



Dockside Treatment System Plus Series User Manual and Installation Guide



The practice of running dock water through a standard seawater watermakers has been done for some time now.

It has allowed the boater to enjoy making purified water while at the slip and take advantage of the relatively spot free water produced under these circumstances. The downside has always been the premature failure of the seawater membranes due to exposure to chlorine, hot water, hard water, and various other contaminants that can foul a membrane. In addition, because the seawater membranes are not designed to be run under these conditions, they require far more energy and pressure than would membranes specifically designed for municipal water purification.

With the Dockside Treatment System Plus Solo, you can now purify dock water without the risk of fouling your seawater membranes.

The DTS^{+SOLO} is a standalone system, complete with dual inlet carbon and particulate filtering, pump, panel, HMI touchscreen, R1 ROC control system, and pressure vessel set (which house the reverse osmosis membranes).

The dual filters remove harmful chlorine and particulates from the dockwater stream before they reach pump and membranes. The dual filter assembly has a service valve, allowing the users to remove the inlet stream pressure after shutdown when replacing the carbon or particulate filter elements.

The membranes used in the DTS^{+SOLO} are specially designed for purifying freshwater, requiring lower pressure and energy than membranes designed for purifying saltwater. The pump is matched to the lower pressure requirements and is replaceable as a unit, eliminating the need to rebuild valves and seals.

The system is controlled by HMI touchscreen, an adjustable reject flow valve, and an adjustable recycle flow valve. Pressure gauges and flowmeters are provided on the system panel. These, along with information provided on the HMI touchscreen, informs the operator of the state of the machine at a glance.

The DTS^{+SOLO} advances the dockside treatment system lineage with the introduction of a recycle valve technology. The recycle valve technology increases the water recovery rate approximately 50%.

The DTS^{+SOLO} is also versatile in its mounting requirements. The optional stand allows the user to deck-mount the system's panel and filters. Without the stand, the user may wall-mount the system's panel and filters. If space is limited, the user can mount the panel and filters separately (modular mount). The pressure vessel set can be mounted horizontally or vertically, and includes mounting rails. An installation kit is included to supply hose and tubing and fittings.

PREFACE

We are committed to customer service that exceeds your expectations. If at any time you have questions about what's covered in this manual, our hands-on technical support will never leave you adrift. This manual contains technical information & instructions for the installation, operation, maintenance, and troubleshooting for FCI Watermakers Desalination Systems. Anyone responsible for the installation, operation, and maintenance of a FCI Watermakers Desalination System must read and understand the contents of this manual, and comply with these instructions, guidelines, and safety requirements at all times.

The term system will be used throughout this manual, and it generally refers to the FCI Watermakers DTS^{SOLO}. Reading this manual in its entirety will familiarize you with the system and the operation of its components. By understanding the system in its entirety, one can readily operate and diagnose problems.

All references within this manual refers to other sections unless specifically defined. Graphics and illustrations are used for reference only and may not represent the actual part or arrangement of parts in a customized system.

ABOUT SAFETY NOTES

Safety issues requiring users attention are highlighted throughout this manual as follows:

WARNING: Provides critical information in order to prevent the possibility of injuries and/or death.

CAUTION: Provides important information to prevent the possibility of damaging the device or equipment.

NOTE: Provides additional information to safely and properly operate the equipment.

NEW SYSTEM PERFORMANCE

Although each system has been fully tested prior to shipping, there will be a break-in period. During this period, approximately 48 hours, membrane performance will change or settle. Adjustments will need to be made to the reject flow valve, and the water quality and quantity will vary. The reject flow valve will need to be increased (turned clockwise) and the water quality produced will improve over this break-in period.

THEORY OF OPERATION

The DTS^{+SOLO} is designed especially for making fresh drinking water from municipal water.

The dockwater is delivered to the boat under city pressure. If the city pressure exceeds 50 psi, the resulting pressure to the pump will be beyond the pump's pressure limit. If this is the case, a pressure regulator can be installed to keep the pressure before the pump below the maximum limit. Contact the factory or your local FCI dealer for further details.

The dockwater passes through a service valve and into the dual filters. First, the particulate filter removes particles as small as 5 microns. Second, the granular activated carbon filter removes chlorine and bromide, harmful to the membranes of the watermaker. The service valve is used to remove the city pressure when it is necessary to clean or replace the filters.

The filtered dockwater is then controlled by a solenoid valve. When the user starts the DTS^{+SOLO} via the HMI touchscreen, the solenoid valve opens, and after priming, the pump is turned on. After initializing, the pump will pressurize the dockwater stream to operating pressure, and as the stream is passed over the membranes, product is pushed through the membrane and impurities are washed away in the reject. Product water quality is monitored by a TDS probe. A recycle valve reflows approximately 50% of the reject back into the dockwater stream, and the rest of the reject is sent to drain.

While running, the user adjusts the operating pressure with the reject flowmeter valve until the product output matches the rated output. Also, the user adjusts the recycle flowmeter valve until the recycle flow is approximately 50% of rated output.

LIMITED WARRANTY

This policy will define, in detail, what is and is not covered under warranty. It will also define how to obtain warranty service and approval.

I. Filtration Concepts Incorporated, dba FCI Watermakers (“FCI”), warrants to the original purchaser (“Purchaser”) that new Water Purification Products, Pumps, and Related Accessories (“Product(s)”), if used in accordance with FCI’s published specifications and operating manuals and all applicable laws and regulations, will not fail due to defects in material or workmanship during the period of the earlier of (i) one year from Startup (defined below), or (ii) 18 months from shipment (“Warranty Period”). At FCI’s option, it will repair, replace, or refund the original purchase price for the defective Product. Any parts repaired or replaced under this Product warranty shall not extend the original Warranty Period for the Product and will not be warranted any longer than the original Warranty Period. Labor costs to repair or replace are not included in this warranty.

Replacement parts (outside the original sale of the Product) shall carry a separate warranty as set forth in Article VI below.

Products built to Purchaser’s own specifications (“Custom products”). Custom Product Warranty: All Custom products manufactured by FCI pursuant to the design and specifications provide by Purchaser are warranted for one year from the date of manufacture. FCI warrants only that the Custom product will be manufactured in accordance with the Purchaser’s specifications.

II. To commence the warranty process, the Purchaser must call FCI’s Customer Service Department (see IV.2. below) for a recommendation as to the closest Authorized Servicing Dealer (see IV.2. below). If the Purchaser has a prior relationship with an Authorized Servicing Dealer, the Purchaser may contact same directly. If the Purchaser contacts FCI’s Customer Service Department for an Authorized Servicing Dealer and FCI has no one located in that particular area on the list, FCI will authorize the use of a local service company and work with that local company to assist in any way possible.

III. Exclusions to the above warranty:

1. Product failures resulting from improper installation or use contrary to operating manuals and other Product instructions;
2. Product failures resulting from abuse, misuse, accident, fire, or submergence;
3. Products manufactured by a third party that are not included in the original Product;
4. Products which fail as a result of improper application or improper installation, including but not limited to hose clamps, fittings, flare nuts, quick disconnects;
5. Products damaged during loading or shipment;
6. Cosmetic damages that do not affect the use and function of the Products;
7. Pumps that have been run dry, are water damaged or have been allowed to freeze;
8. Pumps with cracked heads;

LIMITED WARRANTY (continued)

9. Pump seals and UV light bulbs;
10. Sea strainer elements and cartridge filter elements;
11. Damage due to sand and/or gravel in a multi-media filter;
12. Pump packing assemblies;
13. Pump valve assemblies;
14. Pump crankcase oil;
15. Gauge instrument calibration;
16. Fuses;
17. Valve seals and packings;
18. Exterior corrosion;
19. Membrane elements;
20. Water damage to logic boards;
21. Logic boards with blown MOV's (Power Surge) or mis-programmed displays;
22. Water damage to displays or remotes;
23. Failures due to improper winterization;
24. All other consumable parts not covered herein;
25. Product damage resulting from improper return packaging by Purchaser; or
26. Force Majeure as more specifically defined in Section 9 of the General Terms and Conditions.

IV. Additional Exclusions/Restrictions:

1. For issues regarding installation, assembly or Start-up of the Product, the installer maintains all liability for its work, and FCI disclaims all liability therefor. Purchaser shall defend, indemnify and release FCI from and against any claims arising from the installer's work. "Start-up" is when the OEM or Authorized Servicing Dealer ("installer") has put the Product into service as shown on the Warranty Card (as defined in Article V. #3 below).
2. The installer must be an OEM or "Authorized Servicing Dealer". A list of Authorized Servicing Dealers can be found at <https://fciwatermakers.com/dealer-map/> or by calling FCI's Customer Service Department Monday-Friday from 8:00 a.m. until 5:00 p.m. (MT) at (801) 906-8840. If Purchaser wishes to use an installer that is not found on the list, please call the telephone number above for prior authorization. FCI is not liable for work performed by an installer and Purchaser shall defend, indemnify and release FCI from and against any claims arising from such third-party work.
3. Warranty repairs shall be subject to the same restriction as found in IV. #2 above. If an OEM or Authorized Servicing Dealer is not used for warranty repairs and/or installation, the warranty shall be voided.

LIMITED WARRANTY (continued)

4. Except as provided in IV. #5 below, labor costs and expenses for warranty repairs are excluded.
 5. If Purchaser, at its own cost and liability, packages and ships the defective Product to FCI for repair, FCI will repair the Product (or component) in its facility at its own expense (including labor) if found to be defective.
 6. If the Product is replaced under this warranty, all costs of uninstallation of the warranted Product and reinstallation of the new Product are excluded.
 7. In the case of a refund, the Purchaser must package and ship the Product back to FCI at its own cost and liability. If found to be defective, a refund will be issued.
 8. If the Product is uninstalled and reinstalled by Purchaser or its agent to another location, the warranty shall be voided.
 9. Purchaser (or its agents) shall be responsible for the cost to make the Product accessible for warranty repair.
 10. Products are not intended for use in connection with any nuclear facility or activity and FCI disclaims all liability for nuclear damage, injury, or contamination. Purchaser shall indemnify, defend, and hold FCI, its officers, directors, agents, employees, successors, assigns harmless from and against any and all damages or expenses of whatever nature (including attorney's fees and costs) which may be incurred arising from such use.
 11. If Purchaser or an installer purchases replacement parts to perform warranty repairs, unless FCI finds the returned part to be defective, FCI will not credit such purchase of a new part. Instead, FCI encourages Buyer to send the part in question to FCI's facility for evaluation of the alleged defect prior to purchasing a new part.
- V. Additional required conditions to warranty effectiveness:
1. FCI WARRANTIES ARE EFFECTIVE UPON PAYMENT IN FULL, AND FCI IS NOT OBLIGATED TO HONOR ANY WARRANTY OR PROVIDE ANY SERVICE UNTIL FCI RECEIVES PAYMENT IN FULL.
 2. Proof of purchase or proof of installation date may be required to verify warranty coverage.
 3. Purchaser must submit the "Warranty Card" at the time of Start-up through the portal found at <https://fciwatermakers.com/register-your-product/>. If Buyer fails to submit the Warranty Card upon Start-up, the Warranty Period for the purchased Product shall be limited to one year from shipment. All other terms and conditions herein shall apply.
 4. All products manufactured by FCI are based on a set criterion for performance based on feed water conditions. These parameters can be found on the product data sheet(s) ("PDS") for each product. Please refer to the applicable PDS for additional warranties, exclusions and terms and conditions. Variations from these parameters will affect system performance and in some cases damage system components. FCI is not responsible for feed water quality or changes in the feed water over time or the resulting system performance due to feed water being unbalanced or containing contaminants or biological elements. In these circumstances, the warranty will be void.

LIMITED WARRANTY (continued)

In cases when FCI's Application Questionnaire is completed by Purchaser, FCI assumes no liability for the accuracy of the data submitted by Purchaser or subsequent recommendations based on the submittal. If Purchaser's responses are inaccurate or incomplete, the warranty shall be void. If the feed water conditions change, the warranty will be void. If Purchaser does not return the Application Questionnaire and the product fails due to improper feed water conditions for the model purchased, the warranty will be void.

VI. Parts' Warranty: All parts ("Parts") sold outside the original Product sale (excluding replacement parts covered by the Product warranty above in Article I) that are sold by FCI shall be warranted for 90 days from the date of sale. FCI does not warrant parts manufactured by third parties and the Parts buyer should contact the original manufacturer for any applicable warranty rights.

VII. Additional limitations to the Product, Custom product and Parts warranties:

THE REMEDIES SET FORTH HEREIN ARE THE ONLY REMEDIES AVAILABLE TO ANY PERSON OR ENTITY FOR BREACH OF WARRANTY OR FOR BREACH OF ANY OTHER COVENANT OR OBLIGATION ON THE PART OF FCI AS SET FORTH HEREIN. FCI SHALL HAVE NO LIABILITY OR OBLIGATION TO ANY PERSON OR ENTITY FOR BREACH OF ANY OTHER COVENANT OR OBLIGATION UNDER THIS WARRANTY EXCEPT AS EXPRESSLY SET FORTH HEREIN.

IT IS EXPRESSLY AGREED THAT THIS WARRANTY DOES NOT FAIL OF ITS ESSENTIAL PURPOSE.

IN NO EVENT SHALL FCI BE LIABLE FOR INCIDENTAL, SPECIAL OR CONSEQUENTIAL OR PUNITIVE DAMAGES OF ANY NATURE WHATSOEVER, WHETHER ANY SUCH CLAIM OR DAMAGES BE BASED UPON WARRANTY, CONTRACT, NEGLIGENCE, STRICT LIABILITY, TORT, OR OTHERWISE.

IN NO EVENT SHALL FCI'S TOTAL LIABILITY HEREUNDER EXCEED THE ORIGINAL PURCHASE PRICE OF THE PRODUCT OR PART, AS APPLICABLE.

THIS LIMITED WARRANTY CONSTITUTES FCI'S EXCLUSIVE PRODUCT, CUSTOM PRODUCT AND PARTS WARRANTIES. ANY SERVICE, ADVICE, OR CONSULTATION FURNISHED TO PURCHASER OR BUYER BY FCI OR ITS REPRESENTATIVES AS WELL AS ALL OTHER WARRANTIES EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY DISCLAIMED.

VIII. FCI's General Terms and Conditions of Sale and applicable PDS are included in and applicable to this Limited Warranty. FCI's Customer Service Department can provide Purchaser with a copy of the General Terms and Conditions of Sale upon request.

Effective Date: 4/29/2022

WARRANTY REGISTRATION

INSTRUCTIONS: At the time of purchase of the FCI Watermakers system, please complete the warranty information listed below. After completing this form, please make a copy and submit the copy using one of the options at the bottom of the page. Keep this copy in your manual for future reference.

SYSTEM INFORMATION:

Model # _____
Serial # _____
Operating Voltage: _____

Date Purchased: _____

Date Commissioned: _____

DEALER INFORMATION:

Dealer Name: _____
Address: _____
City: _____ State: _____
Country: _____ Postal Code: _____
Dealer Invoice #: _____

CUSTOMER INFORMATION:

Customer Name: _____
Address: _____
City: _____
State: _____ Postal Code: _____
Country: _____
Phone: _____ Fax: _____
E-mail: _____

VESSEL INFORMATION:

Boat Manufacture: _____
Boat Model: _____
Boat Name: _____
Boat Length: _____

LAND BASED INFORMATION:

Installation site: _____
Site Name: (resort, company etc) _____

Application:

Operator Contact Information:
(person in charge of system maintenance and operation)
Name: _____
E-mail: _____
Phone: _____

Mail a copy to:

FCI WATERMAKERS, INC
ATTENTION: WARRANTY REGISTRATION
3782 W 2340 S, STE E
WEST VALLEY CITY, UT 84120-7291 USA

EMAIL: info@fcewatermakers.com
Subject: Warranty Registration

FAX: +1-801-883-9985

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FCI CONTACT INFORMATION

If you have questions regarding your FCI Watermakers system or the contents of this manual, or if you need replacement parts, please do not hesitate to contact us immediately. Our hands-on technical support is always at your service.

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GENERAL INFORMATION

FCI watermakers are the most advanced desalinating systems available, which produce potable water from seawater or brackish water. For over a decade, FCI Watermakers, Inc. has pioneered technology and innovated features that have become standards for today's desalinators: one-touch commands, multiple station operation, and remote system control and monitoring. As both engineers and craftsmen, we specialize in high-performance, value-driven watermakers and are proud of the thousands of continuously operating units that have been cruising the globe for decades.

At FCI Watermakers, our commitment and attention to detail transcends beyond materials and construction. Things that are seemingly trivial are never overlooked. For instance, your system's specifications formulate the Model Number. It is comprised of the Series, the Model Name, and the Production Rating of the unit in gallons per day (GPD):

A	B	C
DTS+	SOLO	-3000
A	B	C
Series	Model Name	DTS Production
DTS+: DTS+ Series	SOLO: DTS+SOLO	-2000: 2,000 GPD -3000: 3,000 GPD

Your FCI Reverse Osmosis Desalination System is designed to provide lasting performance using high-grade materials and uncompromising engineering. FCI systems utilize high-grade alloys in critical components, where competing brands often use inferior material that compromise system operation and jeopardize the vessel.

NEW SYSTEM PERFORMANCE

Although each system has been fully tested prior to shipping, there will be a break-in period. During this period, approximately 48 hours, membrane performance will change or settle. Adjustments will need to be made to the reject flow valve, and the water quality and quantity will vary. The reject flow valve will need to be increased (turned clockwise) and the water quality produced will improve over this break-in period.

2/ PRE-INSTALLATION

This section provides key information for a successful install, leading to long-term enjoyment of your FCI watermakers. It includes warnings, cautions and notes associated with the preparatory work necessary to properly install and maintain your watermaking system.

The FCI Watermakers System is supplied with an installation kit which includes an assortment of hoses needed to install the system. Because of the various options with regard to location, some installations may require additional hose or wire. Please contact your local dealer for these supplies. Be sure to follow all local codes when installing your new FCI watermaking system.

Always use genuine FCI approved parts to ensure proper operation of your watermaker.

PRE-INSTALLATION PRECAUTIONS

STORAGE PRIOR TO REMOVAL FROM CRATE

Adhere to crate markings:

- **DO NOT** store in direct sunlight;
- **DO NOT** store above 120° F (50° 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 WET AT ALL TIMES.**

REVERSE OSMOSIS MEMBRANE ELEMENT IS SUSCEPTIBILITY TO CHEMICAL ATTACK

CAUTION: Do Not expose the FCI Watermakers system to intake Feed Water from any chemical not approved in writing by FCI Watermakers, or any of the following chemicals:

- | | |
|---------------------|-------------------------|
| • Hydrogen peroxide | • Chloramines-T |
| • Chlorine dioxide | • Chlorine |
| • Bromine phenolic | • Disinfectants |
| • Chloramines | • N-chloroisocyanurates |
| • Hypochlorite | • Iodine |
| • Bromide | • Petroleum products |

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 aforementioned chemicals. Example: Do not connect the inlet of the system to the ship's potable water system or the dockside water system without the filter assembly, if the water systems contain chlorinated or brominated water. These chemicals destroy the copolymer components within the R.O. system. These oxidants and others also damage the R.O. membrane element.

DO NOT PERFORM INSTALLATION UNLESS:

1. The system feed water valve is closed.
2. The system main electrical disconnect switch is switched **OFF, LOCKED, and TAGGED.**

WARNING: ELECTRICAL SHOCK HAZARD. The installation procedures expose the installer to **HIGH VOLTAGE** and electrical shock hazard. Only attempt installation if you are a qualified electrician and only if surrounding conditions are safe.

QUALIFICATIONS

Technicians must have technical knowledge and ability in the following fields:

- a) Electrical, Electronic, Electric Motors and Circuits
- b) Electromechanical and Mechanical Systems
- c) Hydraulic and Liquid Pressure and Flow Systems
- d) Piping and Plumbing Systems
- e) Water Suction and Pressure Lines
- f) Thru-Hull Fitting below and above water level

WARNING: Do not attempt installation, commissioning, troubleshooting, or repair if you are not proficient in the above fields of expertise.

SPECIAL CONSIDERATIONS INSTALLATION CAUTIONS

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.

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.”

NEVER mount liquid-holding component above any electrical or electronic device. Extensive damage to the electronic device will result if liquid enters device during maintenance or component failure.

CONNECTION LINE CAUTIONS: All connection lines should be as short and straight as possible using minimum fittings. The connection lines must not be “kinked.”

ACCESSIBILITY CAUTIONS: This is a simple rule. Install the system and its supporting components in an accessible manner. The panel must be accessible for operation of the system.

R.O. MEMBRANE ELEMENT NOTES

CAUTION: Some systems are shipped **WITHOUT** the reverse osmosis membrane element. This is to accommodate boat builders that will install the system well in advance of commissioning the boat and the system.

DOES THIS 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 R.O. membrane element has been installed, there will be a R.O. membrane element serial number tag attached to the pressure vessel(s). Find this serial number tag to ensure that the R.O. membrane element(s) have been installed. If the R.O. membrane element serial number tag is missing or does not contain a serial number, then the R.O. membranes are not installed. If the R.O. membrane elements are not installed and you wish to install them at this time, contact FCI Watermakers, Inc. and supply us with your original purchase order number, FCI's invoice number, and this system's serial number.

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 elements are not installed;
to contact the factory for the R.O. membrane elements; and
DO NOT operate the system without the R.O. membrane
elements installed. Extensive damage will occur if the system is
operated without the R.O. membrane elements installed.

Damage to the system caused by the operation of the system without R.O. membrane elements installed:

- Is **NOT** covered by the FCI Watermakers, Inc. warranty
- Is the liability of the installer if the installer did not notify the end user.
- Is the liability of the end user if the installer notified the end user that the R.O. membranes were not installed and to not operate the system without the R.O. membrane elements installed.

COMPONENT IDENTIFICATION

Figure 1 introduces the components required for the install. Each component plays an important part in the install and is referenced throughout this manual.

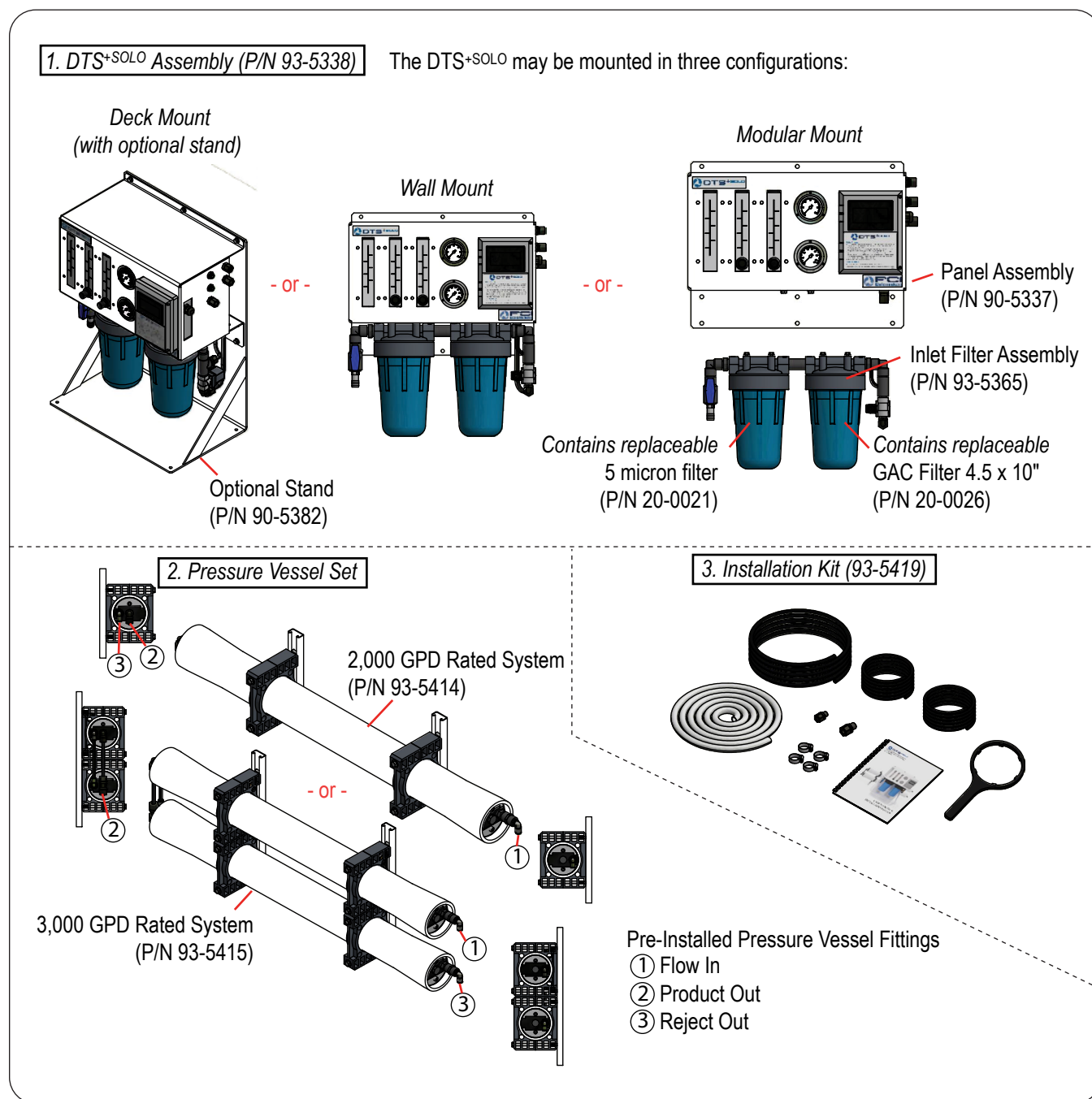


Figure 1: Component Identification

INSTALLATION KITS

The installation kit provided with DTS⁺SOLO will match the kit shown in *Figure 2*.

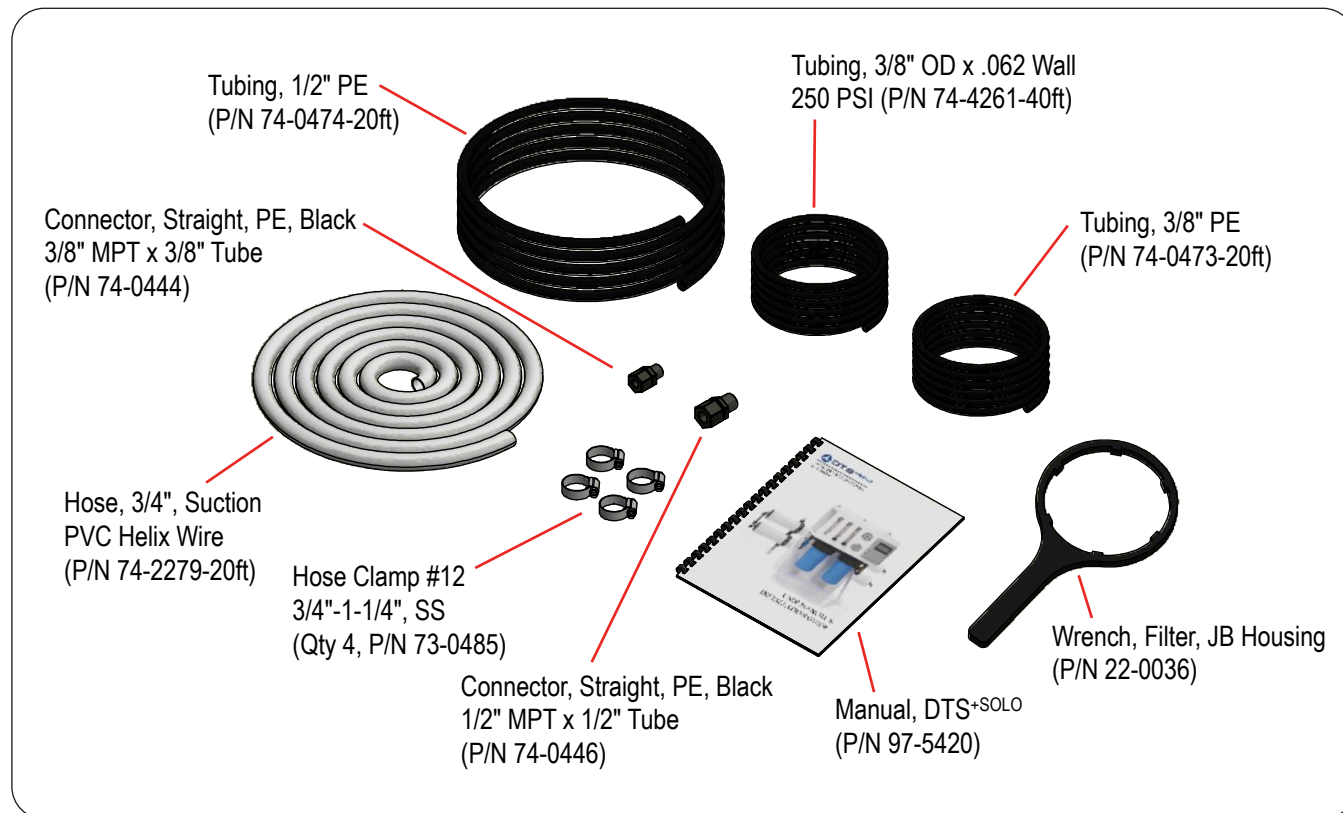


Figure 2: Installation Kit (P/N 93-5419)

PIPING & INSTRUMENTATION DIAGRAM

Figure 3 shows the piping and interconnect of the components, including standard and optional accessory configurations. Determine the pre-filtration and post-filtration components that were supplied with your system, and identify how each component interconnects.

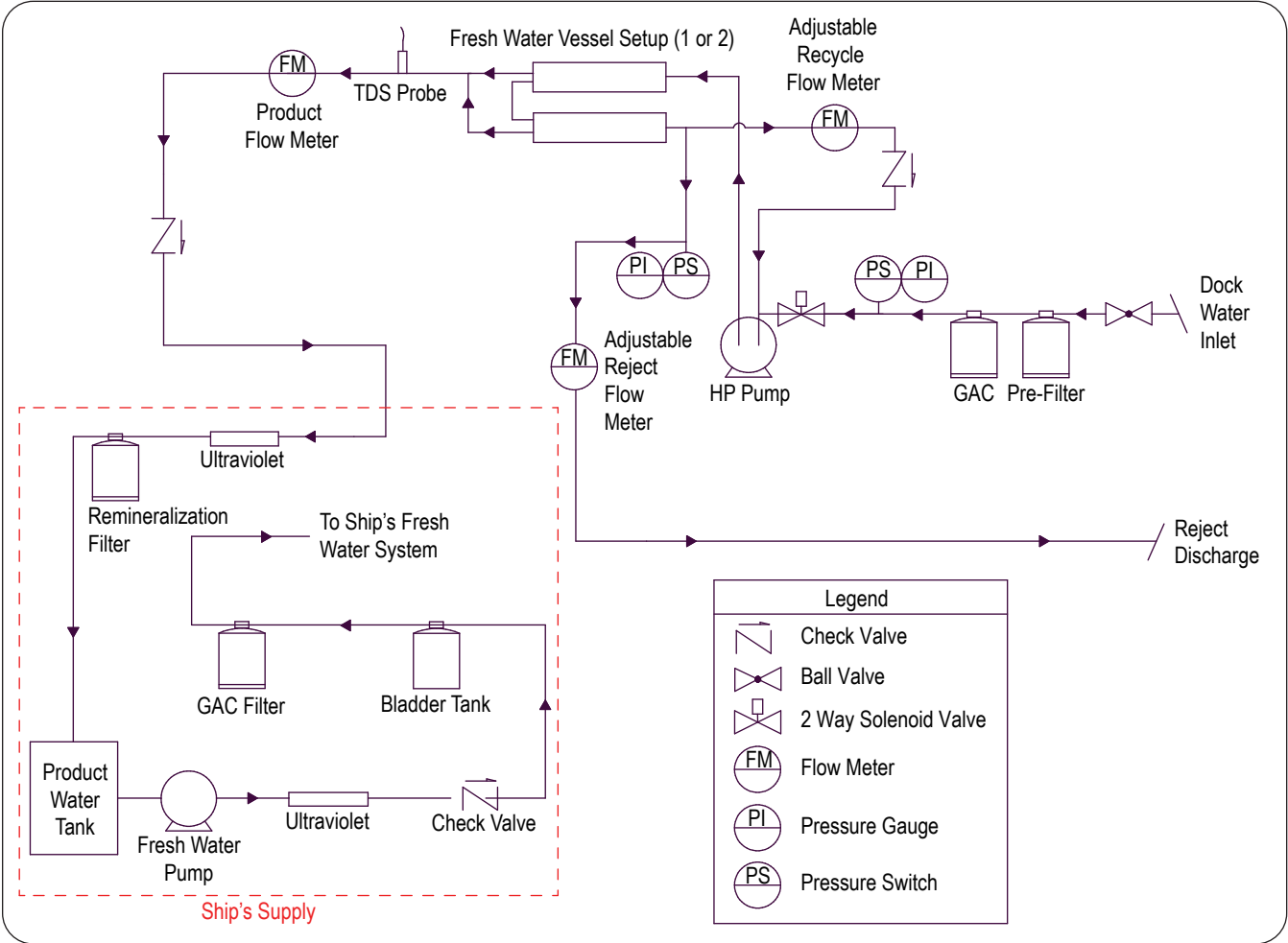


Figure 3: Piping & Instrumentation Diagram

COMPONENT DESCRIPTIONS

Standard and optional components are described in this section, and items required by the installer are listed. The location, operation, and purpose of each major component of the system is briefly explained.

Use of third party, Non-FCI (or unauthorized) components may lead to premature failure, added operating and maintenance costs, and increased labor. Using 3rd party, Non-FCI components may void any and all FCI Watermakers Warranty. We only wish to help you enjoy the luxury of owning a FCI Desalinating System. Treat it properly by using only FCI supplied parts, recommended consumables, and authorized accessories.

DECK MOUNT, WALL MOUNT OR MODULAR MOUNT

The DTS^{SOLO} may be installed using the optional stand (deck mount), or without the stand (wall mount), or with panel and filter separated (modular mount). The deck mount consists of securing the stand with screws to the deck. The wall mount consists of securing the panel and filter assembly with screws to the wall. The modular mount consists of separating the filter and panel and mounting separately. The pressure vessel set will be secured separately in all mounting configurations. See *Figure 4*.

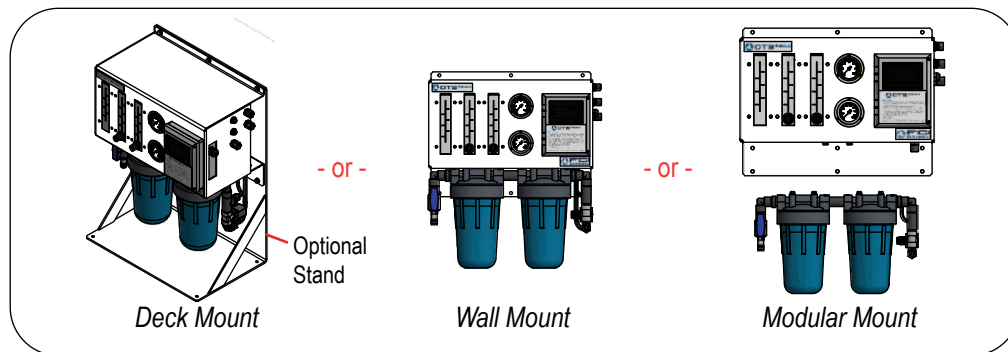


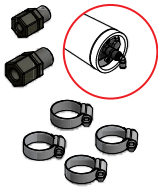
Figure 4: Deck Mount, Wall Mount, or Modular Mount



INSTALLATION KIT

The installation kit supplies hose, tubing, clamps and fittings to connect the plumbing. Some fittings may be shipped attached to components. For custom installation, you may need to order additional lengths of hoses and tubes. Wire is not supplied because the required lengths varies per installation. Wire is needed for power connection. If you intend to install using a modular mount, extra wire may be needed to connect the solenoid of the filter assembly to the panel.

COMPONENT DESCRIPTIONS (continued)

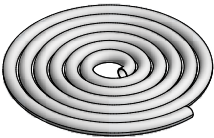


FITTINGS

Push-in fittings, clamps, and barbs allow secure attachment of the hoses and tubes to the components. They are provided in the installation kit and on the components.

There are two types of fittings. Fittings with release button allow tube removal by depressing button, should you need to remake connection. Install these fitting by pushing in tube until it bottoms. Fittings with loosening nut require disassembly to remove tube, should you need to remake the connection. Install these fittings by loosening nut three turns before inserting tube until it bottoms, then tightening nut.

Clamps are used on the barbed fittings. Use two clamps on one barb for a secure connection.



3/4 INCH PVC HELIX WIRE SUCTION HOSE (supplied with kit)

The suction hose is used with the barbed fitting and clamps to plumb from the dockwater source to the filter assembly inlet. Use two clamps per barb.



1/2 INCH PE TUBING (supplied with kit)

Use the 1/2 inch PE tubing for replacing the "feed from filters" line into the panel, should you use modular mount. Also use the 1/2 inch PE tubing for connecting the panel's "reject discharge" outlet to drain.



250psi PE Tubing
is shiny black

3/8 INCH 250PSI PE TUBING (supplied with kit)

The tubing rated for high pressure (250 PSI) is used to connect the panel's post-pump flow into the freshwater pressure vessel, and the reject out of the freshwater pressure vessel back into the panel. The tubing must be cut to length and the push-in fittings installed on the tube ends. Note that the 250psi tubing is shiny black and the 125psi tubing (described below) has a dull black appearance.



125psi PE Tubing
is dull black

3/8 INCH 125PSI PE TUBING (supplied with kit)

The low pressure tubing (125 PSI) has a duller black appearance than the 250psi tubing described above. The tubing must be cut to length and the push-in fittings installed.

The 125psi tubing is used to connect the product out of the pressure vessel to the "product inlet" of the panel, the "product out" of the panel to product water tank.

COMPONENT DESCRIPTIONS (continued)

FILTER ASSEMBLY

The filter assembly is shown in *Figure 5*.

The filter assembly has a replaceable granular activated carbon filter (P/N 20-0026) and a 5 micron particulate filter (Part # 20-0021). Chlorine and bromide are harmful to the fresh water membranes. The filter assembly is supplied to remove these chemicals and harmful particulate.

NOTE: The filter is your first line of defense protecting the pump and membrane. Keeping the filter in good condition will help insure trouble-free operation.

WARNING: Do not use third party filter elements, use only FCI filter elements. Third party filter elements do not properly fit and the seams fall apart. They also allow by-pass resulting in damage to pump as well as premature fouling of the R.O. membrane element(s).

CAUTION: Do not use “string wound” or “fiber” filter elements. String wound and fiber filter elements are designed for the photographic film developing industry. If they are used, they will plug up rapidly in one-tenth or less time than a FCI supplied filter cartridge element. This will cause frequent shut downs of the system and frequent changing, resulting in high maintenance cost and user frustration.

The inlet of the filter assembly has a barbed fitting and plumbs to the dockwater source. The maximum allowed pressure of the dockwater source is 50 psi. If it is more, a pressure regulator must be installed. Contact FCI Watermakers for details.

The outlet of the filter assembly is pre-connected to the panel. If you are using modular mount, you can reuse the fittings on the existing 1/2 inch PE tubing, and replace the tubing with a longer length.

Also, the filter assembly has a solenoid valve on the outlet. The solenoid valve is pre-wired to the panel's electrical enclosure. If you are using modular mount, extra wire may be needed.

The filter assembly has a service valve on the inlet side. This is used to remove the pressure from inlet stream when you need to clean or replace the filters. A filter wrench is included in the Installation Kit to assist in servicing the filters.

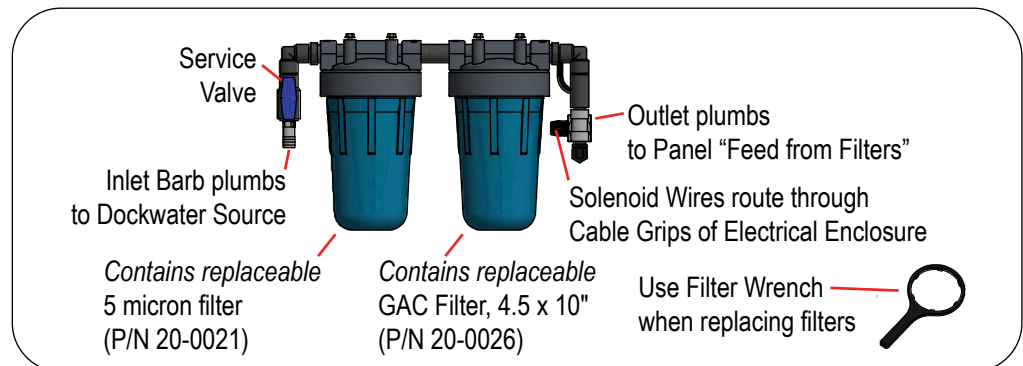


Figure 5: Filter Assembly Features

COMPONENT DESCRIPTIONS (continued)

PANEL ASSEMBLY

The panel assembly is shown in *Figure 6*.

The panel contains the operational controls. This includes the HMI touchscreen, the adjustable reject flow valve (used to match product output with rated output), and the adjustable recycle flow valve (used to match recycle flow to approximately 50% of rated output). The panel has flowmeters for product, reject, and recycle flow. In addition, the panel has gauges for feed pressure and operating pressure.

The panel contains the electrical enclosure. The front of the enclosure opens on hinges (after loosening the securing screws in the right top and bottom corners). Inside are connections for power and the solenoid. The wires feed into the enclosure through the cable grips on the sides.

The plumbing connections are located on the right side of the panel, and the feed from filters is located on the bottom of panel.

The plumbing connections are:

- *To Vessels* – This is the post-filter, post-pump flow from panel to inlet of pressure vessel set. Uses 3/8 inch, 250psi PE tubing.
- *From Vessels* – This is the reject flow from reject outlet of vessels to panel. Uses 3/8 inch, 250psi PE tubing.
- *Product Inlet* – This is the product flow from product outlet of vessel to panel. Use 3/8 inch, 125psi PE tubing.
- *Reject Discharge* – This is the post-recycle reject flow from panel to discharge. Uses 1/2 inch, PE tubing.
- *Product to Tank* – This is the product flow from panel to product water tank. Uses 3/8 inch, 125psi PE Tubing.

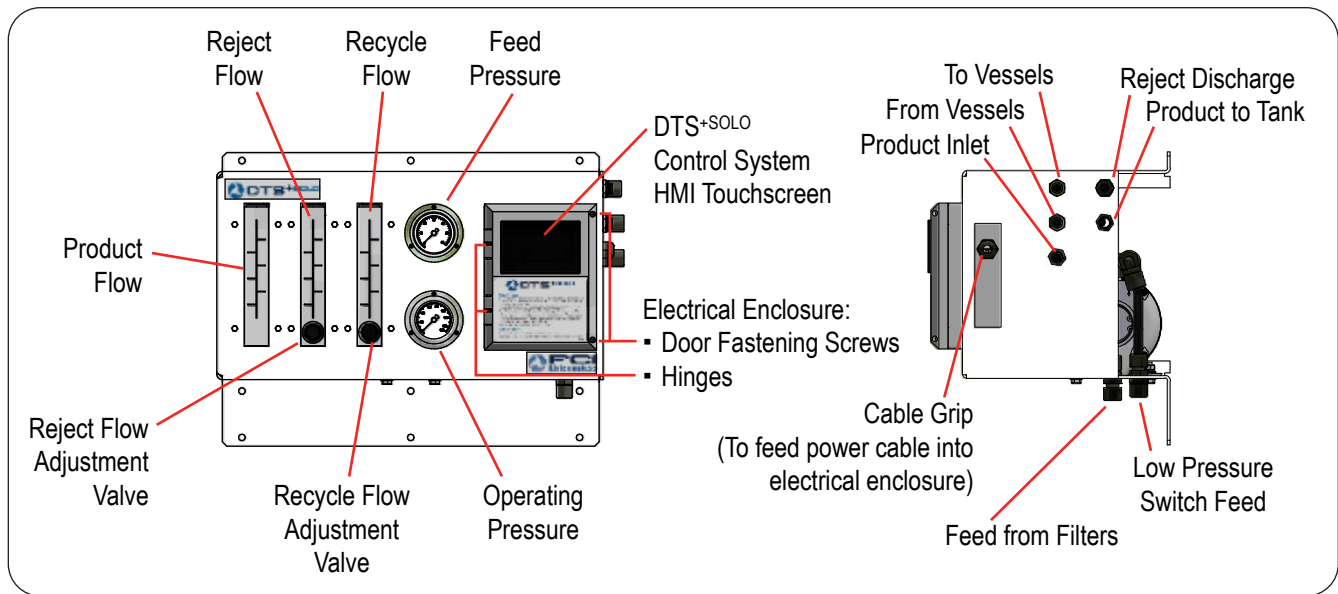


Figure 6: Panel Assembly Features

COMPONENT DESCRIPTIONS (continued)

PRESSURE VESSEL SET

The pressure vessel sets are shown in *Figure 7*.

The pressure vessel set contains the R. O. membranes used to purify the dockwater. There are three plumbing connections from the vessels to the panel: flow in, reject out, and product out.

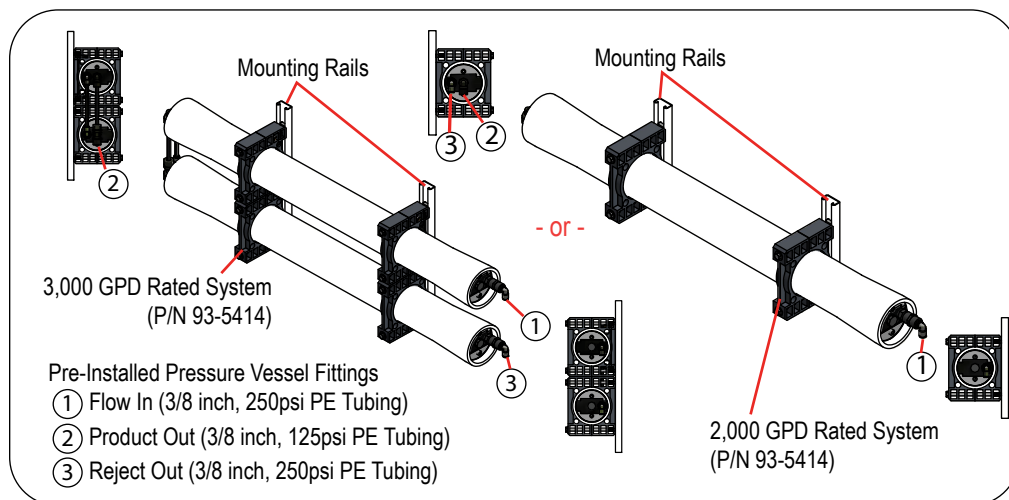


Figure 7: Pressure Vessel Set Features

3/ INSTALLATION

Read below to understand the overall approach of the install.

COMPONENTS SUPPLIED BY INSTALLER

The first section lists the items not included with the system that you may need to supply for the installation.

DIMENSIONS, WEIGHT, & FOOTPRINTS

Immediately following this overview are diagrams of the DTS^{+SOLO} components with their dimensions and footprints. These diagrams are used to plan where to mount the components.

GENERAL CONNECTION DIAGRAMS

The General Connection Diagram is supplied to provide a one page layout of how the system components connect. This diagram is used to plan where to mount the components and as a reference when connecting the plumbing.

SYSTEM INSTALLATION / MOUNTING

This section has instructions on mounting the components. The footprint and layout diagrams of the previous sections are available for reference when mounting the system components.

SYSTEM INSTALLATION / PLUMBING

After the mounting instructions, the manual describes the plumbing. General instructions are provided on how to install the hose ends and fittings. Illustrations and a table call out the plumbing connections by letter. You are instructed to work through the hoses and tubes letter-by-letter until the plumbing is connected.

SYSTEM INSTALLATION / ELECTRICAL CONNECTIONS

Power must be wired to the power supply, located in the electrical enclosure of the DTS^{+SOLO} system. If installing by modular mount, the solenoid cable may need to be replaced with a longer cable.

INSTALLATION CHECKLIST

After the installation is complete, use the list to double check the installation.

COMPONENTS SUPPLIED BY INSTALLER

Most of what you will need to install your system is included in your package. As each system installation varies, not all installation fittings, hose and tubing can be provided. There are a few items that you will need to consider for your individual system.

Select a suitable location for the components and evaluate where you plan to place them. Obtain a good working estimate as to the footage of hose that will be needed and contact your dealer or FCI for the supplies. *Table 1* summarizes the specifications for components supplied by installer.

CAUTION: All fittings, valves, and piping installed prior to, within, and after the system must not contain iron. If the resulting failure of the R.O. membrane element is attributed to improper installation, it is the liability of the installer.

Table 1: Specifications for Components Supplied by Installer

Connection	Specification
Dockwater source	The FCI Watermakers System must receive an uninterrupted supply of feed water (50 psi maximum) without air
Connection at dockwater source	3/4" hose barb
Reject discharge	1/2" minimum at or above water level
Connection at reject discharge	1/2" NPT
Connection to dockside unpressurized potable water storage tank NOTE: In order to avoid problems such as reverse flow from the tank to the system and chlorination attack of the R.O. membrane element, the fitting must terminate above the maximum water level. WARNING: 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.	3/8" NPT
Incoming Power	120 VAC / 240 VAC, 50/60 Hz
Current Draw (Actual current draw will vary with incoming power conditions)	5.7 A @ 120 VAC 2.9 A @ 240 VAC

DIMENSIONS, WEIGHT & FOOTPRINTS

Dimensions, weight and footprints of the systems components are shown in *Figure 8* to *Figure 11*. Refer to the figures when planning where to mount the components. Planning considerations are discussed in "SYSTEM INSTALLATION / MOUNTING" on page 34

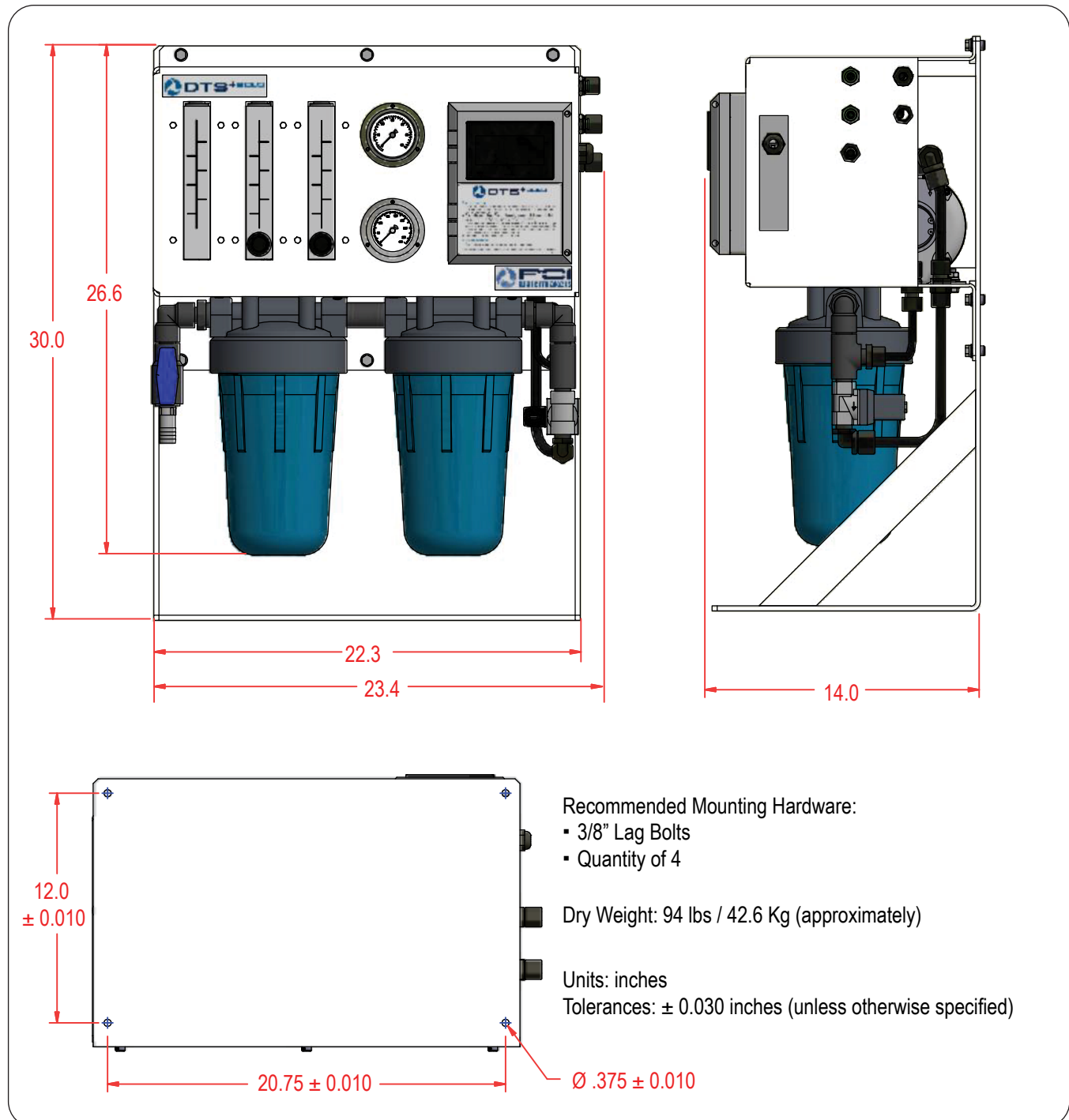
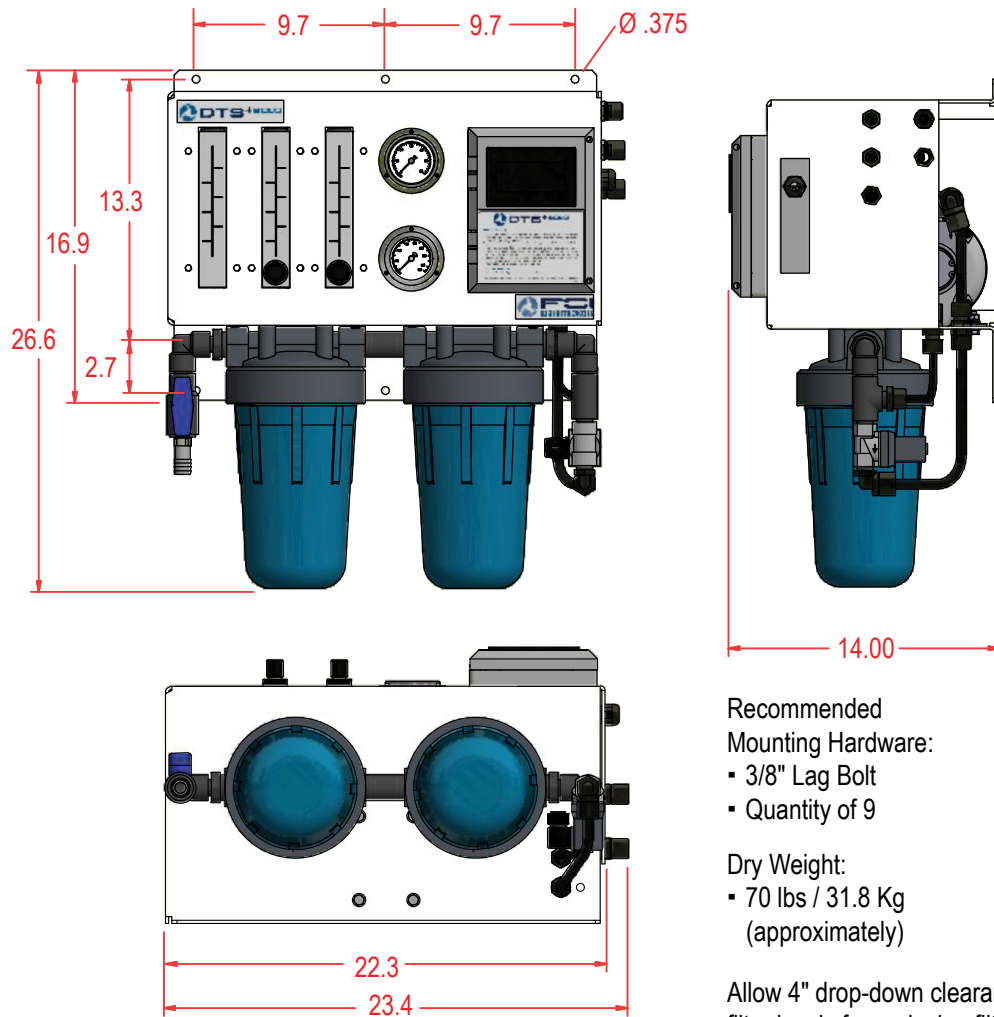


Figure 8: Dimensions - Stand for Deck Mount

DIMENSIONS, WEIGHT & FOOTPRINTS (continued)

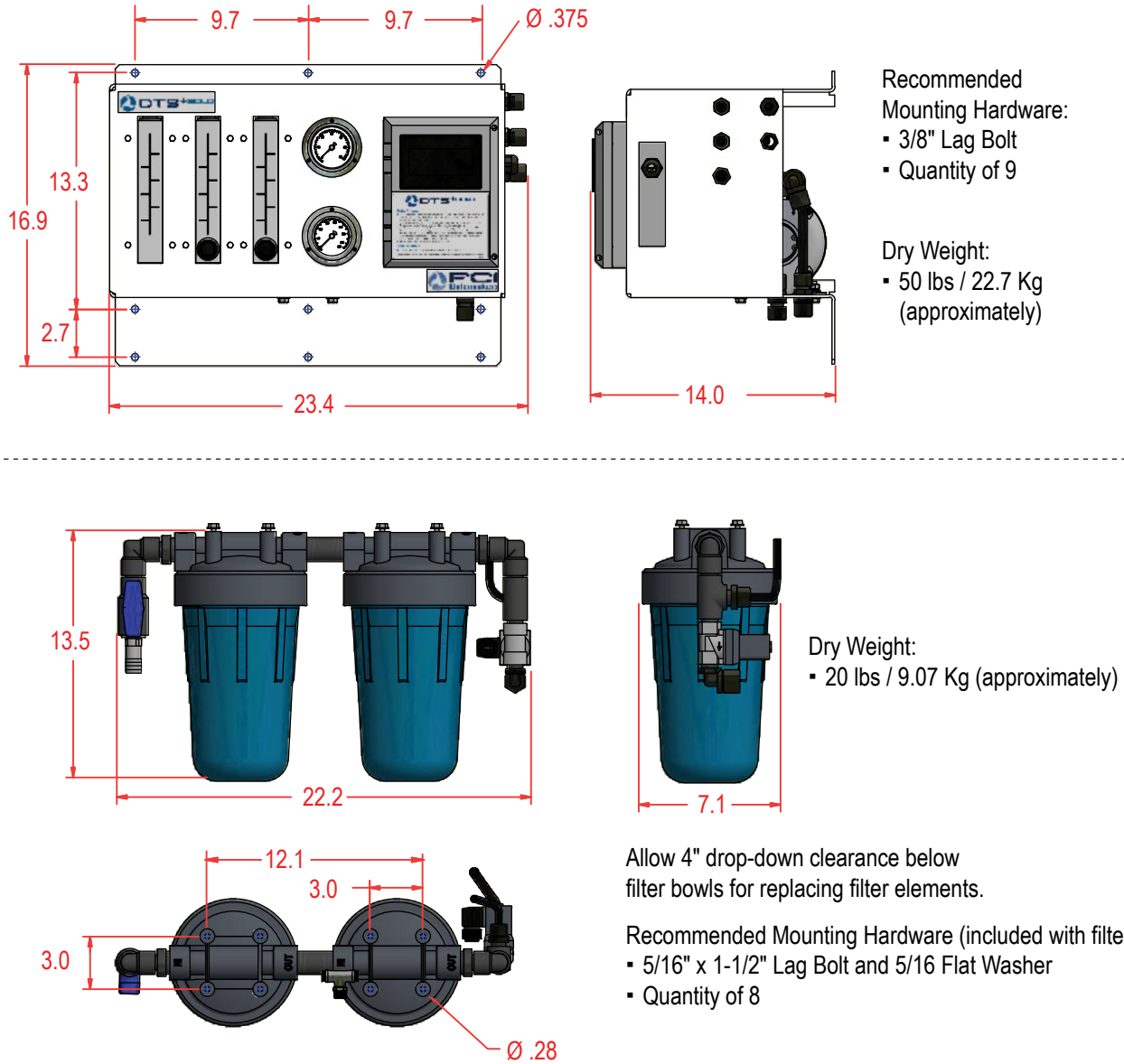


Units: inches

Tolerances: ± 0.010 inches (unless otherwise specified)

Figure 9: Dimensions - Wall Mount

DIMENSIONS, WEIGHT & FOOTPRINTS (continued)



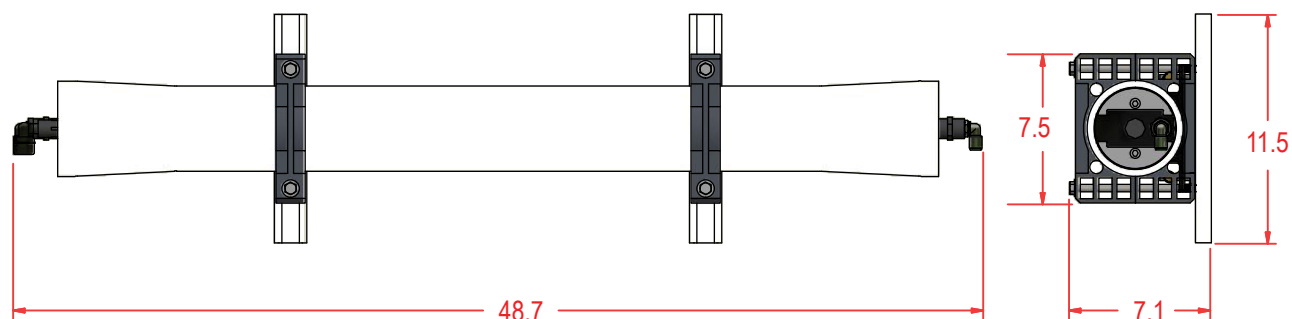
Units: inches

Tolerances: ± 0.010 inches (unless otherwise specified)

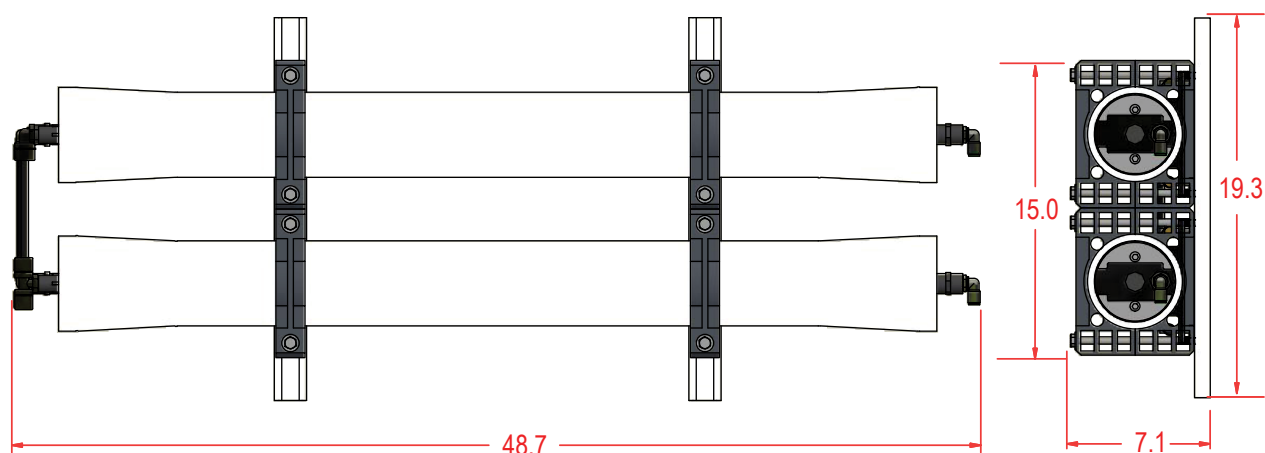
Figure 10: Dimensions - Modular Mount

DIMENSIONS, WEIGHT & FOOTPRINTS (continued)

Systems with One Pressure Vessel



Systems with Two Pressure Vessel



Recommended Mounting Hardware:

- 1/4" Lag Bolts
- Quantity of 4

Units: inches

Tolerances: ± 0.030 inches (unless otherwise specified)

Dry Weight:

- 1 Pressure Vessel: 23 lbs / 10.4 Kg (approximately)
- 2 Pressure Vessels: 40 lbs / 18.1 Kg (approximately)

Allow 40" clearance on either end of Pressure Vessel to service membrane without dismounting.

Figure 11: Dimensions - Pressure Vessel Sets

GENERAL CONNECTION DIAGRAMS

The General Connection Diagram (*Figure 12*) is provided to show how the system components connect. Refer to the diagram when planning to mount the components, and as a reference when connecting the plumbing.

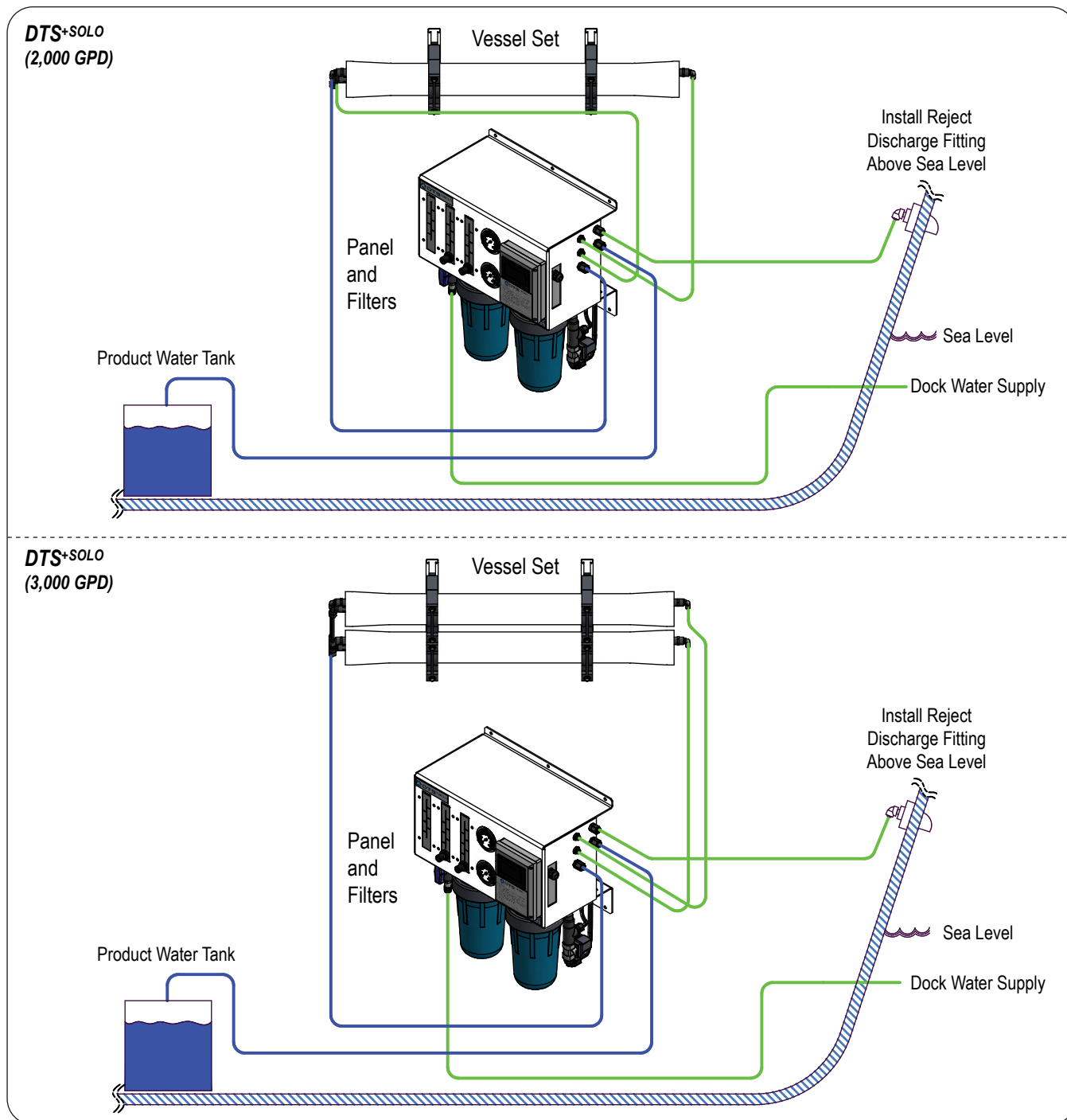
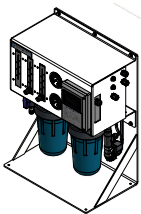


Figure 12: General Connection Diagram

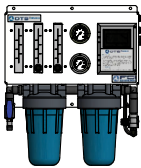
SYSTEM INSTALLATION / MOUNTING

Please refer to the appropriate footprint and layout diagrams from "DIMENSIONS, WEIGHT & FOOTPRINTS" on page 29, and mount the components as described below.



DECK MOUNT

Locate an area for the stand to be mounted. It should not be mounted above any electrical equipment in case a leak develops over time. Be sure to allow enough room to access the valves and HMI touchscreen. To minimize the noise level from pump, do not mount over void areas or compartments that can act as echo chambers. Using four 3/8" lag bolts mount the panel to the solid deck.



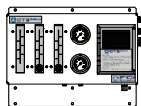
WALL MOUNT

Find a suitable location to mount the filter and panel assembly. Do not install above any electrical equipment. Also, the filter needs to drop down 4" to change the cartridge. Be sure to allow enough room to access the valves and HMI touchscreen. To minimize the noise level from pump, do not mount over void areas or compartments that can act as echo chambers. Using nine 3/8" lag bolts, secure to solid bulkhead.

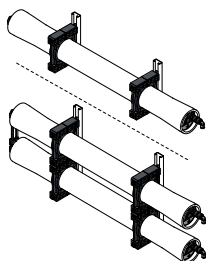


MODULAR MOUNT

Find a suitable location to mount the filter assembly. Do not install above any electrical equipment. Also, the filter needs to drop down 4" to change the cartridge. The inlet source of water for the assembly is the dockside fresh water. The outlet connects to the panel. Using the eight 5/16" x 1-1/2" lag bolts and 5/16" washers included on the filter, secure to solid bulkhead.



Find a suitable location to mount the panel assembly. Do not install above any electrical equipment. Be sure to allow enough room to access the valves and HMI touchscreen. To minimize the noise level from pump, do not mount over void areas or compartments that can act as echo chambers. Using nine 3/8" lag bolts, secure to solid bulkhead.



FRESH WATER PRESSURE VESSEL

Locate an area for the vessel set to be mounted. The set can be mounted vertically or horizontally. It should not be mounted above any electrical equipment in case a leak develops over time. If the ambient temperature of the mounting location will exceed 120°F, it will be necessary to relocate the pressure vessel to a cooler environment. Additional tubing may be needed. Allow 40" on either side of vessel if you plan to service vessels in the future without dismounting.

Mount the pressure vessel set with 1/4" lag bolts, quantity of four.

SYSTEM INSTALLATION / PLUMBING

Before proceeding, review *Figure 13* and the notes below to ensure proper installation of the hose ends and fittings.

PROPER INSTALLATION OF HOSE ENDS AND FITTINGS

Follow these best practices when installing fittings and clamps:

- Cut the tube or hose end square and clean. You may use a vise and fine-tooth saw to facilitate a square and clean cut. Remove any burrs.
- For tubes, fittings are supplied. There are two types of fittings. Fittings with release button (called push-in fittings) require you to only insert tube until it bottoms. Fittings with nut require you to loosen nut three turns, insert tube until it bottoms, then tighten nut.
- For PVC helix wire suction hose, feed hose through a two clamps, push hose on over the barb until it bottoms against the barb, and tighten clamps. Do not use lubricant on the tube end; it may leave a residue that compromises the connection. You may, however, soak the hose end in hot water for a few minutes before pushing the hose on the barb.

CAUTION: 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.

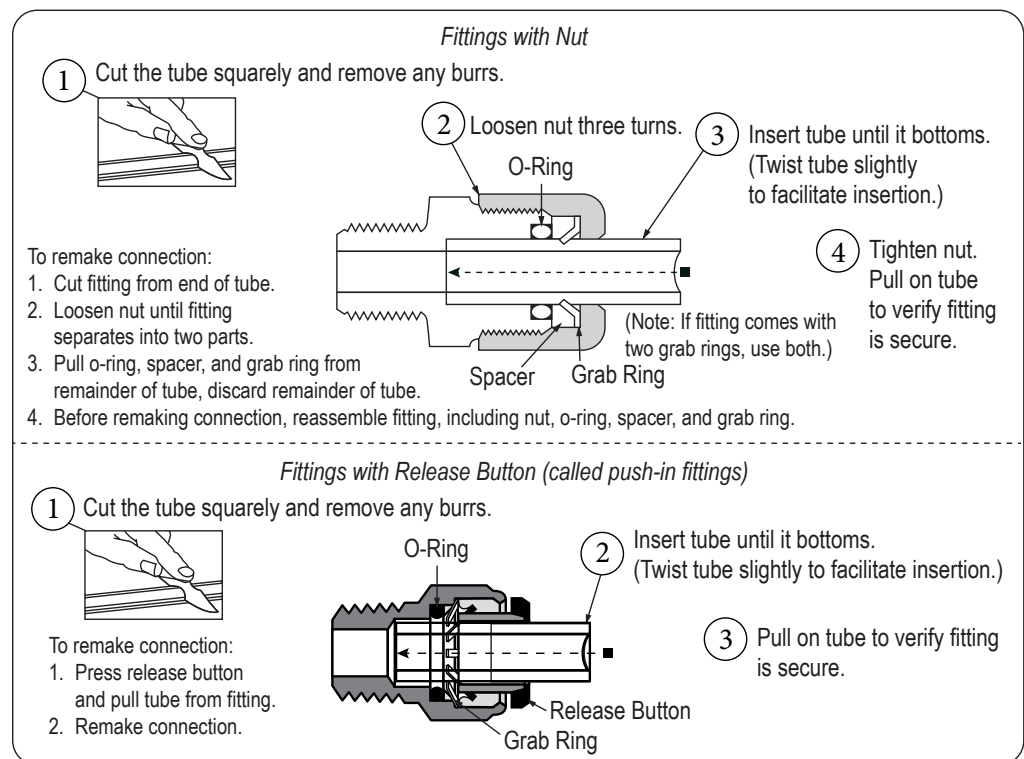


Figure 13: Proper Installation of Hose Ends and Fittings

Read the overview on this page and study the illustrations on the following page. Make the plumbing connections when ready.

INSTALLING THE PLUMBING

Table 2 lists the all the plumbing connections by letter, and Figure 14 shows the connections on the components. Work through each tube or hose in the table, one-at-a-time until complete.

1. Identify the tubing or hose by its specifications in the table's description column. Refer to "COMPONENT DESCRIPTIONS" on page 22 if you need review.
2. Identify where the two ends connect. Use the "General Connection Diagram" on page 33 and Figure 14 on page 37.
3. Cut the tubing or hose to length, install fittings the ends, and connect to the system component. The fittings are on the system or supplied with the installation kit. For PVC helix wire suction hose, use the barbs and clamps.

Table 2: Hose, Tubing, Route & Description

Item	From	To	Description
Hose A	Dockwater Source	Filter Assembly Inlet	3/4 inch PVC Helix Wire Suction Hose
Tube B	Filter Assembly Outlet	Panel, "Feed from Filters"	1/2 inch PE Tubing NOTE: Required only if replacing pre-configured tube for modular mount; you may reuse its connectors.
Tube C	Panel, "To Vessels"	Vessels, Flow In	3/8 inch 250 psi PE Tubing
Tube D	Vessels, Reject Out	Panel, "From Vessels"	3/8 inch 250 psi PE Tubing
Tube E	Vessels, Product Out	Panel, "Product Inlet"	3/8 inch 125 psi PE Tubing
Tube F	Panel, "Reject Discharge"	Reject Discharge Fitting, Above Sea Level	1/2 inch PE Tubing NOTE: Use with 1/2 inch connector from Install Kit.
Tube G	Panel, "Product to Tank"	Product Water Tank	3/8 inch 125 psi PE Tubing NOTE: Use with 3/8 inch connector from Install Kit.

SYSTEM INSTALLATION / PLUMBING (continued)

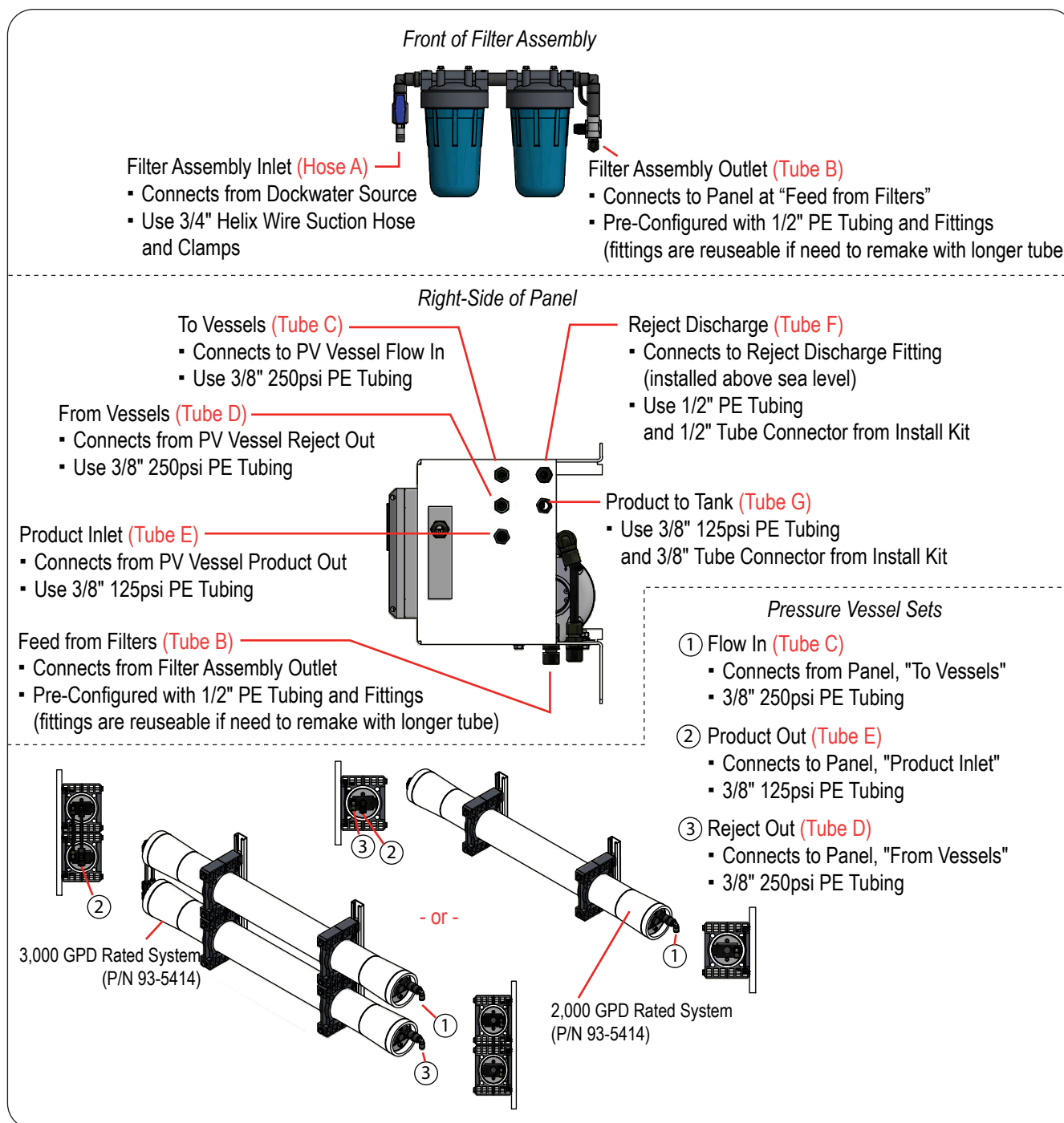


Figure 14: Plumbing Connections

SYSTEM INSTALLATION / ELECTRICAL CONNECTIONS

Read the CAUTIONS before working with the system electrical connections.

CAUTION: DO NOT PERFORM INSTALLATION UNLESS:

1. The system feed water valve 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.

NOTE:

- Always follow all local and Coast Guard codes when installing this system.
- Grounding and circuit protection should be done in accordance with National Electrical Code.
- Never attempt to hook-up or service this system without disconnecting all power.
- Always check to make sure system voltage matches incoming voltage.
- If system is 3-phase, be sure to check for correct rotation on all pumps before running system.

While observing CAUTIONS listed on previous page, make the electrical connections as described below.

WIRING THE POWER SUPPLY

1. Make sure the source water is closed, and the system's main electrical disconnect switch is switched "OFF," LOCKED, and TAGGED.
2. Open door on electrical enclosure by loosening the screws on the right corners of the door and swinging door on hinges.
3. Using the proper gauge wire (consult with your local electrical codes), feed power cable into enclosure through the cable grip on the right side of the enclosure.
4. Locate the contactor block inside enclosure and connect the power cable to terminals 1, 2, and G as shown in *Figure 15*.
5. If your installation uses modular mount, you may need to install a longer cable from the inlet solenoid to the appropriate electrical enclosure contactors. Proceed to "WIRING THE SOLENOID (modular mount only)" on page 40.

Otherwise, close and secure electrical enclosure door with its corner screws and proceed to "INSTALLATION CHECKLIST" on page 27.

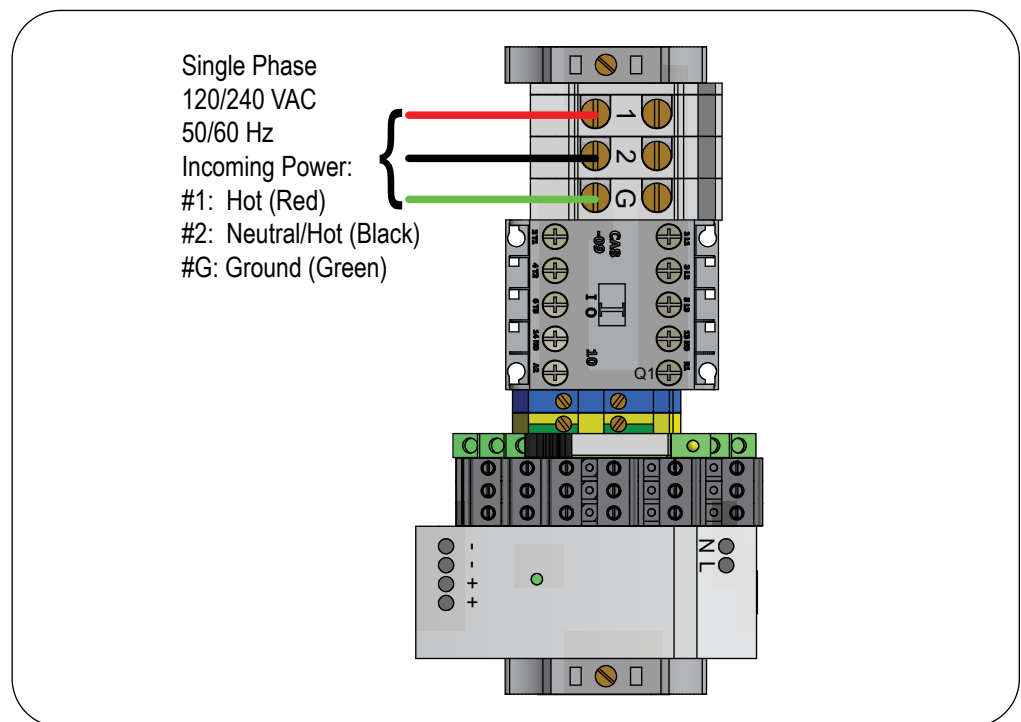


Figure 15: Wiring the Power Supply

WIRING THE SOLENOID (modular mount only)

1. Make sure the source water is closed, and the system's main electrical disconnect switch is switched "OFF," LOCKED, and TAGGED.
2. Replace cable from inlet solenoid to electrical enclosure contactors with a cable of suitable length and equivalent gauge. Refer to *Figure 16*.
3. Close and secure electrical enclosure door with its corner screws and proceed to "INSTALLATION CHECKLIST" on page 27.

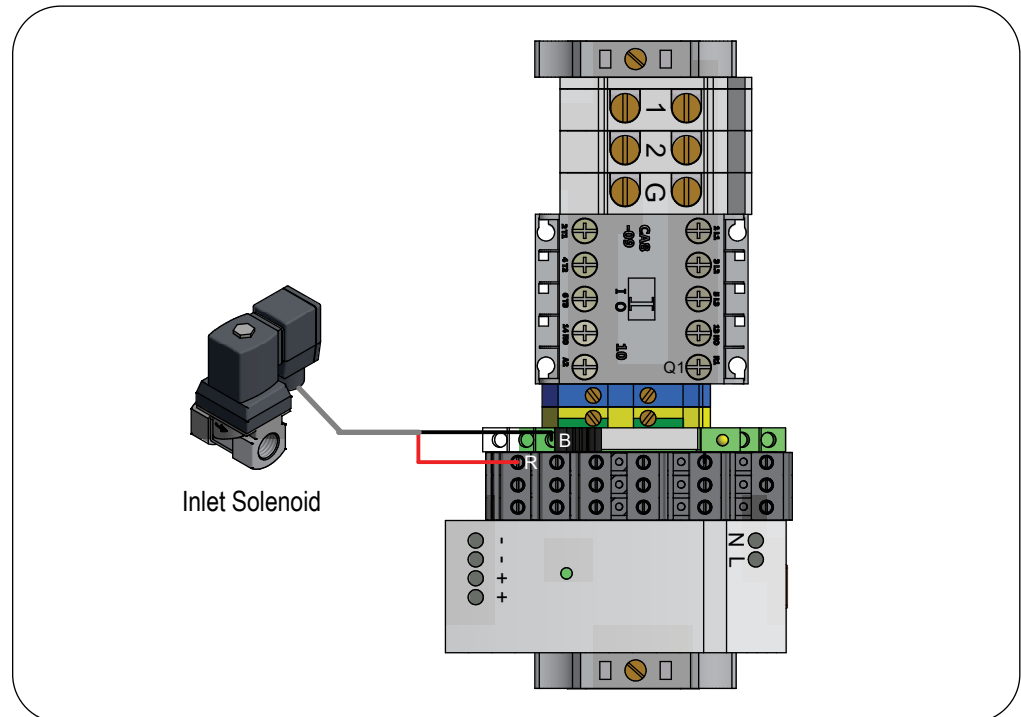


Figure 16: Wiring the Solenoid (modular mount only)

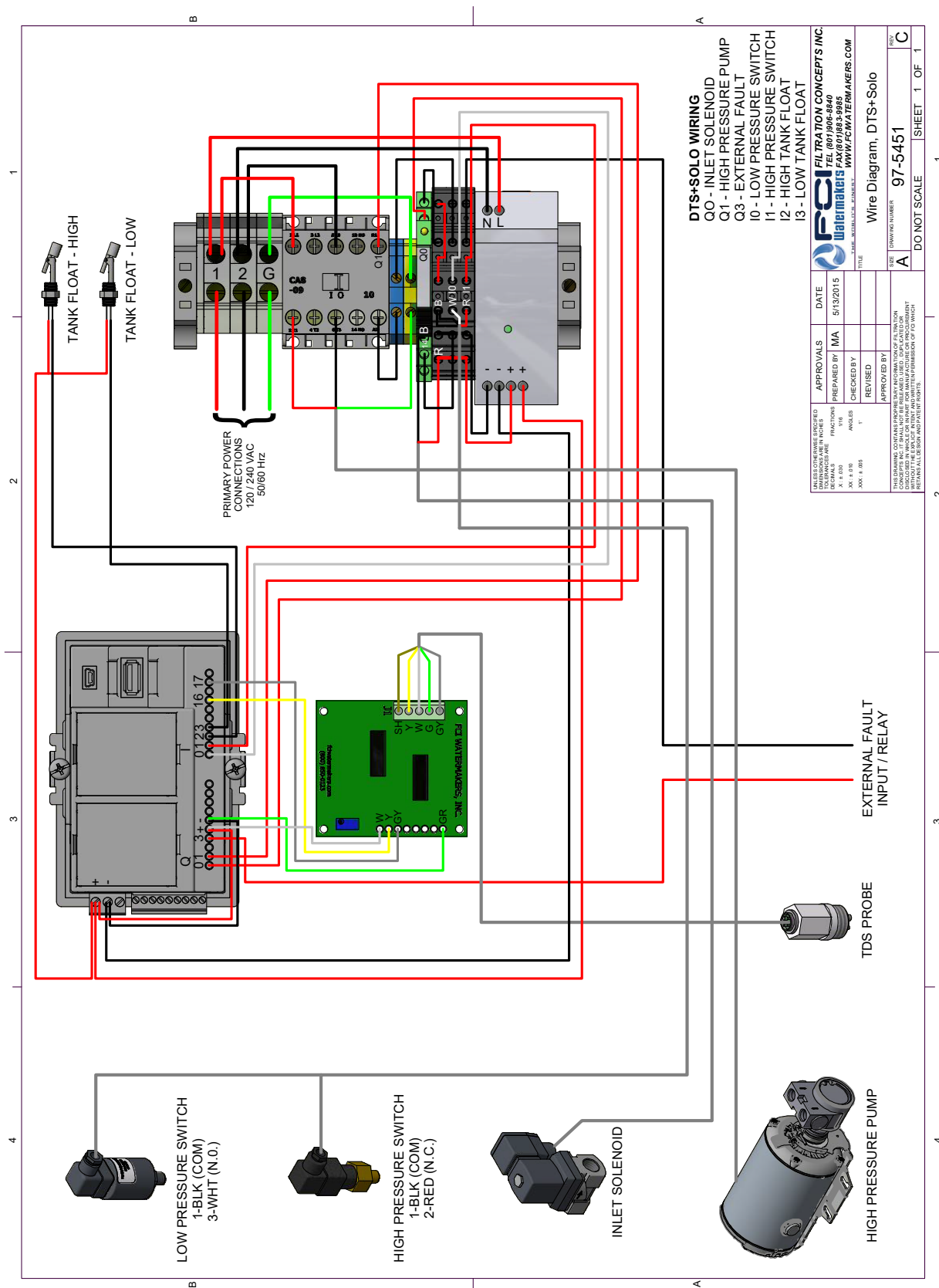


Figure 17: Schematics

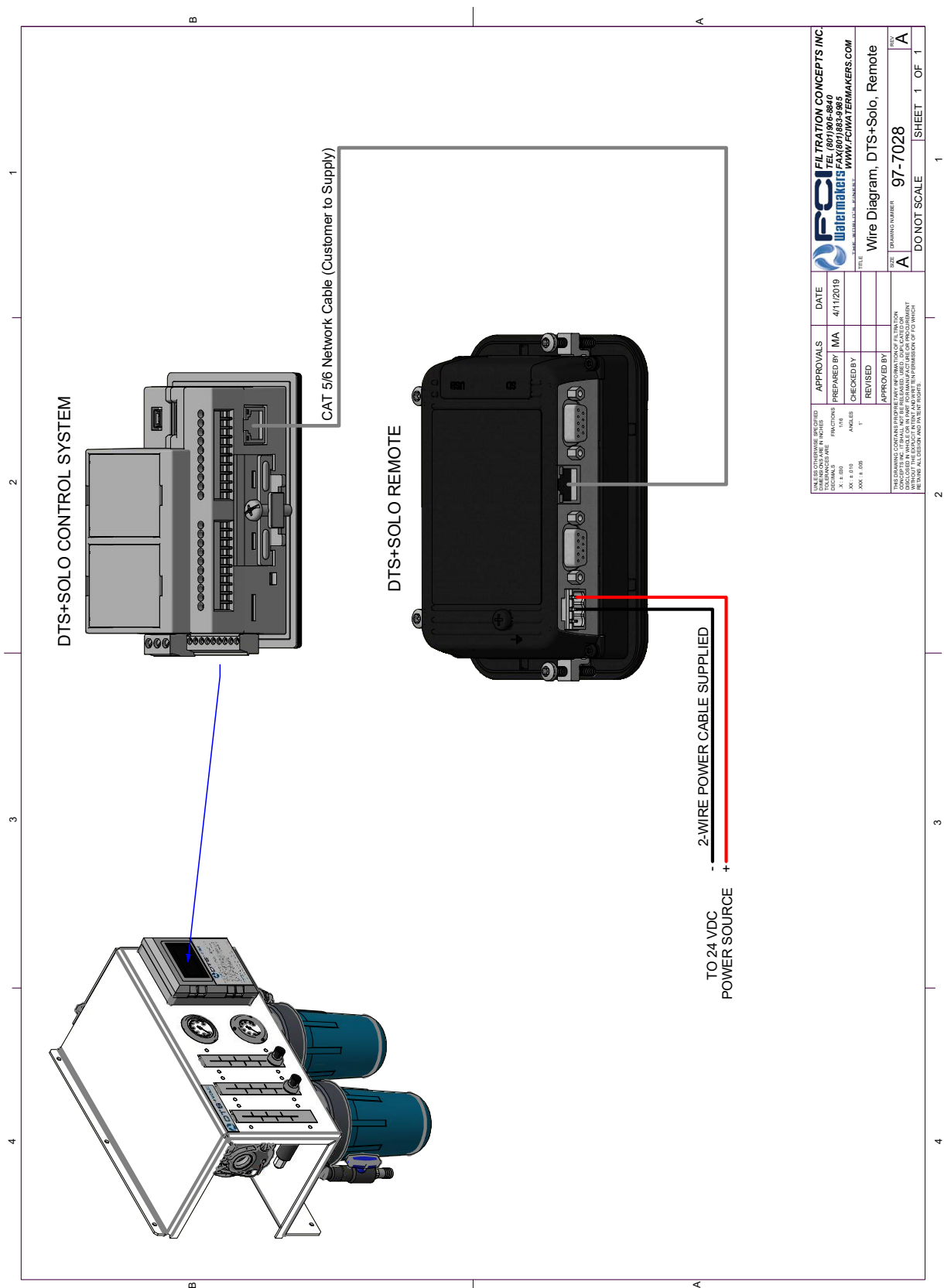


Figure 18: Wire Diagram for Optional Remote

INSTALLATION CHECKLIST

The following list will help ensure a successful installation:

- Ample access around system/components
- All connections are tight
- Electrical connections are secure
- All Coast Guard/local codes have been met
- No iron or ferrous fittings have been used
- Electrical connections are correct
- Plumbing connections do not leak
- Hose clamps are tight

4/ OPERATIONAL INSTRUCTIONS

Prior to Start-Up, it is important to take note of the following:

FEED WATER — Be aware of the condition of the water the system is processing. Is it muddy, silty, or oily? Does it show signs of other man-made contaminants? If this is the case, **DO NOT** run the system. If these feed water conditions are unavoidable, additional filtration will be necessary. Consult the factory or your local dealer for further details and assistance with specific water conditions.

SALINITY EFFECT — Like water temperature, the salinity of the water has a direct effect on the output of the system and the quality of water produced. Your watermaker is equipped with protection for overproduction and low quality water produced. When operating with a low saline water source, the pressure required will be less. Reduce the pressure to the point where you are making the rated output of your system. If this pressure adjustment is not monitored the system may detect a fault condition, protect itself, and shutdown.

PRESSURE EFFECT — The pressure within a system is regulated by the size of the orifice through which the stream flows, creating back pressure in the pressure vessel. This pressure squeezes product water out of the stream. The amount of pressure applied through the system directly affects the quantity and quality of water produced. More pressure is needed in cold water than in warm waters. The reason being, membranes contract in cold water, not allowing the fresh water through as easily. Always try to maintain the pressure necessary for the system to operate at its rated output. As a safety feature, the system will shutdown when the pressure is too high or too low.

TEMPERATURE EFFECT — Water temperature has a great effect on the output of the system. Increased water temperature increases output at a given pressure. Therefore, it is very critical to adjust the pressure of the machine to maintain proper fresh-water production rate. It is more important to produce the rated output than it is to achieve a certain pressure. It is perfectly normal and acceptable for your system to produce good quality water while operating at its rated output at a lower pressure. This reduced pressure is most likely caused by an increase in the water temperature, or a reduction in salinity. Refer to *Figure 19*.

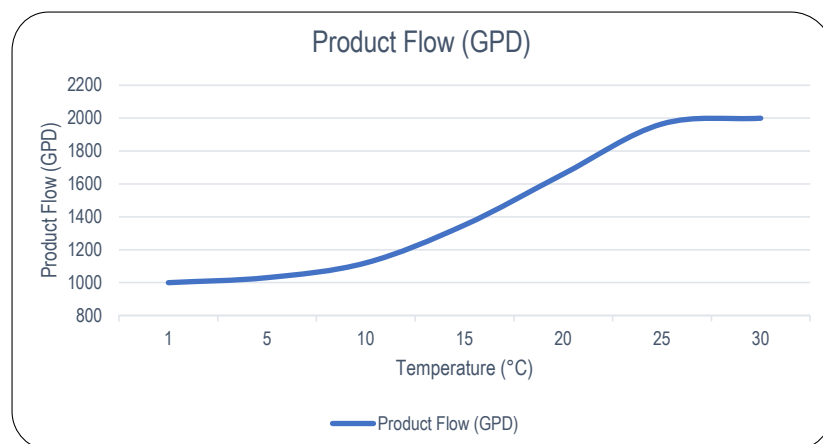


Figure 19: Water Temperature vs. Output (constant pressure)

Refer to *Figure 20* and follow the procedures below to operate the DTS^{+SOLO}.

START-UP PROCEDURE

Proceed as follows:

1. Check to be sure all Inlet/Discharge valves are open, fully open Reject Flow knob, fully close Recycle Flow knob, and check the main breaker is turned on. Display will show FCI Watermakers, press the water logo to proceed to home screen.
2. Press the Start button: The Low-Pressure Solenoid will engage and the display screen will indicate “Prime” mode in the top right corner. System will prime for time span indicated.
3. After “Prime” mode times out, the High-Pressure Pump will engage and the display screen will be in “Initialize” mode as indicated in the top right corner of the display. System will initialize for the time span indicated. At this time, slowly close the Reject Flow knob until you are making your rated output. Once stable, slowly open the Recycle Flow and set to approximately 50% of rated output. Adjustment to the Reject Flow knob may be necessary to maintain rated output.
4. After “Initialize” mode times out the unit will be in “Run” mode.

SHUTDOWN PROCEDURE

Press the Stop button: System will shutdown and return to the home screen.

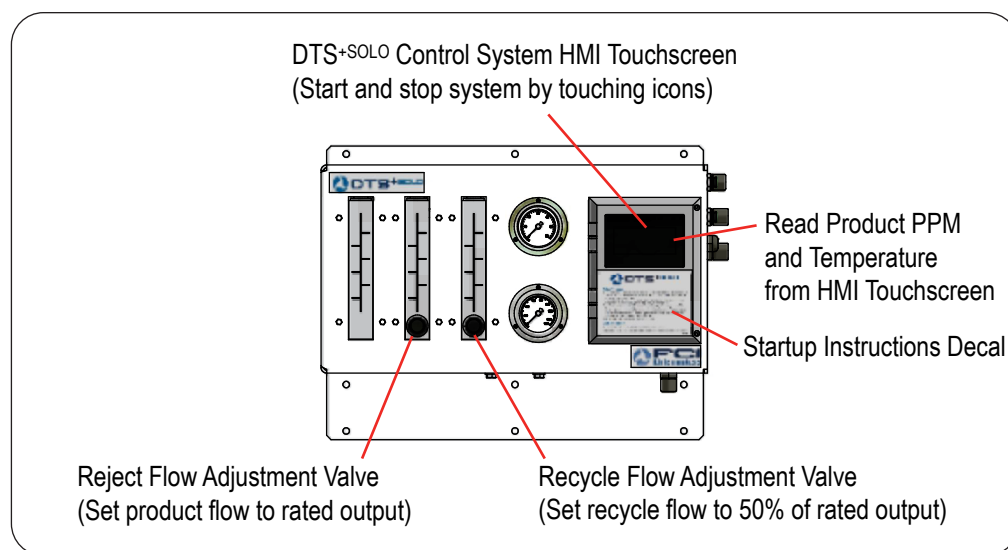


Figure 20: Operating the DTS^{+SOLO}

R1 ROC OVERVIEW

This page introduces the R1 ROC (R1 Reverse Osmosis Controller) that works with the user to operate the watermaker.

R1 ROC OVERVIEW

The DTS^{+SOLO} is controlled by the R1 ROC (R1 Reverse Osmosis Controller), specially designed for watermakers. This controller can be run either locally via the display, or remotely via remote display or remote IP access.

The R1 ROC is designed to continuously monitor all inputs and control all outputs for proper machine operation, notifying user of warnings, alarms, and shutdowns on all displays. The R1 ROC also provides diagnostics, system overview, and production statistics for the operator.

The R1 ROC is designed to make machine operation as simple as possible for the operator. Once the operator places the machine into production with the appropriate setpoints, the R1 ROC automatically sequences all controlled devices in order to ensure the proper amount of fresh water is delivered. In addition, the R1 ROC monitors water quality, flow rates, filter life, pressures, and pump status to ensure safe and reliable operation.

Operation, machine setup, and calibration are all performed via the display, with factory default settings stored permanently in the system, and adjustable settings user savable.

SAFETY

The R1 ROC has a couple different ways to ensure the safety of the personnel operating the unit and also the safety of the unit itself. There are two types of alarms that will be activated depending on the severity of the issue.

- Alarm
- Shutdown

Alarm – This is used to alert the user that an item needs to be addressed immediately, otherwise the system will shutdown. An example would be if the Product TDS is higher than the setpoint: if left alone, the system will safety shut itself down to avoid damage.

Shutdown – This is used to protect both the user and machine: if a condition arises that is considered unsafe, the unit will immediately shutdown. An example would be the high pressure shutdown: if the system reaches its high pressure limit, the unit will immediately shutdown.

DISPLAY OPERATIONAL OVERVIEW

The FCI display has been specially selected for the marine environment. It is designed to not interfere with marine electronics and is fully dimmable for night time operation. The display utilizes a resistive touch screen: unlike most touch screens, the display relies on the press action of your finger in order to make contact with the screen. This allows the user to be able to activate the screen even with gloves on, and allows for better overall screen design.

DISPLAYS AND GRAPHICS

The basic operational graphics of the system and how they function are listed below and in the following page.

Numeric Input

Numeric Inputs show the value of a setpoint that can be adjusted. For example, the Timer Setpoint and the TDS High Setting are adjustable setpoints. They can be found in the setup screen of the display. To change settings touch the number in white.

TIMER SETPOINT	SECONDS
PRIME	123
INITALIZE	123

SETTINGS		
PROD TEMP CAL	-123	DEG F
TDS HIGH SP	123	PPM

Upon pressing a Numeric Input, the Numeric Keypad will open up.

1234567890			
7	8	9	CLR
4	5	6	CAN
1	2	3	ENT
0	+/-	.	

Numeric Display

Numeric Displays show the value of a device, such as a pressure transducer or flow meter. These values cannot be adjusted and are for reading machine status.

TIMER	123	SEC
-------	-----	-----

Navigation Bar

This quick navigation bar is positioned at the bottom of each main screen for quick and easy navigation between the various screens.



Home – Displays the home and run screens when the unit is in operation.

Alarms – Displays the alarm screen.

Setup – Displays the setup home screen which allows the user to change settings.

Contact – Displays the contact screen.

Direction Arrows – Allow the user to navigate through various screens. The arrows will be white in color when they can be pressed to show additional screens.

Status Indicator

The Status Indicator shows a quick overview of what is active in the system and if there are any fault alarm conditions present.



LPV – Low Pressure Valve indicator shows the status of the valve.

- **Green** = Pump On
- **Gray** = Pump Off

HPP – High Pressure Pump indicator shows the status of the pump.

- **Green** = Pump On
- **Gray** = Pump Off

ALM – Alarm indicator shows the status of any alarms.

- **Red** = Alarm Active
- **Gray** = No Alarm

Status Bar

The Status Bar show a quick overview of what is active in the system and if there are any fault alarm conditions present.



Gray – System is not active and in standby mode.

Flashing Green – System is active, and is either priming or initializing.

Green – System is active and running.

Red – System is shutting down.

DISPLAY SCREENS

The display screens used by the system are listed and described in the following pages.

Startup

Upon powering your unit on, the screen will go through its boot process. Once complete it will show the Startup Screen.



The Startup Screen displays the Model and Serial Numbers for your reference. Touch the large watermaker logo to proceed to the Home Screen.

Home

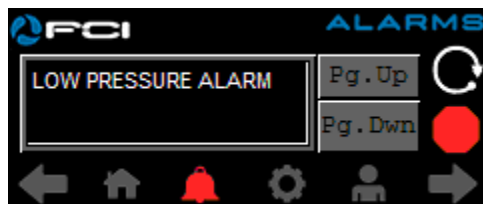
The Home Screen is your main navigation portal.



You will be able to access all screens from here by using the Navigation bar located on the bottom. In addition you can Start and Stop your unit from this screen.

Alarms

The Alarms Screen is where you can view and clear any current alarms.



Text – This will tell the user what the alarm is.

Clear – Press this button to clear the system after a shutdown has taken place.

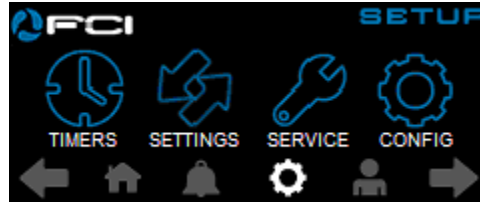
Stop – Press this button to stop the system.

Navigation Bar – This allows the user to easily navigate between main screens.

DISPLAY SCREENS (continued)

Setup

The Setup Screen will show you all the areas in which you can adjust settings of your system.



Timers – Press the image to take you to the system timers.

Settings – Press the image to take you to the system settings.

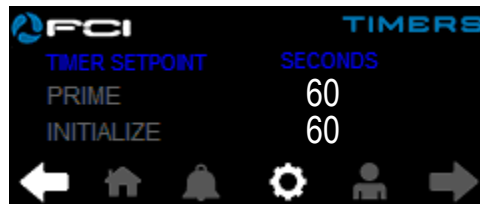
Service – Press the image to take you to the system service mode.

Config – Press the image to take you to the system configurations.

Navigation Bar – This allows the user to easily navigate between main screens.

Timers

The Timers Screen will allow you to adjust timer setpoints for the system.



To adjust a timer, press the white number of the timer you would like to adjust. Once pressed, a numeric keypad will come up.

Prime – The prime timer is the amount of time in seconds the prime sequence will be active.

Initialization – The initialization timer is the amount of time in seconds the initialization sequence will be active.

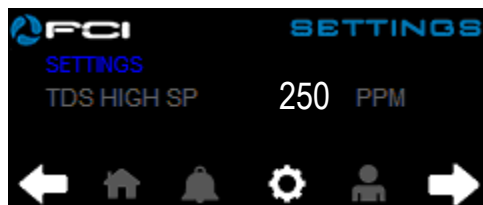
Navigation Bar – This allows the user to easily navigate between main screens.

Left Arrow – Goes back to the main setup screen.

DISPLAY SCREENS (continued)

Settings #1

The Settings #1 Screen will allow you to adjust system settings



To adjust a setting, press the white number of the setting you would like to adjust. Once pressed, a numeric keypad will come up.

TDS High SP – This is your TDS High alarm setpoint. This is set by the factory but can be changed to the user's requirements.

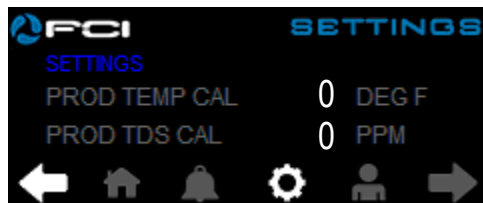
Navigation Bar – This allows the user to easily navigate between main screens.

Left Arrow – Goes back to the main setup screen.

Right Arrow – Goes to page #2 of settings.

Settings #2

The Settings #2 Screen will allow you to adjust system settings



To adjust a setting, press the white number of the setting you would like to adjust. Once pressed, a numeric keypad will come up.

Prod Temp Cal – This is your product temperature calibration. This is set by the factory and can be adjusted if needed. We recommend not making any adjustments unless done by a factory dealer.

Prod TDS Cal – This is your product TDS calibration. This is set by the factory and can be adjusted if needed. We recommend not making any adjustments unless done by a factory dealer.

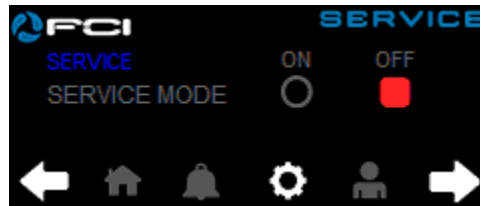
Navigation Bar – This allows the user to easily navigate between main screens.

Left Arrow – Goes to page 1 of settings.

DISPLAY SCREENS (continued)

Service #1

The Service #1 Screen allows the user to test and run the system in a manual mode.



To turn on a setting, touch the gray circle, this will then turn into a green circle which will indicate the item is on. To turn off an item, touch the gray square and it will turn red after the item is turned off.

Service Mode - This allows the user to turn service mode on/off which allows the user to manually run their machine. Service mode can only be turned on when the machine is in standby mode.

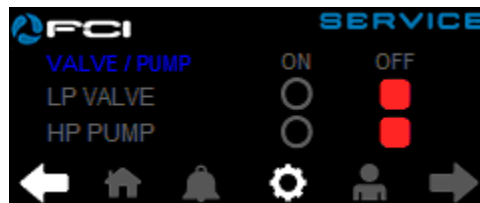
Navigation Bar - This allows the user to easily navigate between main screens.

Left Arrow - Goes back to the main setup screen.

Right Arrow - Goes to page #2 of service.

Service #2

The Service #2 Screen allows the user to test and run the system in a manual mode.



To turn on a setting, touch the gray circle, this will then turn into a green circle which will indicate the item is on. To turn off an item, touch the gray square and it will turn red after the item is turned off.

LP Valve - Manually activate the low pressure valve.

HP Pump - Manually turn on the high pressure pump.

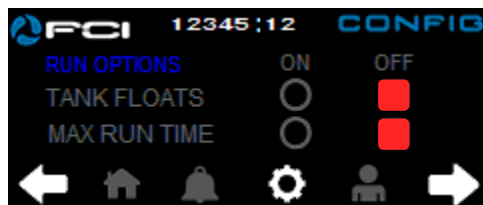
Navigation Bar - This allows the user to easily navigate between main screens.

Left Arrow - Goes to page #1 of service.

DISPLAY SCREENS (continued)

Config #1

The Config #1 Screen allows the user setup special modes in which the unit can operate.



Hour Meter – An hour meter is located at the top center of the screen.

Tank Floats – This allows the user to install tank floats on their product water tank, and wire the floats to the controller (see instruction in wiring schematic). Once the option is turned on, the controller will wait till both floats are dry before turning on the unit. Once both floats are wet, the unit will shutdown and fresh water flush itself.

Max Run Time – This allows the user to setup the maximum amount of time the unit will run. Once this option is turned on, the user will be able to set the number of hours for which he wants the system to run prior to the system shutting down and fresh water flushing itself.

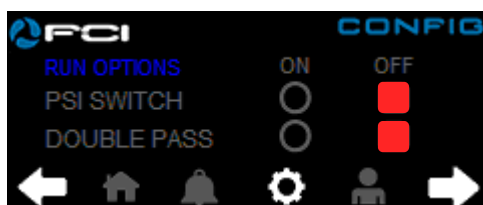
Navigation Bar – This allows the user to easily navigate between main screens.

Left Arrow – Goes back to the main setup screen.

Right Arrow – Goes to page #2 of config.

Config #2

The Config #2 Screen allows the user setup special modes in which the unit can operate.



PSI Switch – This allows the user to run the unit in PSI Mode. When this mode is selected, the unit will automatically start when the system sees more than 5 PSI and will automatically stop when the system sees less than 5 PSI.

Double Pass – Optional purchase that allows the system to work in a double pass capacity. See DTS^{SOLO} Double Pass Manual addendum.

Navigation Bar – This allows the user to easily navigate between main screens.

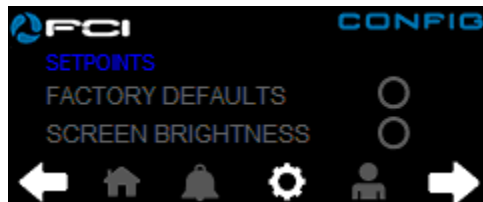
Left Arrow – Goes to page #1 of config screen.

Right Arrow – Goes to page #3 of config.

DISPLAY SCREENS (continued)

Config #3

The Config #3 Screen allows the user to adjust units, language, setpoints, and screen brightness.



Factory Defaults - This restores the defaults, that is, the setpoints the watermaker has when it is shipped from the factory. Press and hold the gray circle to restore factory defaults, a popup will appear confirming you want to Restore Factory Defaults. Press and hold Yes until a red “factory defaults restored” notification appears.

Brightness – This allows the user to dim their screen for night time operation.

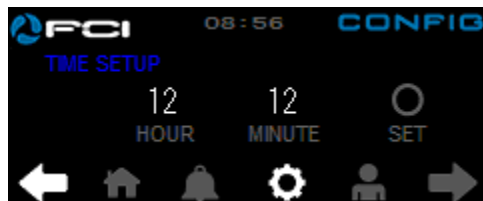
Navigation Bar – This allows the user to easily navigate between main screens.

Left Arrow – Goes to page #2 of config.

Right Arrow – Goes to page #4 of config.

Config #4

The Config #4 Screen allows the user to adjust the time format, time, and date.



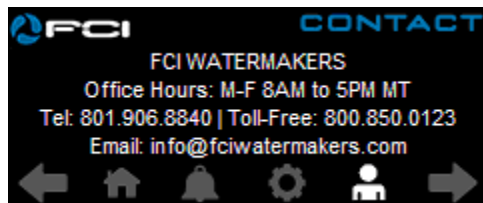
Time Setup – Set the hour and minute (24-hour based). Press the Set button when completed to adjust time.

Navigation Bar – This allows the user to easily navigate between main screens.

Left Arrow – Goes to page #3 of config.

Contact

The Contact Screen shows information on how the company can be contacted with any questions.



Navigation Bar – This allows the user to easily navigate between main screens.

SYSTEM FUNCTIONALITY

The system modes and their sequencing are described in the following pages.

SYSTEM FUNCTIONALITY

Standby Mode

When the machine is at rest, the unit will be in Standby Mode. This is the only time the system can be started.

When the system is in Standby Mode:

- LPV is off.
- HPP is off.

Running Mode

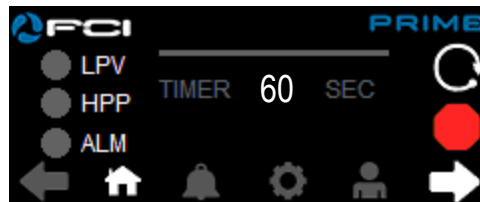
At any point during Standby Mode the system can be started by pressing the Start Button on the Home Screen. Once the system starts you will then be taken to the Prime Screen.

Prime

During the Prime Sequence :

- LPV turns on. The valve status is then verified by the Low Pressure Switch. It must be greater than 3 PSI or the system will shutdown.
- HPP remains off.

The Prime Timer counts down from its setpoint, Prime Timer Setpoint (which is user adjustable by navigating to Setup Screen and the Timing Screen). Once the timer reaches zero, the timer has expired and the system then moves to Initialize Sequence.



Timer – Indicates time left in seconds for the Prime Sequence.

Clear – Press this button to clear the system once a shutdown has taken place.

Stop – Press this button to stop the system.

Navigation Bar – This allows the user to easily navigate between main screens.

Right Arrow – When pressed, will proceed to the Initialize Sequence.

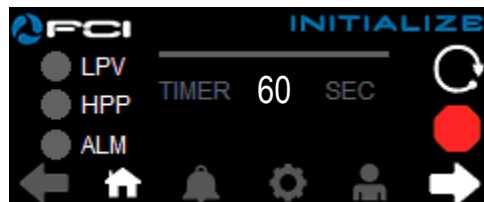
SYSTEM FUNCTIONALITY (continued)

Initialize

At the beginning of the Initialize Sequence:

- HPP turns on.
- LPV remains activated.

The Initialize Timer counts down from its setpoint, Initialize Timer Setpoint (which is user adjustable by navigating to Setup Screen and then Timing Screen). Once the timer reaches zero, the timer has expired and the system then moves to Running Sequence.



Timer – Indicates time left in seconds for the Initialize Sequence.

Clear – Press this button to clear the system once a shutdown has taken place.

Stop – Press this button to stop the system.

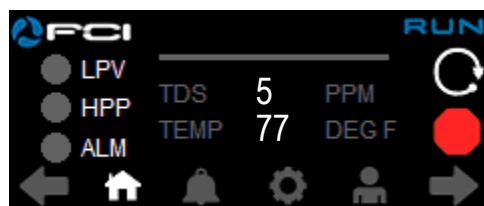
Navigation Bar – This allows the user to easily navigate between main screens.

Right Arrow – When pressed, will proceed to the Running Sequence.

Run

During Run:

- LPV remains activated.
- HPP remains on.



TDS – Shows the Product TDS meter reading.

Temp – Shows the temperature of the product water.

Clear – Press this button to clear the system once a shutdown has taken place.

Stop – Press this button to stop the system.

Navigation Bar – This allows the user to easily navigate between main screens.

SYSTEM ALARMS

The system alarms are described below.

The system alarms are divided into two categories:

Alarm – This is used to alert the user that an item needs to be addressed immediately, otherwise the system will shutdown. An example would be if the Product TDS is higher than the set point: if left alone, the system will safety shut itself down to avoid damage.

Shutdown – This is used to protect both the user and machine: if a condition arises that is considered unsafe, the unit will immediately shutdown. An example would be the high pressure shutdown: if the system reaches its high pressure limit, the unit will immediately shutdown.

Alarm

The following is a list of Alarms and their causes, and how to clear the alarm condition.

- High TDS Alarm

Cause	Triggered when the Product TDS is greater than the setpoint for more than 60 seconds.
Clear	Increase product quality by reducing the PPM reading
	Check for possible bad membranes.

Shutdown

The following is a list of Shutdowns and their causes, and how to clear the shutdown condition.

- Low Pressure Shutdown

Cause	Triggered when the system's pressure reaches 5 psi.
Clear	Select the alarm, and clear the system.

- High Pressure Shutdown

Cause	Triggered when the system's pressure reaches 225 psi.
Clear	Select the alarm and clear the system.

This chapter provides supplemental information on replacing, cleaning, and storing the fresh water membranes.

MEMBRANE REPLACEMENT

As your watermaker ages, your membrane will start to deteriorate and produce lower grade water. When this happens, you may try to chemically clean the membrane(s) to recover the performance. If this fails, you will need to replace the membrane. Refer to *Figure 21*, *Figure 22*, or *Figure 23*, and proceed as follows:

1. Shut the the fresh and salt water sources, and disconnect the high-pressure (and low-pressure, if needed) hose connections from the end of the vessel in question.
2. Remove the hoses and fittings from one end of the pressure vessel.
3. Remove the two retaining clip screws on the end of the vessel, and remove the retaining clip.
4. Remove the end plug. The membrane will now be visible inside the pressure vessel.
5. Using a pair of needle-nose pliers, grab the exposed white tube. With a firm grip, pull the membrane out of the vessel. If you are taking the membrane(s) out to be returned to FCI for evaluation, do not damage or mar the white tube—doing so will make it impossible for us to evaluate the membrane.
6. Take the new membrane out of the bag. Take care NOT to get the membrane dirty.
7. If the old membrane is being returned to FCI, rinse well with fresh water and place into the bag. Seal the end with tape and return immediately.
8. With the new membrane in hand, slide into the vessel in the same position as the original came out.
9. Inspect the o-rings, replace if needed, lubricate the o-rings and slide into the vessel.
10. Replace the fittings and hoses.

MEMBRANE REPLACEMENT (continued)

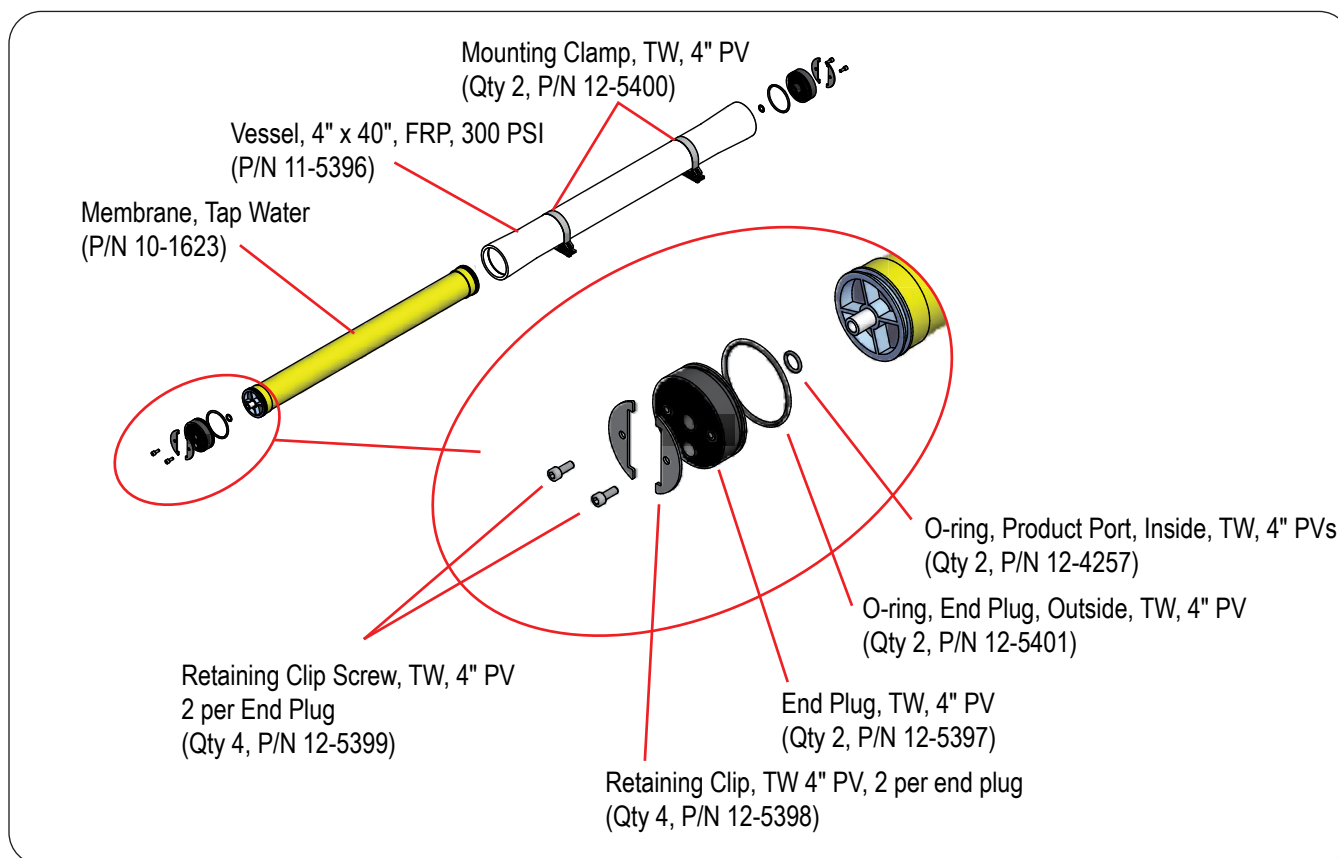


Figure 21: Replacing the Membrane

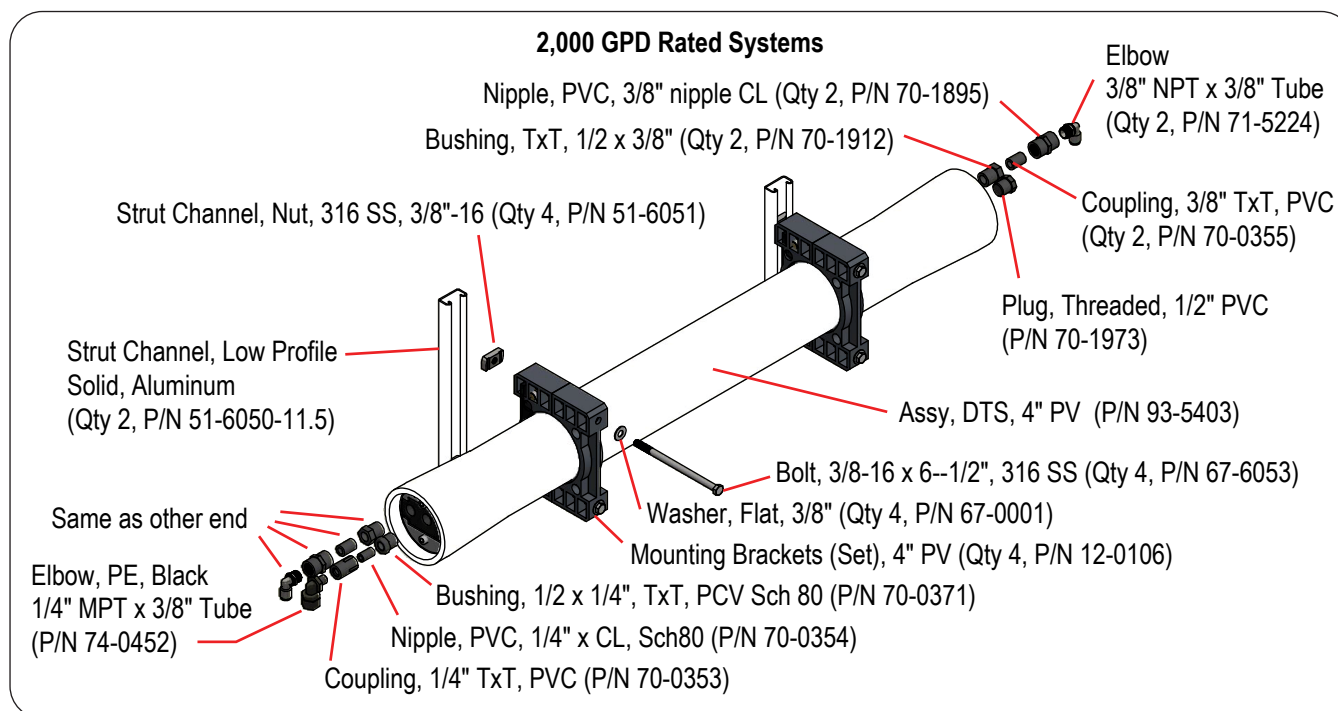


Figure 22: 1 PV for 2,000 GPD Rated Systems (P/N 93-5414)

MEMBRANE REPLACEMENT (continued)

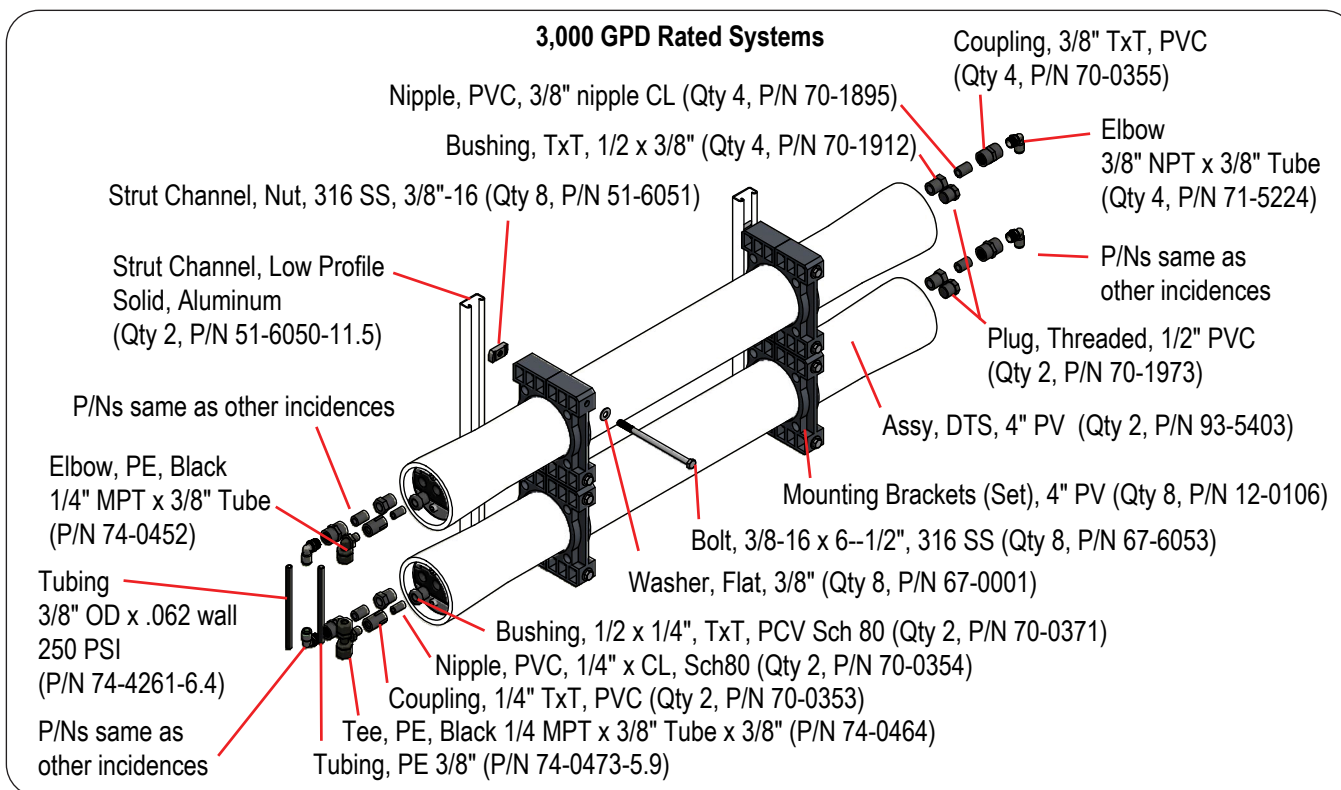


Figure 23: 2 PVs for 3,000 GPD Rated Systems (P/N 93-5415)

STORAGE AND WINTERIZING PROCEDURES

Invariably there will be times when the watermaker will not be used. During this time, it is recommended that the system be shut down and certain precautions are taken. By following these simple instructions, your FCI System will continue to provide you with fresh water for years to come.

STORAGE PROCEDURES

Flush the membranes with fresh water weekly to keep them wet.

WINTERIZING PROCEDURE

If the system will be exposed to freezing temperatures, the system must be drained of all product water and rinsed with a solution of product water with 20% food-grade glycerin (propylene glycol).

WARNING: FREEZING TEMPERATURE

The system must be protected from freezing if it will be exposed to temperatures below 32° Fahrenheit (0° Celsius). Freezing temperatures (below 32° F / 0° C) will cause extensive damage to the system as the water expands within the system during the freezing process. Resulting damage to the system caused by freezing temperatures is the liability of the operator. DO NOT subject the system to temperatures below 32° Fahrenheit (0° Celsius) unless the system has been rinsed with a solution of product water with twenty percent (20%) food-grade glycerin (propylene glycol).

When ordering replacement parts, refer to the illustrated part drawings in this chapter to identify the part numbers.

ORGANIZATION OF THE ILLUSTRATED PARTS

The illustrations are organized in the following categories:

- "ILLUSTRATED PARTS / DTS+SOLO" on page 63
- "ILLUSTRATED PARTS / PUMP & MOTOR" on page 67
- "ILLUSTRATED PARTS / PRESSURE GAUGES" on page 68
- "ILLUSTRATED PARTS / FLOW METERS" on page 70
- "ILLUSTRATED PARTS / ELECTRICAL" on page 73
- "ILLUSTRATED PARTS / FILTER ASSEMBLY" on page 75
- "ILLUSTRATED PARTS / PRESSURE VESSELS" on page 76

ILLUSTRATED PARTS / DTS+SOLO

1

2

3

4

B

A

1

2

3

4

B

A

REV		DESCRIPTION		DATE		ENG		MFG	
A		Production Release		8/24/15		IMA			
REVISIONS									

ITEM		QTY		PART NUMBER		DESCRIPTION	
1		1		90-5382		Stand, DTS+SOLO (Optional)	
2		1		93-5338		Assy, DTS+Solo	
3		1		93-5414		Assy, DTS+SOLO, 2000 GPD PV	
4		1		93-5419		Kit, Installation, DTS+SOLO	

APPROVALS		DATE	
PREPARED BY		Mark	
CHECKED BY			
APPROVED BY			

TITLE		DATE	
DTS+SOLO, 2000 GPD		8/24/2015	

FCI WATERMAKERS, INC.		TEL (801) 906-8840		WWW.FCIWATERMAKERS.COM	
1200 W. 1200 N. SUITE 100					
PROVO, UT 84601					

DRAWING NUMBER		SHEET		1 OF 1	
DTS+SOLO-2000		A		DO NOT SCALE	

ILLUSTRATED PARTS / DTS+SOLO (continued)

1

2

3

4

B

A

REV		DESCRIPTION		DATE		ENG		MFG	
A	1	Production Release		8/24/15		MA			

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	90-5382	Stand, DTS+SOLO (Optional)
2	1	93-5338	Assy, DTS+Solo
3	1	93-5415	Assy, DTS+SOLO, 3000 GPD PV
4	1	93-5419	Kit, Installation, DTS+SOLO

FCI FILTRATION CONCEPTS INC.

Watermakers

TEL (801)966-8840

FAX (801)863-9985

WWW.FCIWATERMAKERS.COM

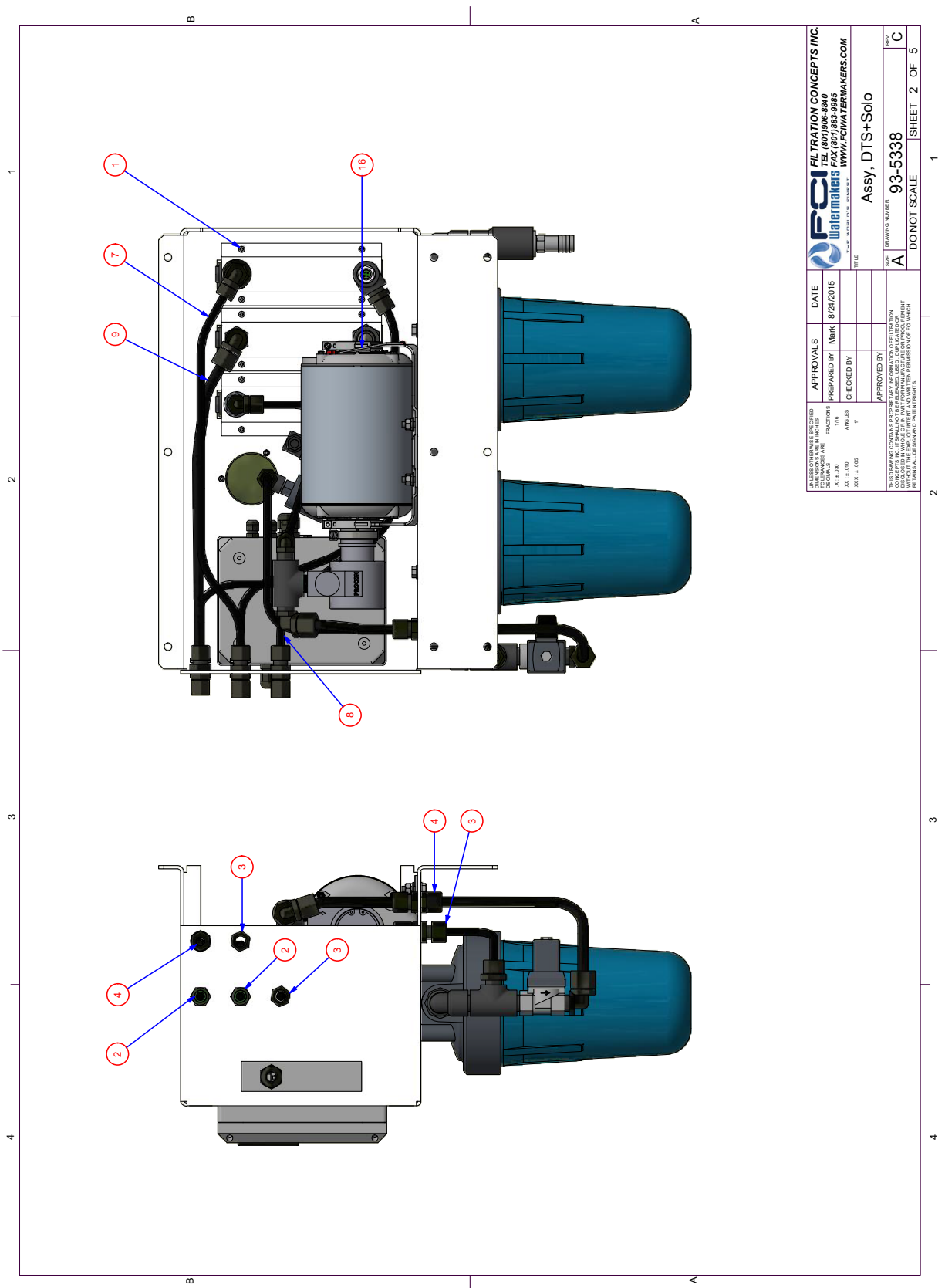
100% QUALITY GUARANTEE

APPROVALS	DATE	SIZE	DRAWING NUMBER
PREPARED BY Mark	8/24/2015	A	DTS+SOLO-3000
CHECKED BY		DO NOT SCALE	SHEET 1 OF 1
APPROVED BY			

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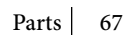


ILLUSTRATED PARTS / DTS+SOLO (continued)

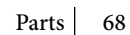


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FRIEDRICH ENGINEERING, INC.		PREPARED BY		MMK	
FRIEDRICH ENGINEERING, INC.		CHECKED BY		8/24/2015	
X 1/8" = 1/8"		APPROVED BY			
XX 1/8" = 1/8"		DRAWING NUMBER		93-5338	
XXX 1/8" = 1/8"		SIZE		A	
		TITLE		DO NOT SCALE	
		ASSY, DTS+Solo		SHEET 2 OF 5	
		FCI WATERMAKERS, INC.		TEL (801) 966-8840	
		FAX (801) 883-9985		WWW.FCIWATERMAKERS.COM	
		FRIEDRICH ENGINEERING, INC.			

FCI WATERMAKERS, INC.



FCI WATERMAKERS, INC.



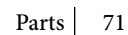
Parts | 69



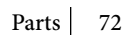
FCI WATERMAKERS, INC.



FCI WATERMAKERS, INC.



FCI WATERMAKERS, INC.



ILLUSTRATED PARTS / ELECTRICAL

1

2

3

4

B

A

1

2

3

4

B

A

REV	DESCRIPTION	DATE	ENG	MFG
A	Production Release	8/24/15	MA	

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	51-1690	Enclosure, Collar, 8 x 6
2	1	50-5387	PLCHMI, 3.8"
3	1	51-1689	Enclosure, Lid 8 x 6
4	1	51-1691	Enclosure, Carbon, base 8 x 6 base
5	3	52-0254	Cable Grip 1/4"
6	2	52-0256	Cable Grip 13mm Lock nut
7	1	57-4836	TDS Output Board, V4
8	4	67-2615	Screw, 4-40 x .140 Tapered Head
9	4	67-2616	Screw, 4-40 x .241 Panhead
10	4	52-2613	Standoff, 1/4"x 3/8", 4-40 Female/Female
11	1	96-5457	Decal, DTS+Solo Startup

APPROVALS

DATE

8/24/2015

Mark

REPAIRED BY

1/18

CHECKED BY

1/18

APPROVED BY

1/18

FCI FILTRATION CONCEPTS INC.

10000 W. 100th Ave.

Denver, CO 80231

TEL (801) 906-8840

FAX (801) 983-9885

WWW.FCIWATERMAKERS.COM

Assy, Enclosure, DTS+SOLO

93-5417

DO NOT SCALE

SHEET 1 OF 3

REV	DESCRIPTION	DATE	ENG	MFG
A	Production Release	10/15/15	MA	

REVISIONS	DESCRIPTION	DATE	ENG	MFG
A	Production Release	10/15/15	MA	

REV	DESCRIPTION	DATE	ENG	MFG
A	Production Release	10/15/15	MA	

REV	DESCRIPTION	DATE	ENG	MFG
A	Production Release	10/15/15	MA	

REV	DESCRIPTION	DATE	ENG	MFG
A	Production Release	10/15/15	MA	

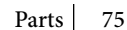
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A	Production Release	10/15/15	MA	

REV	DESCRIPTION	DATE	ENG	MFG
A	Production Release	10/15/15	MA	

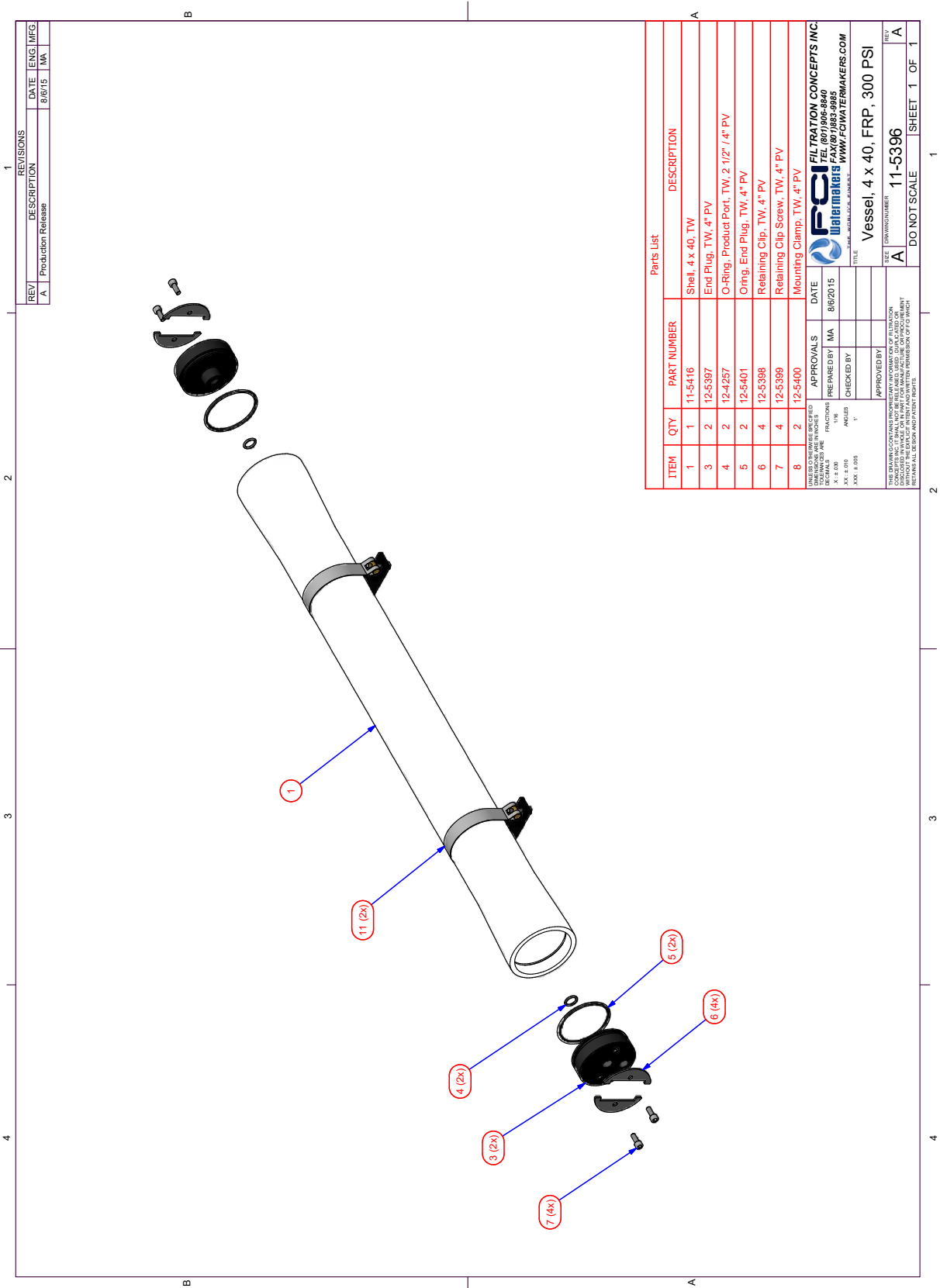
ITEM	QTY	PART NUMBER	DESCRIPTION
1	3	67-3243	#8 x 3/8" PPHSMS 18-8
2	3	52-0242	Contact Block 8 Gauge, White
3	1	52-0243	Contact Block, Spacer
4	2	52-0244	Contact Block, Lock Grey
5	1	57-4955	Power Supply, 60w
6	1	51-2617	Back Panel, PVC, 4-7/8" x 6-7/8" x 1/4"
7	1	52-0252-6.75	Din Rail
8	1	52-1875	Terminal Block, Entelecs, Yellow, Isolated Gnd
9	1	52-1930	Terminal Block, Blue
10	1	54-4784	Contactor, 24VDC
11	3	57-4595	Terminal Block, 3 Level
12	1	57-4713	3 Level Terminal Block End Cap
13	4	67-3848	Screw, #10-32 x 3/8", Phillips Pan, SS
14	1	57-4593	Relay, 24 VDC

FPI FILTRATION CONCEPTS INC.
 TEL 807/906-9840
 FAX 807/983-9885
www.fpiwatermakers.com
 TITLE: _____
 DATE: 10/15/2015
 PREPARED BY: MA
 CHECKED BY:
 APPROVED BY:
 SCALE: DRAWING NUMBER: DTS+SOLO
 SHEET 1 OF 1

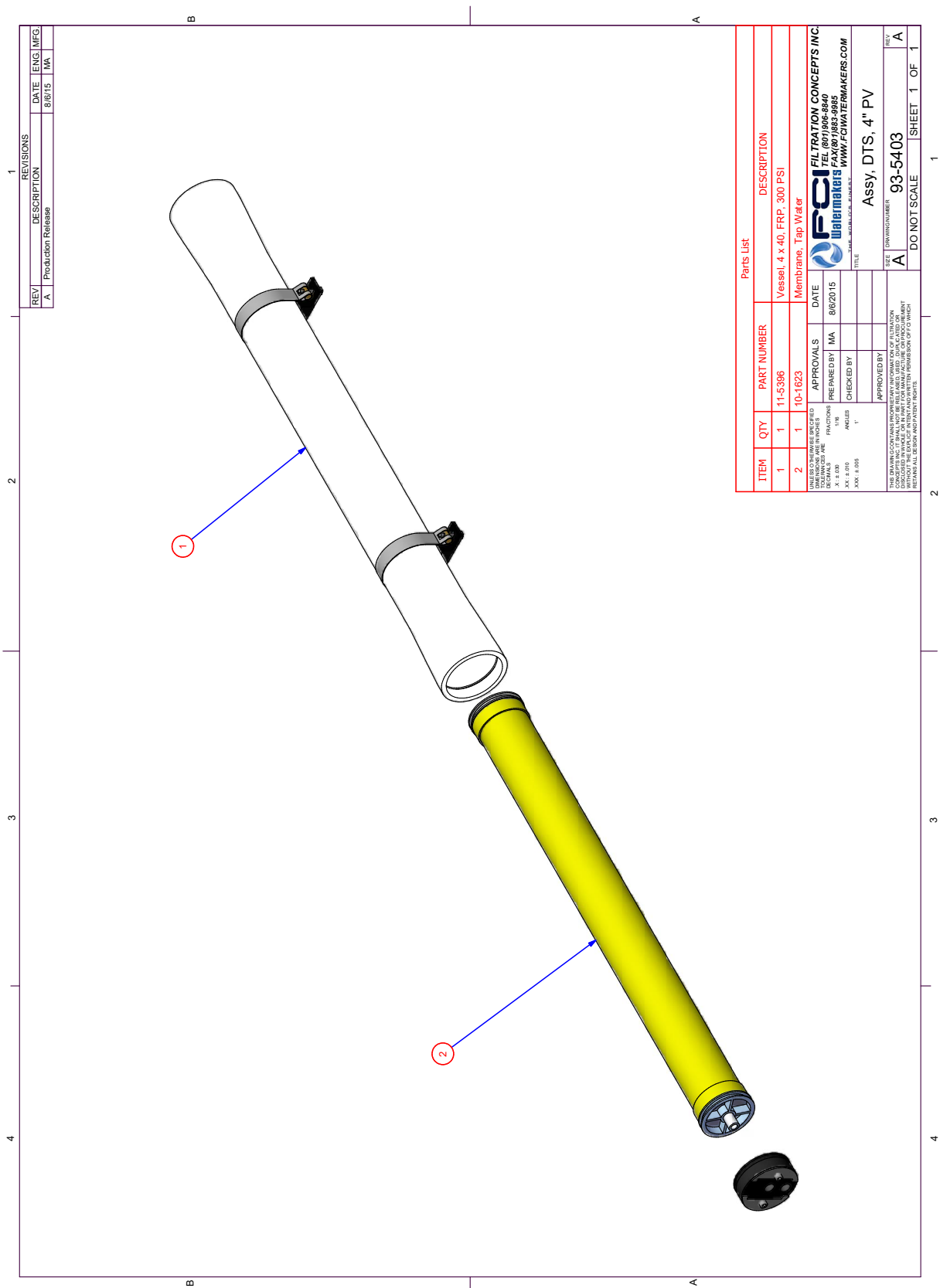
FCI WATERMAKERS, INC.



ILLUSTRATED PARTS / PRESSURE VESSELS



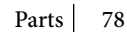
ILLUSTRATED PARTS / PRESSURE VESSELS (continued)



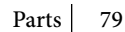
REVISIONS			
REV	DESCRIPTION	DATE	ENG. MFG.
A	Production Release	8/6/15	MA

Parts List			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	11-5396	Vessel, 4 x 40, FRP, 300 PSI
2	1	10-1623	Membrane, Tap Water
UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE IN INCHES TOLERANCES ARE: X .125 X .063 X .031 X .015 X .008			
DATE		DATE	
8/6/2015		8/6/2015	
APPROVALS		APPROVALS	
PREPARED BY: N/A		PREPARED BY: N/A	
CHECKED BY:		CHECKED BY:	
T		T	
APPROVED BY:		APPROVED BY:	
T		T	
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ASSY, DTS, 4" PV		93-5403	
DO NOT SCALE		SHEET 1 OF 1	

FCI WATERMAKERS, INC.



FCI WATERMAKERS, INC.



7/ REVISION HISTORY

REVISION HISTORY

Revision	Date	Description
A	02/15/2016	Initial release.
B	03/01/2017	Schematic and Illustrated Part 93-5372 updated.
C	02/09/2020	Filter wrench added to illustrations.
D	04/09/2020	Low pressure switch feed added to illustrations. Mounting bracket on PV assemblies updated on illustrations. PSI Switch and DP Modes added to Display Screens. Schematic updated. LP gauge in Illustrated Parts updated.
E	06/04/2023	Warranty updated.



Document Part Number: 97-5420 Revision E