2	EACH
19	2220010660	LABEL MEMBRANE SERIAL NO. SRC	2	EACH
20	05202401GR	BRACKET MVA (AL) U CLAMP AW	4	EACH
21	0520051800	MVA RACK, AW SERIES >9/01	2	EACH
22	2417430800	INTERCONNECT MVA SS AW	1	EACH
23	061161845012	SC ALLEN FLAT 1/4-20 X 3/4 SS	8	EACH
24	2632180426	DECOFELT 1/8 X 1 1/4 BLK ADH B	1	FEET
25	0204690100	REDUCER 3/8 X1/4 JQ	2	EACH
26	0117010869	ELB90 1/4 FPT X 1/4 FPT SS	1	EACH
27	1317061769	ELB45 -6 FLARE X 1/4 MPT SS	1	EACH
28	1317011769	ELB90 -6 FLARE X 1/4 FPT SS	1	EACH
29-30	B390800012	HOSE HP ASSY AW 75" TOTAL LENGTH	2	EACH
SPECIAL HIGH PRESSURE HOSE LENGTHS ARE AVAILABLE THROUGH SEA RECOVERY				
FOR AQUA WHISPER II 900-2:				
31	2408132500	VESSEL HIGH PRESSURE 450GPD AW	2	EACH
32-33	2724011233	MEMBRANE 450GPD AW W/ BRINE SEAL	2	EACH
33	2614050433	BRINE SEAL 3"		
FOR AQUA WHISPER II 1400-2:				
31	2408132500-01	VESSEL HIGH PRESSURE 700GPD AW	2	EACH
32-33	2724011333	MEMBRANE 700GPD AW W/ BRINE SEAL	2	EACH
33	2614050433	BRINE SEAL 3"		
FOR AQUA WHISPER II 1800-2:				
31	2408132500-02	VESSEL HIGH PRESSURE 900GPD AW	2	EACH
32-33	2724011433	MEMBRANE 900GPD AW W/ BRINE SEAL	2	EACH
33	2614050433	BRINE SEAL 3"		

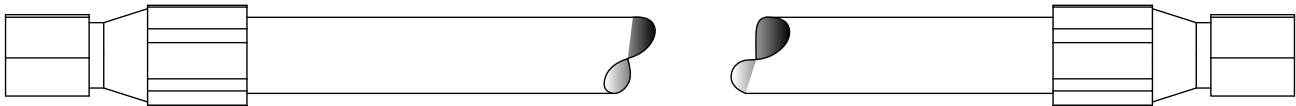
DOUBLE REVERSE OSMOSIS MEMBRANE/VESSEL ASSEMBLY
ILLUSTRATED FOR AQUA MATIC MODULAR STYLE:

AQUA MATIC MODEL AND STYLE	PART NUMBER	DESCRIPTION
AQUA MATIC 900-2 MODULAR	B198000009	MEMBRANE RACK 900-2 AW/AQMM
AQUA MATIC 1400-2 MODULAR	B198000007	MEMBRANE RACK 1400-2 AW/AQMM
AQUA MATIC 1800-2 MODULAR	B198000008	MEMBRANE RACK 1800-2 AW/AQMM



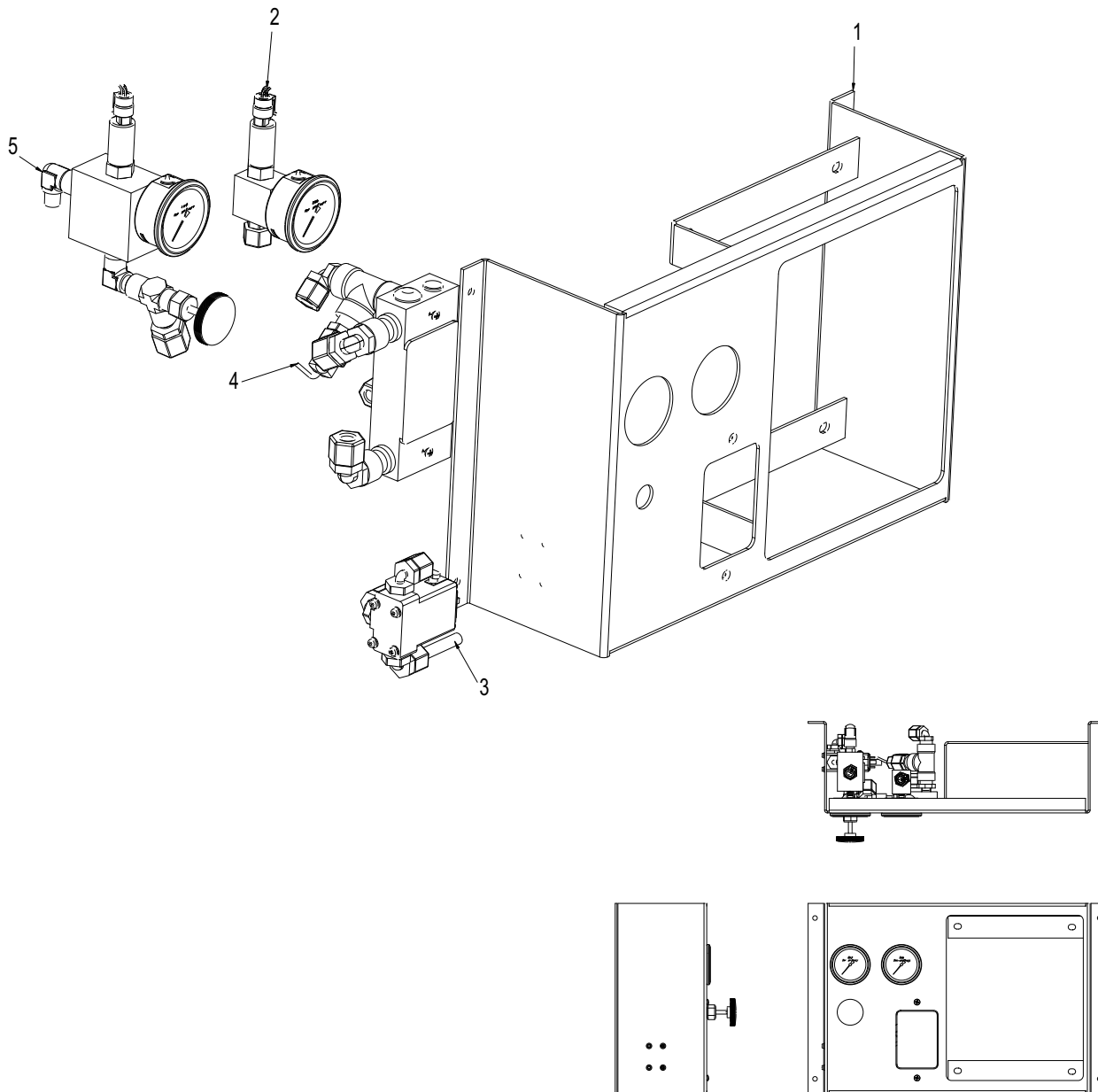
ITEM	PART NUMBER	DESCRIPTION	QTY	U/M
1	B390800012	HOSE HP ASSY AW 75" TOTAL LENGTH	2	EACH

SPECIAL LENGTHS ARE AVAILABLE THROUGH SEA RECOVERY.



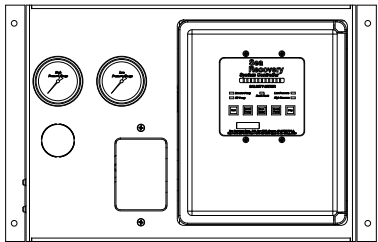
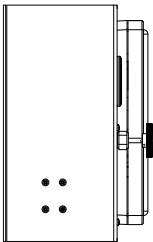
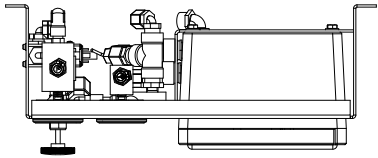
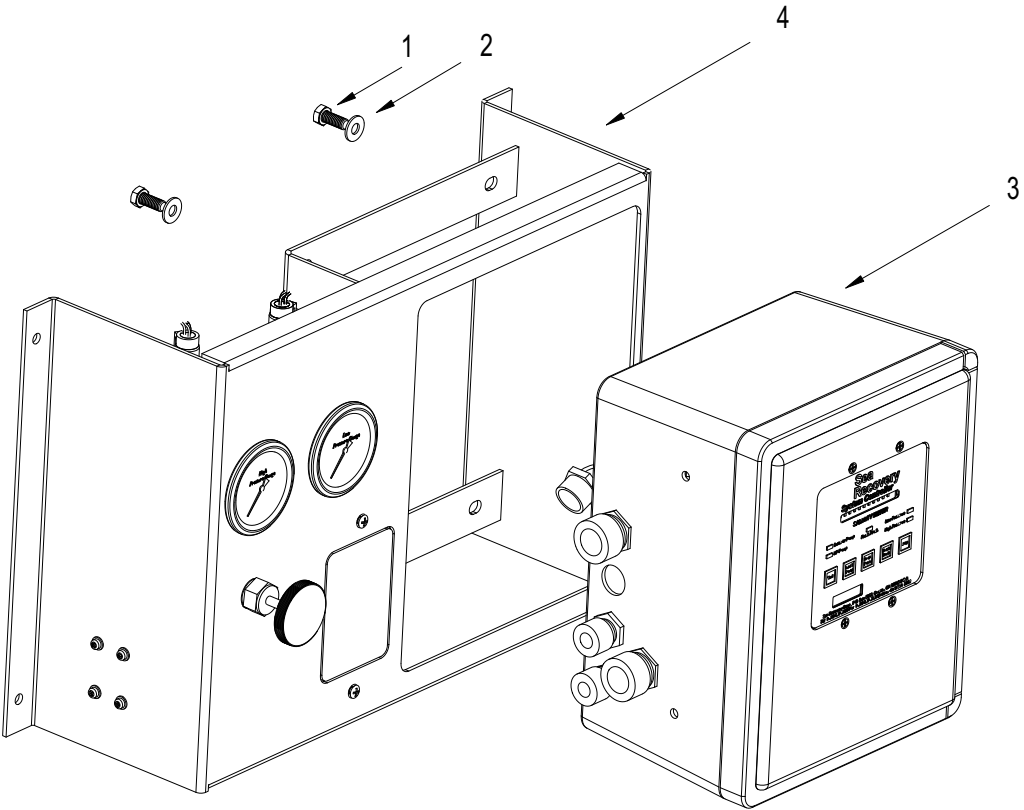
SPECIFIC TO AQUA WHISPER II MODULAR STYLE:

ITEM	PART NUMBER	DESCRIPTION	U/M	QTY
1-5	B594070002	FRONT PANEL ASSY AWM		
1	2020046505	PANEL FRONT AWM	EACH	1
2	B502870002	MANIFOLD LP ASSY AWM	EACH	1
3	B51680006	DIVERSION VALVE ASSY AWM	EACH	1
4	B51090006	FLOW METER ASSY AWM	EACH	1
5	P502920001	MANIFOLD HP ASSY AWM	EACH	1



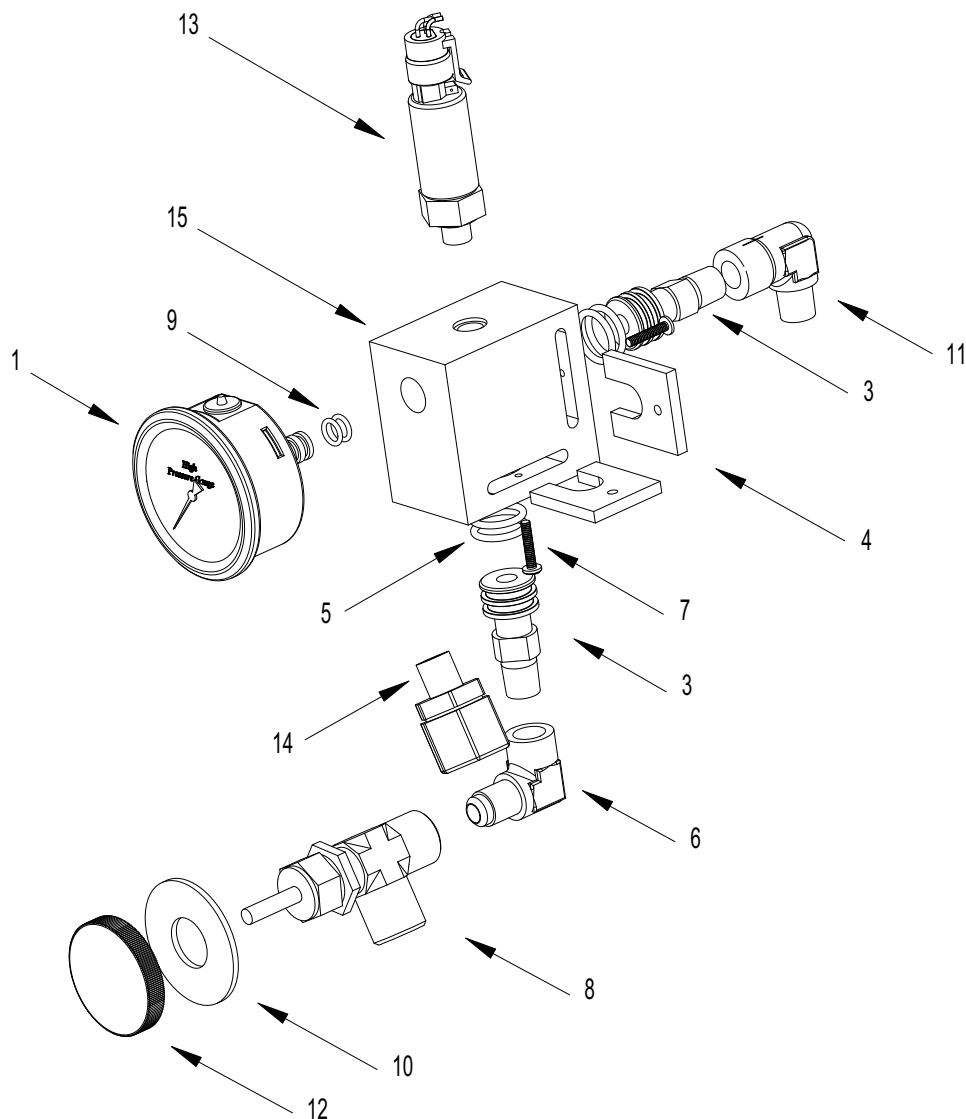
SPECIFIC TO AQUA WHISPER II MODULAR STYLE:

ITEM	PART NUMBER	DESCRIPTION	U/M	QTY
1	061142150016	BOLT HEX 5/16-18 X 3/4" SS	EACH	4
2	061100056000	WASHER FLAT OS 5/16" SS	EACH	4
3	B595800008	CONTROLLER AW	EACH	1
4	B594070002	FRONT PANEL ASSY AWM	EACH	1



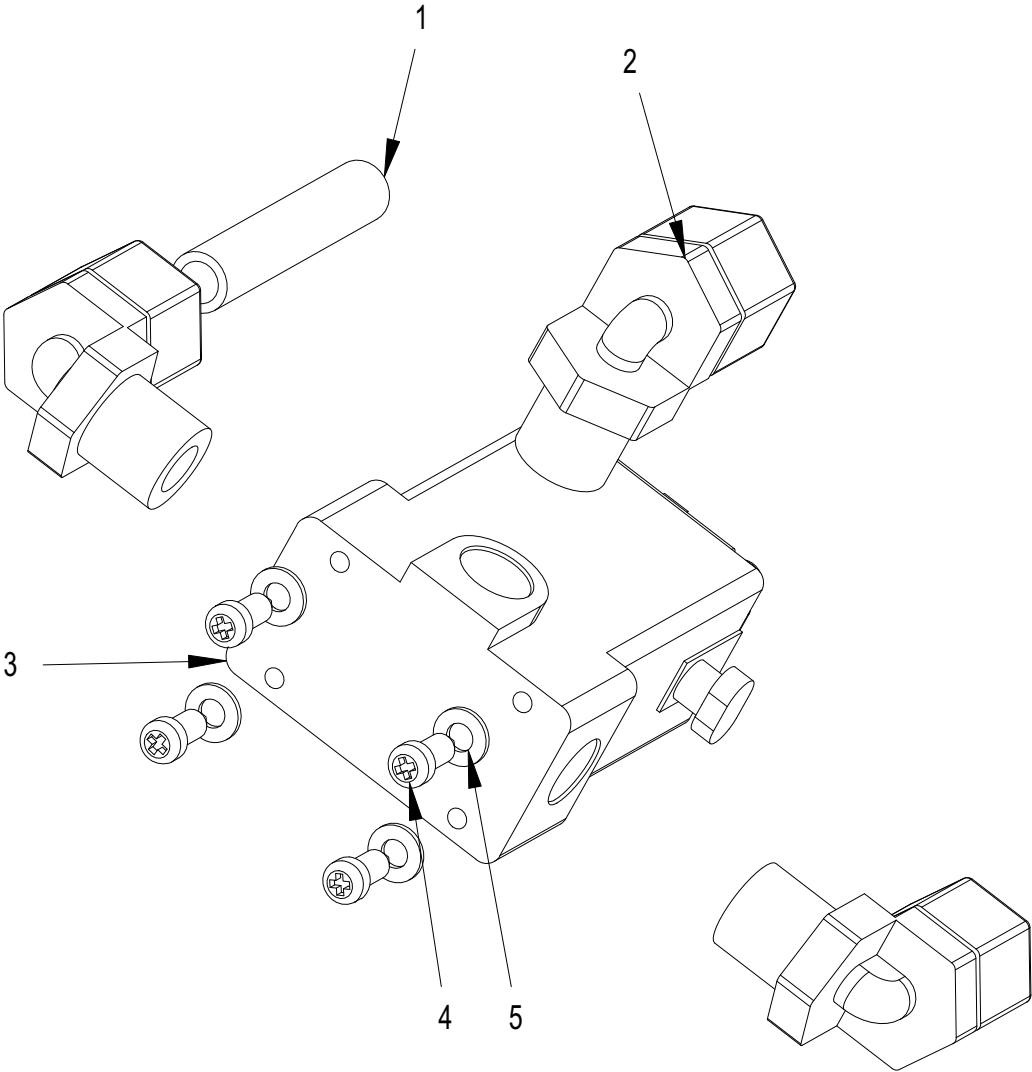
SPECIFIC TO AQUA WHISPER II MODULAR STYLE:

ITEM	PART NUMBER	DESCRIPTION	U/M	QTY
1-15	P502920001	MANIFOLD HP ASSY AWM		
1	10181421CC	GAUGE 0-1400 CBM O-RING SEAL	EACH	1
2	05180851CC	BRACKET GAUGE CBM	EACH	1
3	0117410800	NIPPLE HP MVA AW	EACH	1
4	0520210600	RETAINER PORT MVA AW	EACH	1
5	2614017900	O-RING 115 INTERCONNECT AW	EACH	1
6	1317011769	ELB90 6 FLARE X 1/4" FPT SS	EACH	1
7	061170618109	SC PHIL PAN A #6 X 3/4" SS	EACH	1
8	1417017896	BPR VALVE NEEDLE WITH STEM	EACH	1
9	2614015800	ORING 011 GAUGE-PRES SWITCH	EACH	1
10	061080081000	WASHER FLAT 3/4" SS	EACH	1
11	0117230869	ELB90 ST 1/4" MPT X 1/4" FPT SS	EACH	1
12	1417017896-4	KNOB AQUA TOUCH	EACH	1
13	2317100300	TRANSDUCER 0-2000 psi 7/16" SAE	EACH	1
14	2317100300	CONN 1/2 TUBE X 1/4 MPT PLASTIC	EACH	1
15	5301090800	MANIFOLD HP AW	EACH	1

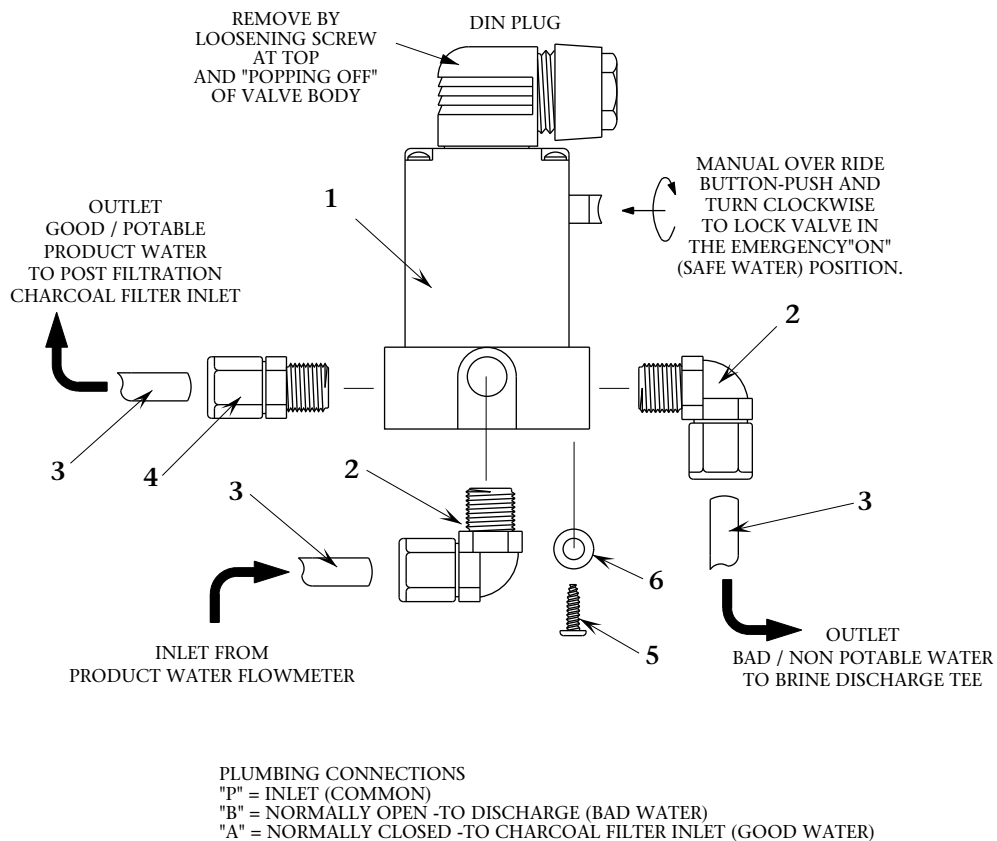
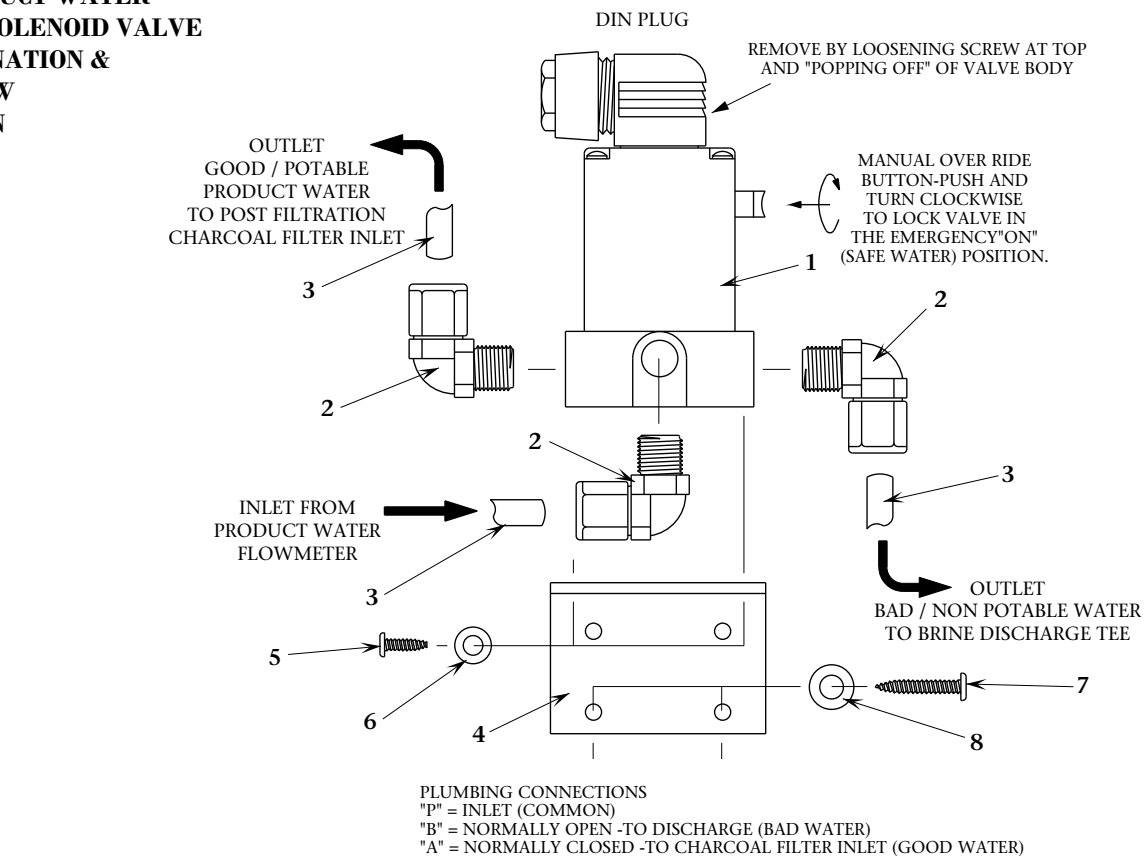


SPECIFIC TO AQUA WHISPER II MODULAR STYLE:

ITEM	PART NUMBER	DESCRIPTION	U/M	QTY
1-5	B51680006	DIVERSION VALVE ASSY AWM		
1	0312123569	TUBE 3/8 BLACK X 2 1/8 " LONG	EACH	1
2	0204021769	ELB90 3/8 TUBE X 1/4 MNPT PLASTIC	EACH	3
3	1041095998	VALVE SOLENOID 12 VDC	EACH	1
4	061170623008	SC PHIL PAN "B" #8 X 1/2" SS	EACH	4
5	065080023000	WASHER FLAT #8 NYLON	EACH	4



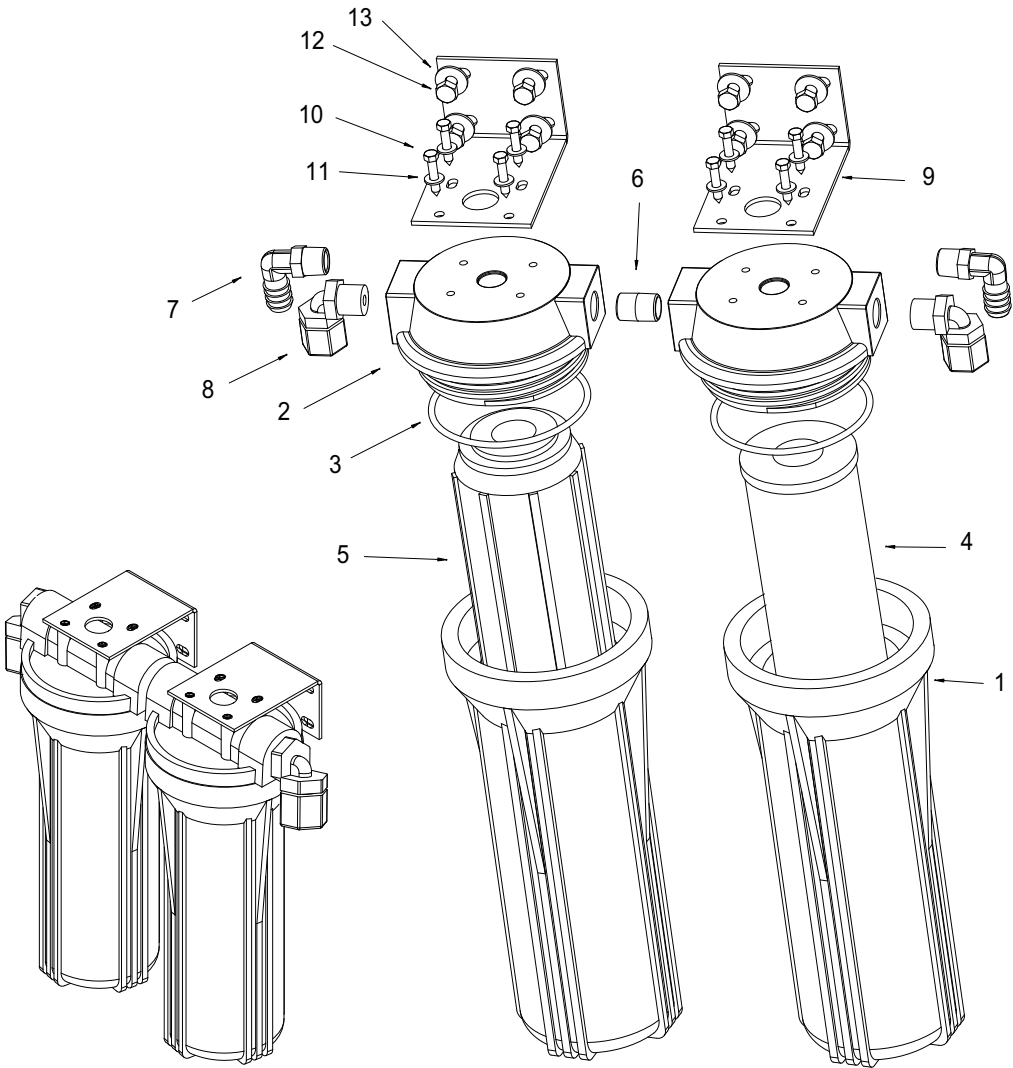
3-WAY PRODUCT WATER DIVERSION SOLENOID VALVE PORT DESIGNATION & WATER FLOW DESCRIPTION



SPECIFIC TO AQUA WHISPER II MODULAR STYLE:

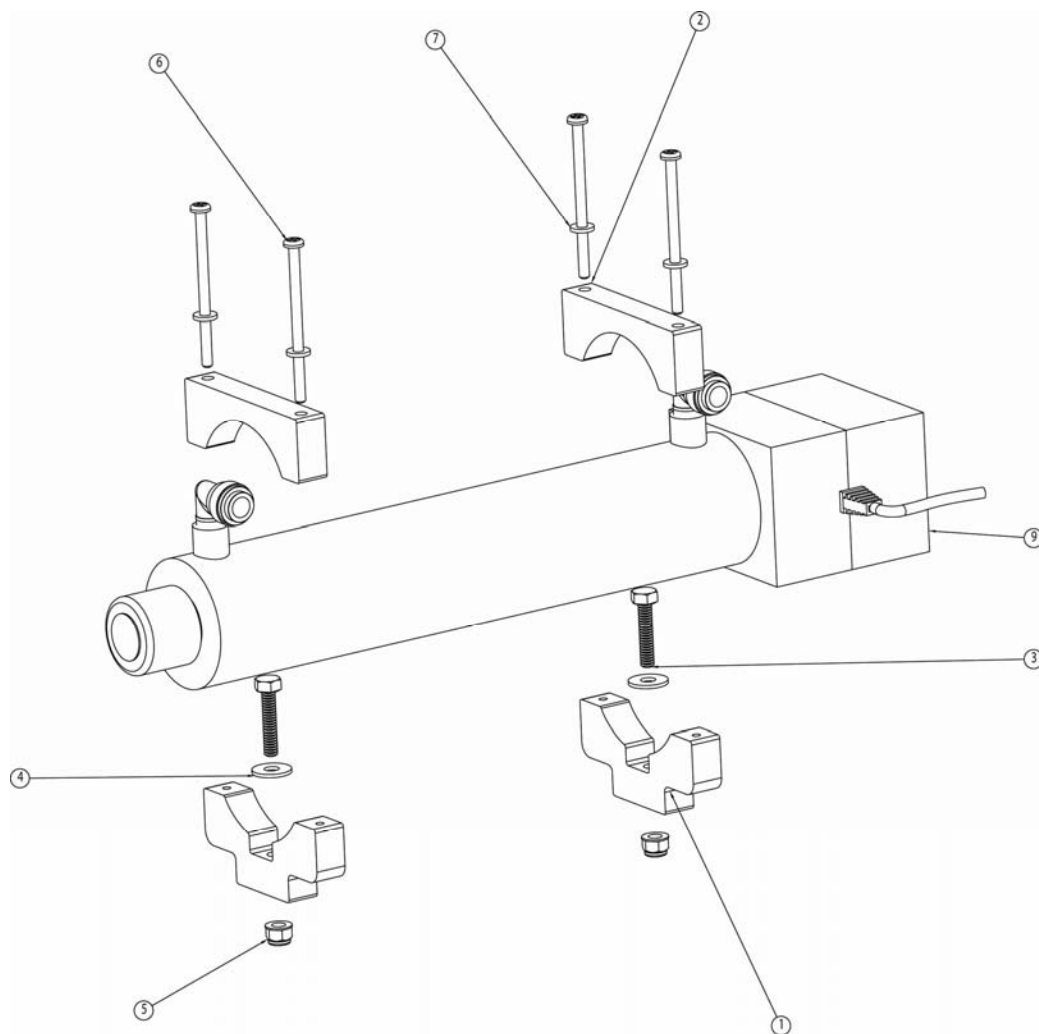
SHOWN CONNECTED TOGETHER, MAY ALSO BE ASSEMBLED AND MOUNTED SEPARATELY

ITEM	PART NUMBER	DESCRIPTION	QTY	U/M
1 - 13	B114130001	POSTFILTER DUAL AQMM		
1 - 3	0713020573	FILTER HOUSING/LID 3/8 X 10	2	EACH
1		BOWL PREFILTER HOUSING 10"		
2		LID PREFILTER HOUSING 10"		
3	2614010473	O-RING PREFILTER 10"		
4	0803004773	ELEMENT CHARCOAL 10"	1	EACH
5	08251950AS	ELEMENT PH 9 3/4"	1	EACH
6	01013718CL	NIPPLE 3/8 NPT X CLOSE PVC	1	EACH
7	0112071900	ELB90 3/8 X 1/2 BARB NYLON	2	EACH
8	0204021869	ELB90 3/8 TUBE X 3/8 MPT PLAST	2	EACH
9	20200402100	BRACKET PREFILTER/CHRCL/PLNKTN	2	EACH
10	061170628016	SC PHIL PAN "A" 10 X 1 SS	8	EACH
11	061080028000	WASHER FLAT #10 SS	8	EACH
12	061172143016	SC HEX "A" 1/4 X 1 SS	8	EACH
13	061100043000	WASHER FLAT OS 1/4" SS	8	EACH



UV STERILIZER

Item No.	Part No.	Description	Qty
1	20010418002A	Valve Bracket Clean/Rinse Kit	2
2	20010418001A	Bracket Mount Saddle UV-AW Top	2
3	061142150016	Bolt Hex 1/4-20X1 1/4 SS	2
4	061100043000	Washer Flat OS 1/4 SS	2
5	065070045000	Nut Locking 1/4-20 Flanged Nylon	2
6	061160630048	SC Phil Pan 10-24X3 SS	4
7	065080028000	Washer Flat #10 Nylon	4
8	2632180426	Decofelt .125x1.25 Blk	1
9	B5262000CV	UV Sterilizer	1



SECTION 10

CONVERSION CHARTS

NOTES:

[illegible]

MICRON / INCH / MESH**COMPARISON MEASUREMENTS**

MICRON	INCH	INCH	MESH (opening)
1	.00003937	.0070	100
5	.00019685	.0075	90
10	.00039370	.0075	80
15	.00059055	.0078	70
20	.00078740	.0110	60
25	.00098425	.0130	50
30	.00118110	.0180	40
40	.00157480	.0260	30
50	.00196850	.0410	20
75	.00295275	.0850	10
100	.00393700	.1770	5
200	.00787400	.9370	1

TEMPERATURES CELSIUS vs FAHRENHEIT**CONVERSION CHART**

°F	°C	°F	°C
0	-32	122	50
32	0	131	55
41	5	140	60
50	10	149	65
59	15	158	70
68	20	167	75
78	25	176	80
86	30	185	85
95	35	194	90
104	40	203	95
113	45	212	100

$$^{\circ}\text{CELSIUS} = (0.556^{\circ}\text{F}) - 32$$

$$^{\circ}\text{FAHRENHEIT} = (1.8^{\circ}\text{C}) + 32$$

Sea Recovery TEMPERATURE EFFECT COMPARISON CHART

(At 820 psi & 35,000 ppm TDS NaCl feed water conditions)

The Temperature Effect Chart on this page illustrates the loss or gain of productivity across the RO membrane.

To determine normal (in spec.) flow of the RO membrane at 77degrees F / 25degrees C follow these directions:

- 1) Determine feed source temperature.
- 2) Locate the corresponding temperature on the chart
- 3) Follow the corresponding temperature in a vertical line up to the plotted production line.
- 4) From this temperature point at the production line, move left horizontally to the plotted productivity percent.
- 5) Calculate the system's present productivity in U.S. gallons per day by multiplying the gallon per hour product water flow meter reading by 24.
- 6) Divide the figure reached in step 5 above, present gallon per day productivity, by the plotted productivity percentage from step 4 above. The answer will be equivalent to the membranes present productivity at specification test parameters, 820 psi & 77° F / 25° C.

Example:

- 1) With the system operating at 820 psi.
- 2) Present feed temperature is 61degrees F or 16degrees C.
- 3) Plotted productivity is therefore 72% of normal.
- 4) The system is a 900 gallon per day model and it is presently producing 630 gallons per day.
- 5) 630 gallons per day divided by .72 equals 875 gallons per day calculated productivity. The system is rated at 900 gallons per day $\pm 15\%$ (765 to 1035 gallons per day). Therefore, the system is within specifications at 630 gallons per day actual productivity at 61 degrees F/16 degrees C, 820 psi and 35,000 ppm feed.

