

# Thermo Scientific Barnstead TII

Type II Water System - Series 1403 and 1404

Operating Manual and Parts List LT1403X8 Rev. 0



<b>Models covered in this manual</b>		
<b>Model Number</b>	<b>Description</b>	<b>Voltage</b>
D14031 (7165)	12 LPH	90V-240V
D14041 (7166)	24 LPH	90V-240V

**MANUAL NUMBER LT1403X8 (7007165)**

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<b>REV</b>	<b>ECR/ECN</b>	<b>DATE</b>	<b>DESCRIPTION</b>	<b>By</b>



**Important** Read this instruction manual. Failure to read, understand and follow the instructions in this manual may result in damage to the unit, injury to operating personnel, and poor equipment performance. ▲

**Caution** All internal adjustments and maintenance must be performed by qualified service personnel. ▲

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Important operating and/or maintenance instructions. Read the accompanying text carefully.



Potential electrical hazards. Only qualified persons should perform procedures associated with this symbol.



Equipment being maintained or serviced must be turned off and locked off to prevent possible injury.



Hot surface(s) present which may cause burns to unprotected skin, or to materials which may be damaged by elevated temperatures.



Marking of electrical and electronic equipment, which applies to electrical and electronic equipment falling under the Directive 2002/96/EC (WEEE) and the equipment that has been put on the market after 13 August 2005.



This product is required to comply with the European Union's Waste Electrical & Electronic Equipment (WEEE) Directive 2002/96/EC. It is marked with the WEEE symbol. Thermo Fisher Scientific has contracted with one or more recycling/disposal companies in each EU Member State European Country, and this product should be disposed of or recycled through them. Further information on Thermo's compliance with this directive, the recyclers in your country and information on Thermo products will be available at [www.thermofisher.com](http://www.thermofisher.com).

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- ✓ Always follow good hygiene practices.
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# Section 1 Safety Information

Your Thermo Scientific Barnstead TII has been designed with function, reliability, and safety in mind. It is your responsibility to install it in conformance with local electrical codes. This manual contains important operating and safety information. The user must carefully read and understand the contents of this manual prior to the use of this equipment. For safe operation, pay attention to Notes, Cautions, and Warnings throughout the manual.

Water purification technology employs one or more of the following: chemicals, electrical devices, mercury vapor lamps, steam and heated vessels. Care should be taken when installing, operating or servicing Thermo Scientific products. The specific safety notes pertinent to this product are listed below.

## Warnings

To avoid electrical shock, always:

1. Use a properly grounded electrical outlet of correct voltage and current handling capacity.
2. Do not locate the Barnstead TII directly over equipment that requires electrical service. Routine maintenance of this unit may involve water spillage and subsequent electrical shock hazard if improperly located.
3. Replace fuses with those of the same type and rating.
4. Do not disassemble water lines or remove cartridges where spilled water could contact equipment that requires electrical service. Electrical shock hazard could result.
5. Power unit OFF before plugging in or unplugging unit.
6. Disconnect from the power supply prior to maintenance and servicing.

**To avoid personal injury:**

1. Do not use in the presence of flammable or combustible materials; fire or explosion may result. This device contains components that may ignite such materials.
2. Do not use in the presence of highly corrosive substances such as bleach or acid baths; fire may result.
3. This device is to be used with water feeds only. Cleaning agents must be used in compliance with instructions in this manual. Failure to comply with the above could result in explosion and personal injury.
4. Avoid splashing cleaning solutions on clothing or skin.
5. Ensure all piping connections are tight to avoid chemical leakage.
6. Ensure adequate ventilation.
7. Carefully follow manufacturer's safety instructions on labels of chemical containers and material safety data sheets.
8. This unit is equipped with an ultraviolet lamp. Ultraviolet radiation is harmful to the eyes and skin. Do not attempt to observe the lamp directly.
9. Refer servicing to qualified personnel.

Do not use this product for anything other than its intended usage. If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

**Note** The UV lamp contains mercury. If broken or no longer needed, do not dispose of the UV lamp in the trash. Recycle or dispose of the UV lamp as hazardous waste. ▲

## Section 2 Product Information

The Barnstead TII is a tap-fed water purification system designed to be simple to use and to provide reagent-grade water that exceeds ASTM Type II, and CLSI®-CLRW standards. It uses a thin film composite reverse osmosis membrane with pretreatment to produce RO water that is then polished using a two-stage deionization process combined with UV oxidation and a 0.2 micron final filter.

The % of the rejection between incoming and reverse osmosis product water is monitored and an indication is provided to the user if the RO water quality is unacceptable. Pressure sensors located inside the unit monitor incoming feed water and RO pressure. The DI water purity is continuously measured by a resistivity cell and displayed on a multifunctional display.

RO operation is automatic and works independently of the DI system to fill the external reservoir as determined by sensors in the reservoir.

Read the instructions carefully to ensure that you receive maximum benefit from the Barnstead TII. Also, please fill out and return the enclosed warranty registration card, as it will help us assure you of proper warranty coverage.

**Note** The Barnstead TII is not shipped with pretreatment and DI polishing cartridges or a final filter. These must be ordered separately. The start-up kit containing these components can be ordered using part number D502138 for all units. ▲

# TII Water Specifications

**Table 2-1.** Feed Water Requirements

Types	Tap <sup>1</sup> (Potable)
Turbidity	1.0 N.T.U. maximum
Pressure Range	2-6.9 bar (30-100psig)
Temperature Range	4-40°C (39-104°F)
Minimum Inlet Flow Requirements	100 lph
pH	3-10
TDS	600 (max. ppm as CaCO <sub>3</sub> )
Silt Density Index	< 5%
Free Chlorine	< 3 ppm
Langlier Saturation Index	< 1
Iron (total as Fe)	< 0.5 ppm
Silica	< 30 ppm

<sup>1</sup> 1500 ppm NaCl feed water solution @ 25°C (77°F), @ 4.5 bar (65 psig), 15% recovery. Flow rate and recovery will decrease with lower water temperature and pressure. We recommend the use of a hot water mixing valve before the RO system for water cooler than 15°C (59°F). Feed water suitability must be determined by a water analysis.

**Table 2-2.** RO System

Model	RO Product Flow Rate	Recovery
D14031	12 lph (3.2gph), ±15%	10-20%
D14041	24 lph (6.3gph), ±15%	20-40%

**Table 2-3.** Membrane Performance<sup>2</sup>

	Rejection
Inorganic (minimum)	>90%
Inorganic (typical)	>95%
Particles	>99%
Bacteria	>99%
Organics (>300 MW)	>99%

<sup>2</sup> 500 ppm NaCl feed water solution @ 25°C (77°F), @ 4.5 bar (65 psig), 15% recovery. Flow rate and recovery will decrease with lower water temperature and pressure. The use of a hot water mixing valve before the RO system is recommended for water cooler than 15°C (59°F).

## TII Water Specifications (cont.)

**Table 2-4.** DI Product Water Quality (dispensed from unit)

Resistivity	ASTM Type II, >15 Megohm-cm
TOC	<15 PPB
Flow Rate	Up to 1 LPM with a new D3750 final filter
Bacteria	Less than 0.01 CFU/ml
Volumetric Dispense	Accuracy: ±5%, Repeatability: ±3%

## Technical Specifications

**Table 2-5.** Dimensions and Clearance Requirements

Barnstead TII Dimensions	13.5" W X 18.5" D X 19.5" H (34.3 cm X 47.0 cm X 49.5 cm)
Clearances	Sides - 9" (22.9 cm) minimum to allow for servicing
	Above - 3" (7.6 cm) minimum for removal of top cover
	Front - 4.75" (12.1 cm) minimum for opening front door
Electrical Requirements	Barnstead TII is equipped with four power cords and corresponding fuses taped to each power cord to be plugged into a grounded electrical outlet of the appropriate voltage.
	All models: 90-240 VAC, +5% -10%, 47-63 Hz.

**Table 2-6.** Environmental Conditions

Operating	15°C -30°C; 20% -80% RH, non-condensing.
	Installation Category II (over-voltage) in accordance with IEC 664.
	Pollution Degree 2 in accordance with IEC 664.
Altitude limit	6562 ft (2,000 meters)
Storage	-25°C -65°C; 10% to 85% relative humidity

## **Technical Specifications (cont.)**

### **Declaration of Conformity**

We hereby declare under our sole responsibility that this product conforms to the technical requirements of the following standards:

#### EMC

EN 61000-3-2 Limits for harmonic current emissions

EN 61000-3-3 Limits for voltage fluctuations and flicker

EN 61326-1 Electrical equipment for measurement, control, and laboratory use - EMC requirements; Part I: General Requirements

#### Safety

EN 61010-1 Safety requirements for electrical equipment for measurement, control, and laboratory use; Part I: General Requirements

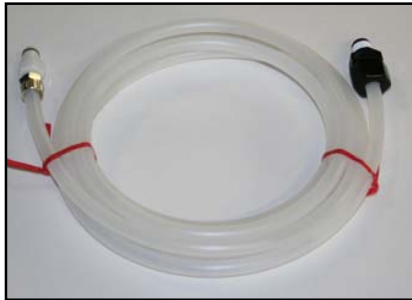
Per the provisions of the Electromagnetic Compatibility Directive 2004/108/EC, and per the provisions of the Low Voltage Directive 2006/95/EC.

Copies of the Declaration of Conformity are available upon request.

## Section 3 Installation



**Figure 3-1.** Drain Water Tubing



**Figure 3-2.** Feed Water Tubing



**Figure 3-3.** Reservoir Connection Tubing.



**Figure 3-4.** Power Cord with Fuses.



**Figure 3-5.** Tube Removal Tool.

### Unpacking

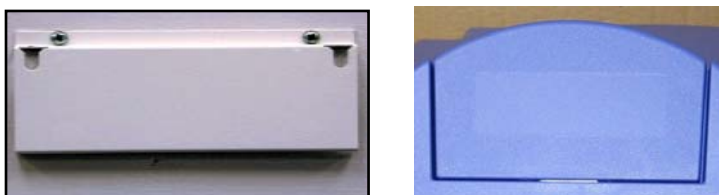
Remove the unit from its shipping container and ensure that the following items are removed before discarding the packaging materials:

1. **Barnstead TII unit**
2. **Drain Water Tubing.** Approximately 6 ft. (1.83 m) of 1/4" (0.64 cm) O.D. drain tubing (TU1190X12) with no fittings (Fig 3-1)
3. **Feed Water Tubing.** Approximately 10 ft. (3.05 m) of 3/8" (0.95 cm) O.D. feed water tubing provided with a quick disconnect insert on one end and a 1/4" NPT fitting on other end (TU1119X7) (Fig 3-2)
4. **Reservoir Connection Tubing.** Two approximately 10 ft. of 3/8" O.D. tubes (TU550X5) for fluidically connecting the unit to the storage reservoir (Fig 3-3).
5. **Model D14041 only: Membrane Reject 1 to Membrane Feed 2 tube**
6. **Four power cords:** one of which is pictured in Figure 3-4 with fuses.
7. **UV lamp (LMX13)**



## Unpacking (continued)

8. Tube removal tool (AYX23): shown in Figure 3-5.
9. Wall Bracket - Unit (BC1190X12)
10. Wall Bracket -Remote Display (BC1190X10), shown in Figure 3-6.
11. Display Cable (WH1403X4)
12. Blank Display (DL1190X18), shown in Figure 3-6.
13. RO Membrane (FL1265X1) - Model D14041 has two membranes.
14. Quick Reference Guide (LTX112)



**Figure 3-6.** Control Panel Accessories:  
(Left) Blank Display (DL1190X18), (Right) Control Panel Wall Mount Bracket

**Note** Also required for installation (purchased separately):

1. A storage reservoir. If a Barnstead TII storage reservoir (D14061, D14062, D14063, D14064, D14071, D14072, D14073 or D14074) is also purchased, see contents in separate box.
2. Start-up kit (D502138). Contains the Barnstead TII DI Cartridge Pack (with 0.2  $\mu$ M final filter) (D502137), 1  $\mu$ M Pre-filter (D502113), MPS Cartridge (D502114), Extruded Carbon Cartridge (D502115), and Cartridge Block (BK1404X2).
3. Customer-supplied fasteners to mount unit and remote display.
4. Household bleach for the cleaning process. ▲

## Locating Unit

Locate storage reservoir approximately 2 - 5 ft. (1.52 m) from the Barnstead TII for electrical connections.

Refer to the Barnstead TII storage reservoir manual or customer-supplied reservoir manual for mounting instructions. The outlet of the Barnstead TII storage reservoir must be above or at the same level as the inlet of the Barnstead TII.

## **Bench Mounting**

Place the Barnstead TII on a bench top that is accessible to electricity and an atmospherically vented drain.

## **Wall Mounting**

Wall composition, condition and construction, as well as fastener type, must be considered when mounting this unit. The mounting surface and fasteners selected must be capable of supporting a minimum of 150 lbs. (68kg). Inadequate support and/or fasteners may result in damage to mounting surface and/or equipment. If you are unsure of mounting surface composition, condition and construction or correct fasteners, consult your building maintenance group or contractor. Refer to Section 2 Technical Specifications, for clearance requirements.

**Warning** Do not locate the Barnstead TII directly over equipment that requires electrical service. Routine maintenance of this unit may involve water spillage and subsequent electrical shock hazard if improperly located.

Install the Barnstead TII on a wall in a convenient location that is accessible to an atmospherically vented drain and electricity.

1. Locate the wall bracket packed separately from the unit.
2. Using the wall bracket as a template, locate and drill the mounting holes in the wall. A minimum of four (customer-supplied) fasteners will be required — two on the top and two on the bottom.
3. Attach the wall bracket to the wall using customer-supplied fasteners.
4. Remove the locking screws on each side of the wall bracket.
5. Pull the two locking slides on each side of the wall bracket out as far as they will go.
6. Hang the unit on the wall bracket by sliding the mounting pins into the wall bracket slots.
7. Push the locking slides on each side of the wall bracket in as far as they will go.
8. Replace the locking screws.

**Note** The outlet of Barnstead TII storage reservoir must be above or at the same level as the inlet of the Barnstead TII. ▲

## Push-to-Connect Fitting Tubing Install

The following instructions will apply when you need to attach a piece of tubing to your Barnstead TII during installation, unless otherwise noted in the installation instructions. To make tubing connections:

1. Make sure the tubing is cut off reasonably square and that no plastic burrs or ridges are present.
2. Mark from end of tube an insertion length of 3/4" (1.9 cm).
3. Wet the tube end with water and insert the tube straight into the fitting until it bottoms out on the interior shoulder and the insertion mark is no longer visible.

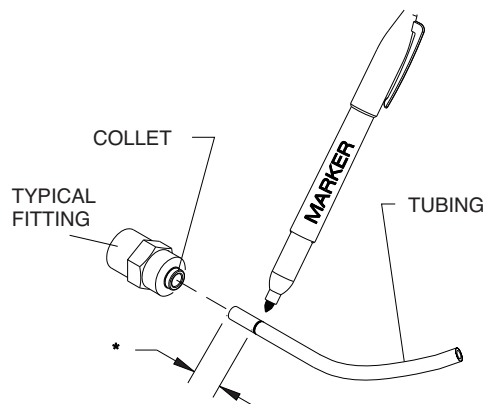


Figure 3-14. Push-To-Connect Fitting Tubing Installation

## Push-To-Connect Tubing Removal

1. Using the tool provided (AYX23), push the collet toward the body while pulling on the tubing to release the tube, as shown in Figure 3-15.

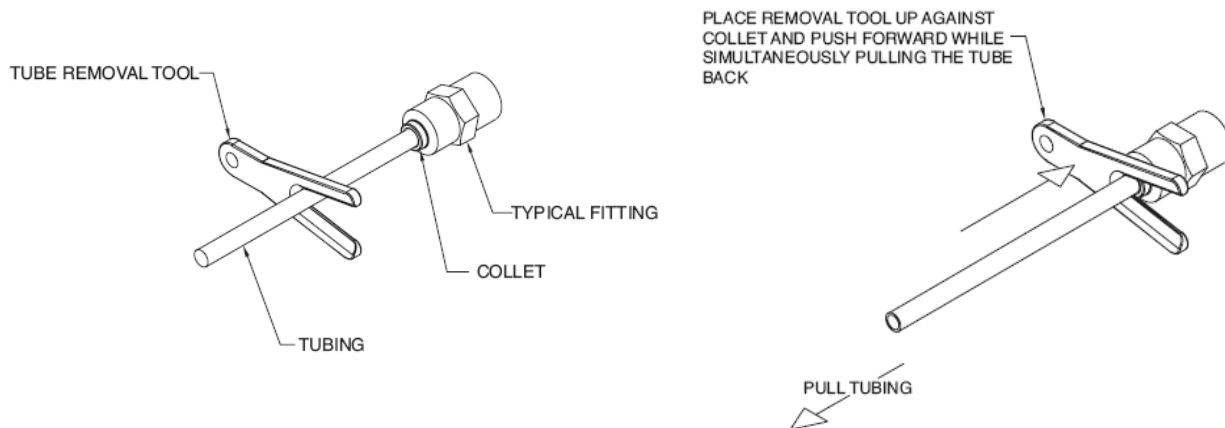


Figure 3-15. Push-To-Connect Tubing Removal

## Tubing Adapter Fittings

1. Completely disassemble the fitting. Refer to Figure 16 to familiarize yourself with the names of the component parts.
2. Make sure the tubing is cut off reasonably square and that no plastic burrs or ridges are present.
3. Place the grab ring and back-up ring in the hex nut in the order and orientation shown in Figure 16. Thread the nut onto the adapter. **DO NOT** use the o-ring at this time.
4. Push the tubing through the nut until it bottoms out in the adapter.
5. Remove the adapter nut and tubing. Place the o-ring over the tubing. Be careful not to push the back-up ring or grab ring further back on the tubing when installing the o-ring.

**Caution** Do not tighten tube fitting hex nut with a wrench. Tight connections can be easily made by hand. ▲

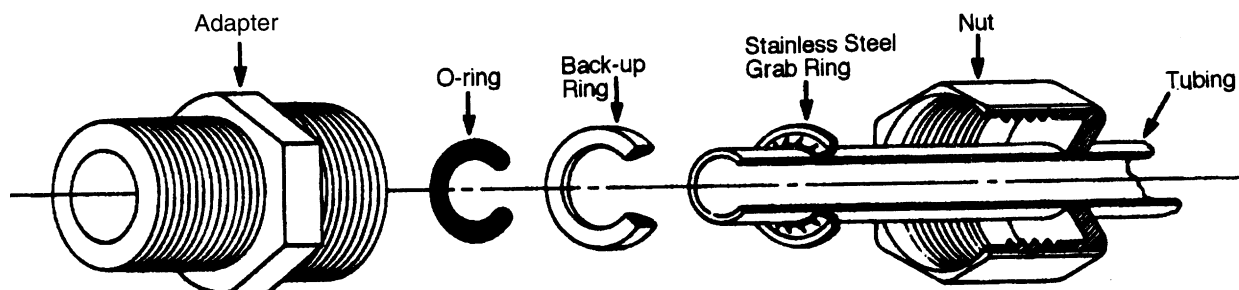


Figure 3-16. Typical Polypropylene Tubing Adapter Installation

## Quick Disconnect Fittings

These fittings, shown in Figure 3-17, are found on the water inlet. To insert the inlet tubing:

1. Press on the metal thumb pad on the coupling body to ensure the fitting is open.
2. Wet the o-ring on the coupling insert and push into the coupling body until you hear a click. Gently pull on the tubing to ensure it is secure.
3. To remove, press the metal thumb pad to release and pull coupling insert out.

## UV Lamp Installation

Locate the UV chamber inside the left door of the Barnstead TII (Figure 3-7). Install the UV Lamp as follows:



**Figure 3-7.** UV Chamber

1. Disconnect the power cord from the unit.
2. Access the left side of the unit by unlatching the screw securing the door with a flathead screwdriver. Open the door.
3. Remove the UV lamp from its packaging. **DO NOT TOUCH THE GLASS PORTION OF THE LAMP!**

**Caution** Do not touch the lamp with fingers! It is recommended that lint-free gloves be worn when handling the lamp. The glass portion must be free of fingerprints, perspiration, etc. Even a light coating of perspiration will reduce the effectiveness of the lamp. If the glass portion of the lamp is touched, clean it with a damp, lint-free cloth. Use isopropyl alcohol as required. ▲

4. Remove black cap by sliding it off UV chamber.
5. Insert the lamp halfway into the UV lamp chamber and plug it in noting proper rectangular orientation, then fully insert the lamp into the chamber, and replace black cap.
6. Make sure the UV lamp cable is tucked behind the chamber before closing and relatching the door.
7. Reset the UV lamp timer as directed in the “Resetting Routine Timers” section of this manual.

**Warning** The UV lamp contains mercury. Do not discard in trash. Recycle or dispose of UV lamp as hazardous waste. ▲

## Cartridge / Membrane Installation

Your Barnstead TII has been shipped with one RO membrane for the 12 lph unit, or two RO membranes for the 24 lph unit, which you will install. The Startup Kit (D502138) includes a prefilter, MPS cartridge, carbon filter, and cartridge pack, and must be purchased separately. To prepare your Barnstead TII for operation, disconnect the unit from the power supply if connected.

**Note** The cartridges must be installed in the correct order to operate properly. ▲

Particulates can damage your membranes, resulting in premature membrane failure. Therefore, your Barnstead TII uses a prefilter to remove particulates from your feed water. Install the prefilter as follows:

1. Open the front left door.
2. Remove the prefilter (Part Number D502113) from its packaging and wet the o-rings with water.
3. Insert the prefilter upright into the left position upper and lower quick disconnects and push until firmly connected. For easier installation, connect bottom first.

## MPS Cartridge Installation

The MPS cartridge contains a slow dissolving anti-scalant material. The anti-scalant material combines with water to prevent scale buildup on the membrane surface. Install the MPS cartridge as follows:

1. Remove the MPS cartridge (Part Number D502114) from its packaging and wet the o-rings with water.
2. Insert the MPS cartridge upright into the middle position upper and lower quick disconnects and push until firmly connected. For easier installation, connect bottom first.



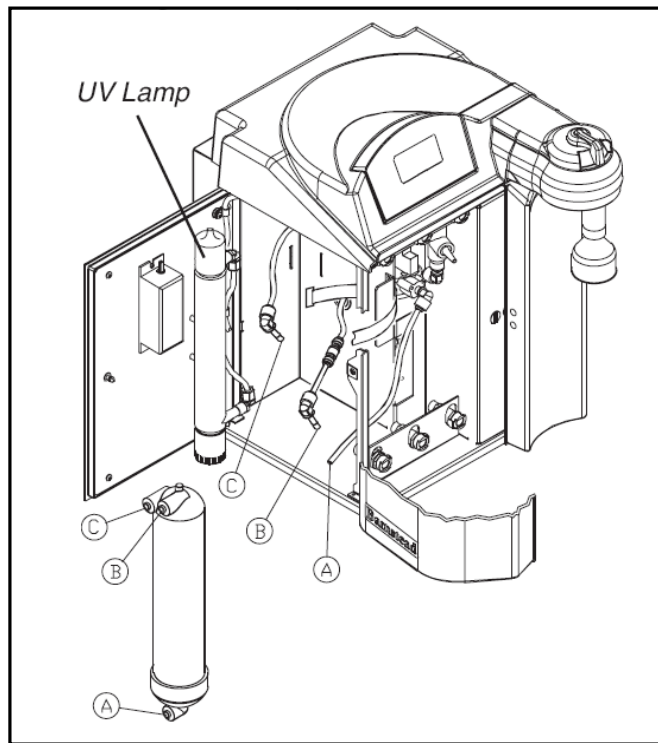
**Figure 3-8.** Cartridge Installation:(left to right) prefilter, MPS, carbon

## Carbon Filter Installation

Chlorine can also damage your membranes, resulting in premature membrane failure. Therefore, your Barnstead TII uses an extruded carbon filter to remove chlorine from your feed water. Install the carbon filter as follows:

1. Remove the carbon filter (Part Number D502115) from its packaging and wet the o-rings with water.
2. Insert the carbon filter straight into the right position upper and lower quick disconnect and push until firmly connected. For easier installation, connect bottom first.

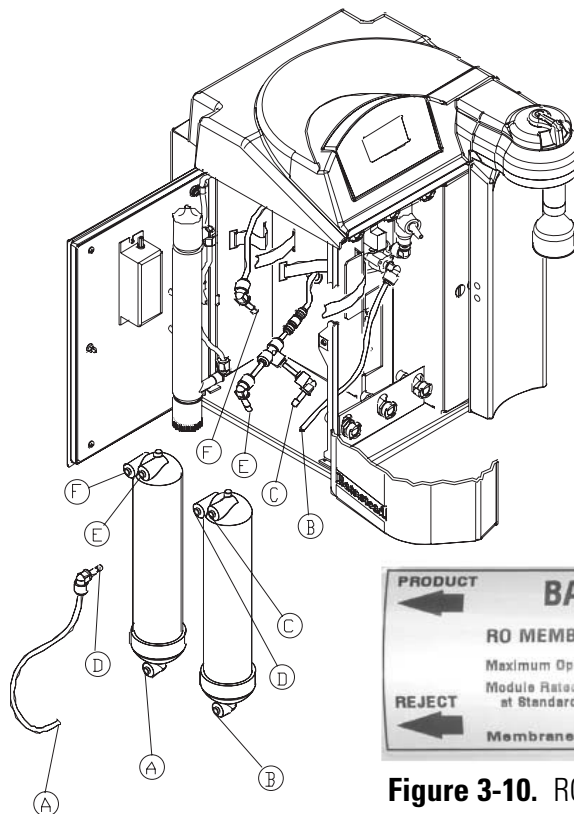
## RO Membrane Installation



**Figure 3-9a.** Schematic of the UV and RO Placement in the Barnstead TII. (a) is FEED, (b) is PRODUCT, and (c) is REJECT.

## 12 LPH Units (1 Membrane)

1. Remove the RO membrane from its packaging. Note the location of the FEED, PRODUCT, and REJECT connections on the membrane. The correct orientation for the installed membrane will be vertical, with the Feed connection on the bottom. See Figure 3-9A.



**Figure 3-9b.** 24 lph RO Membrane Installation



**Figure 3-10.** RO Membrane Housing Label

2. Open the left side door on the Barnstead TII.
3. Referencing Figure 3-9A, locate the three unconnected tubes (two with elbows, one without) labeled FEED (A), PRODUCT (B) and REJECT (C). Refer to the Push-to-Connect Fitting Tubing Install in this section and mark FEED tubing 3/4" (1.9 cm) from end.
4. Make FEED (A) connection by first wetting the tube with water and pushing it firmly into the membrane connector.
5. Using the Velcro® strap, secure the membrane into the right most position against the bracket.
6. Make the PRODUCT (B) and REJECT (C) connections by first wetting the tube stem of the elbow with water and pushing it firmly into the membrane connector.
7. The door can remain open until the unit has been operating and you have checked for possible water leaks at the membrane connections.

*Velcro® is a registered trademark of Velcro Industries, B.V. Ltd Liab Co. Netherlands Castorweg 22-24*



## 24 LPH Units (2 Membranes)

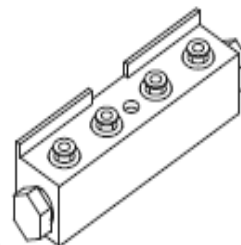
1. Remove the RO membranes from their packaging. Note the location of the FEED, PRODUCT, and REJECT connections on the membrane. See Figure 3-9b. The correct orientation for the installed membrane will be vertical with the Feed connection on the bottom.
2. Open the left side door on the Barnstead TII.
3. Locate the four unconnected tubes (three with elbows, one without) labeled FEED 1, PRODUCT, PRODUCT and REJECT 2. Refer to “Push-to-Connect Fitting Tubing Install” in this section, and mark FEED 1 tubing 3/4” (1.9 cm) from end.
4. Find the tube with the elbow labeled FEED 2 and REJECT 1 packaged with the unit and mark FEED 2 end of the tube 3/4” (1.9 cm) from end.
5. Make FEED 2 (A) connection by first wetting the tube with water and pushing it firmly into the membrane connector. See Figure 3-9b. Using the Velcro® strap, secure the membrane into the leftmost position against the chassis walls.
6. Make the FEED 1 (B) connection by first wetting the tube end and push firmly into the membrane connector. Using the Velcro® strap secure the membrane into the right most position against the bracket. See Figure 3-9b.
7. Make the PRODUCT (C) and REJECT 1 (D) connections on right most membrane by first wetting the tube stem of the elbow with water and pushing it firmly into the connector. See Figure 3-9b.
8. Make the PRODUCT (E) and REJECT 2 (F) connections on left most membrane by first wetting the tube stem of the elbow with water and pushing it firmly into the connector.
9. The door can remain open until the unit has been operating and you have checked for possible water leaks at the membrane connections.

## Cleaning Preparation

Prior to using the TII, you will need to sanitize the unit. Therefore you will install the cleaning block (Figure 3-11) in place of the Durapack cartridge until after the cleaning step is complete. Install the cleaning block as follows:

1. Disconnect the power cord from the unit.
2. Access the right side of the unit by unlatching the screw securing the door with a flathead screwdriver. Open the door.

3. Remove the cleaning block from its packaging and verify that each of the four posts on the cleaning pack has an o-ring. Wet the o-rings with water.



4. Insert cleaning block and align the block so that it mates with the unit manifold. The **Figure 3-11. Cleaning Block** notched top of the block will face the door.

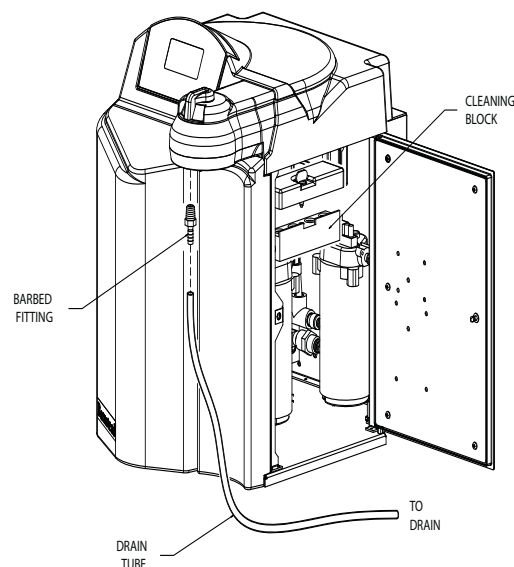
5. Lower unit manifold until it is flush with the top of the cleaning block.

6. Hand-tighten winghead screw securely.

7. Close door.

8. Attach barbed fitting to dispense outlet as shown in Figure 3-12.

9. Securely attach drain tubing to barb fitting and route the open end to an atmospheric drain.



10. Secure drain end of tube as pressurized water will exit the system during the cleaning procedure.

**Figure 3-12. Cleaning Block Installation**

## Feed Water Connections

1. Locate the length of 3/8" (0.95 cm) O.D. tubing provided with a quick disconnect insert on one end and a 3/8" O.D. X 1/4" NPT tubing adapter on the other.
2. Install the tubing adapter onto your incoming water line (Figure 3-16). We recommend a customer supplied shut off valve be installed in your feed water line.
3. The quick disconnect end of the tubing will be inserted into the feed water inlet on the lower left corner in the rear of the Barnstead TII (Figure 3-13).

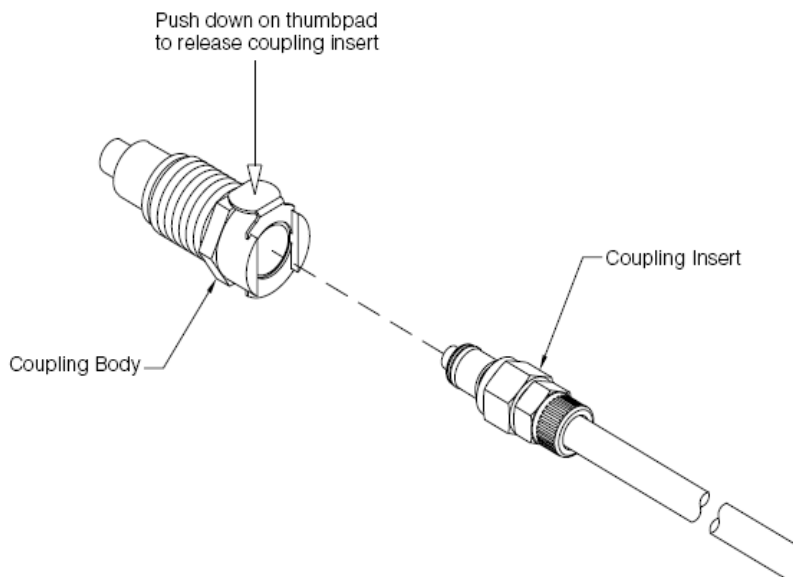
## Atmospheric Drain

The RO reject and flush water is sent to drain through this connection.

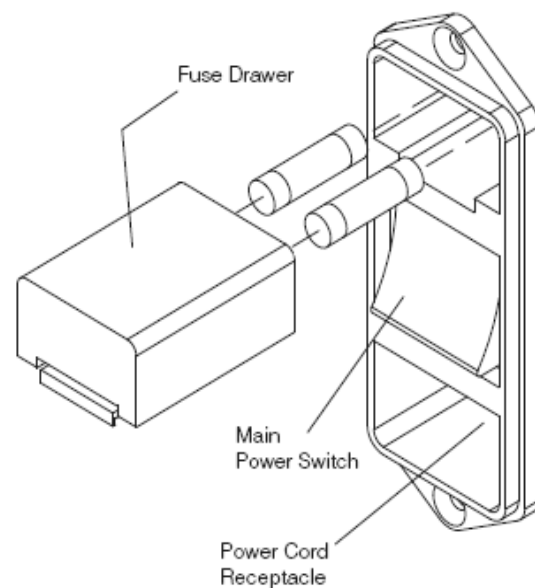
1. Locate the drain water tubing. This is the 1/4" (0.64 cm) O.D. tubing that is approximately 6 ft. (1.83 m) long with a 1/4" O.D. x 1/4" N.P.T. tubing adapter on one end. The atmospheric drain fitting is located on the lower left corner in the rear of the Barnstead TII.
2. Install the tubing adapter into an atmospherically vented drain and route the tubing to the Barnstead TII drain connector, ensuring that there are no kinks.
3. Take the tubing end that has no fitting, wet the tube end with water and insert the tube straight into the unit drain connector until it bottoms out. Refer to the Push-to-Connect Fitting Tubing Install section for more explicit details.



**Figure 3-13.** Feed Water Inlet and Atmospheric Drain



**Figure 3-17.** Quick Disconnect Fitting



**Fitting 3-18.** Power Connections

## RO Membrane Rinse

All the RO prefilters and RO membranes and drain tubing should already be installed at this point. If they have not, refer to UV Lamp, Cartridge, Membrane Installation and Cleaning Preparation in this section.

When new RO membranes are installed in the Barnstead TII, the membranes should be rinsed to remove all traces of preservative from the membranes.

1. Ensure that the feed water and drain connections are in place and power connections are made. Refer to connection information in this section if needed.
2. Verify atmospheric drain tubing is attached
3. Connect tubing from “FROM TANK” on the TII unit connection to an atmospheric drain. Product water (not usable) will flow from this tube during the RO membrane rinse procedure.
4. Turn on power to unit.
5. Ensure the unit is in IDLE mode.
6. Press MENU and use the arrows to scroll to “RO Options”, press OK. Scroll to “Membrane Rinse” and press OK.

## RO Membrane Rinse (continued)

7. Follow the prompts on the screen to rinse membranes. The prompts will ensure that you do not have a tank connected to the TII unit by asking if the tank is empty and if the tubing from the tank goes to drain. Answer yes to both questions. Once initiated, the rinse procedure will last two hours, and will stop automatically.

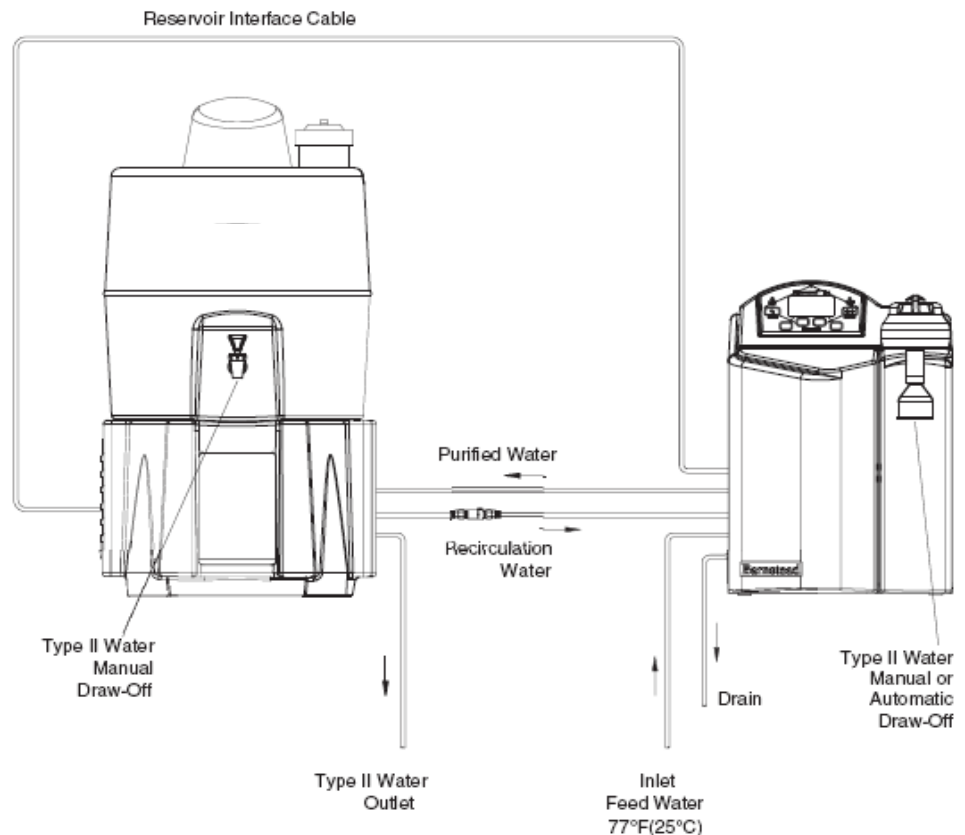
**Caution** Do not allow the Barnstead TII to operate unless water is available to the unit. ▲

**Warning** Use a properly grounded electrical outlet of correct voltage and current handling capacity. ▲

## Reservoir Connection

After performing an RO membrane rinse, connect the TII to a storage reservoir. Refer to the Barnstead TII Storage Reservoir manual.

**Note** Install reservoir at the same height or higher than the TII system. Outlet of the reservoir must be at or above the inlet of the TII. ▲



**Figure 3-19.** Barnstead TII and Barnstead TII Reservoir System Set-Up

## Reservoir Connection (continued)

If an alternate reservoir is being used, one of three float/communication configurations need to be purchased to connect the tank to the TII system.

**Note** An alternative reservoir must have at least two ports to connect it to the TII to allow for recirculation. ▲

1. AY1403X2 – Float Assembly

Complete float assembly to be used with tank without a float. Contains two floats and all connections required for communication with TII system.

2. AY1403X4 – Float Communication Cable

Connects two user supplied floats to the TII system.

3. AY1403X5 – Jones Plug Communication Cable.

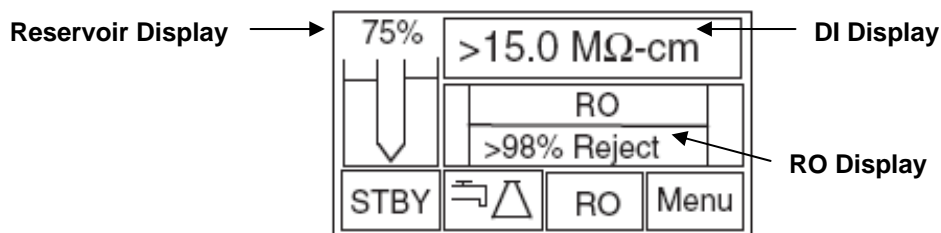
For use with tanks with Jones plug connections for level communication. This includes Barnstead 60L reservoir, D2622 or 100L reservoir, D9021.

For detailed instructions on connecting the TII system to an alternate tank, see the float or cable configuration instruction manual.

**Note** TII system must be programmed to work with the alternate tank configuration. Refer to “Reservoir Type” in the “System Options” section of this manual to correctly configure the TII system.

## System Cleaning Procedure

**Note** Test the float switch assembly in the reservoir to make sure the water level registers on the display before you begin the sanitization mode. You can do this by gently moving the float switches in the tank and looking to the reservoir display to see if it registers. See Figure 3-20 to help locate the reservoir display. This figure shows that the reservoir is 75% full.



**Figure 3-20.** Typical TII Display

## System Cleaning Procedures (cont.)

Prior to beginning the cleaning procedure, ensure the Barnstead TII is attached to a suitable reservoir and that all water and electrical connections between the Barnstead TII and the reservoir are in place. The system should be cleaned before the first use, before a new cartridge pack is installed, or whenever the one-year cleaning timer alerts you. Once set up, the cleaning procedure will run automatically. It is best to perform the procedure when the system or water will not be required as the entire procedure can take up to 16 hours to complete. A cleaning block (BK1403X2) should already be installed, see “Cleaning Preparation” in this section for details. You will also need a quantity of household bleach per the chart on following page.

Do not use bleach with added fragrances. Cleaning your Barnstead TII system as follows:

1. Verify “Cleaning Preparation” section has been completed to prepare your system for cleaning.
2. Press the “Menu” key, and use the up and down arrow keys to select “Sanitization”.
3. Follow the prompts on the screen. These will guide you through the process. It is very important that the steps are followed in order for the cleaning to be successful. Be sure to connect the tubing supplied with the cleaning block and route securely to an atmospheric drain to prevent spillage as the system will use this tubing to automatically drain the bleach water from the system. It is also important that any equipment connected to the optional distribution loop be disconnected from the loop and the lines plugged to prevent bleach from entering those systems or leaking from the distribution loop.
4. When prompted to add bleach, add per the following chart:

<b>Bleach Concentration</b>	<b>Amount needed for 30L reservoir</b>	<b>Amount needed for 60L reservoir</b>
3%	240 mL (1 cup)	480 mL (2 cups)
5.25% - 6%	120 mL (1/2 cup)	240 mL (1 cup)

Once the bleach has been added, if the cleaning cycle is cancelled the system will not be available until it thoroughly rinses all of the bleach from the reservoir and tubing. This will take up to 8 hours.

## **System Cleaning Procedures (cont.)**

To complete the cleaning, the system will automatically fill the reservoir and recirculate the bleach solution through the reservoir and system for six hours. It will then completely drain the solution from the reservoir and tubing by dispensing it through the system dispenser. The reservoir will then be automatically refilled and water which will be re-circulated through the system and again dispensed out the system dispenser to rinse out all remaining bleach.

Once the cleaning is complete, the screen will prompt you to install a new cartridge pack (see Cartridge Pack Installation section of this manual), and will then begin filling the reservoir for normal use. Never install a used cartridge pack into a cleaned system to avoid re-introducing bacteria.

**Warning** This device is to be used with potable water feeds only. Cleaning agents must be used in compliance with instructions in this manual. Failure to comply could result in explosion and personal injury.

**Warning** Be sure to connect the tubing supplied with the cleaning block and route securely to an atmospheric drain to prevent spillage, as the system will use this tubing to automatically drain the bleach water from the system. Avoid splashing cleaning solution on clothing or skin. Ensure all piping connections are tight to avoid leakage. Ensure adequate ventilation. Carefully follow manufacturer's safety instructions and material safety data sheets. This device to be used with water feeds only. Cleaning agents must be used in compliance with instructions in this manual. Failure to comply could result in explosion and personal injury.

## **Cartridge Pack Installation**

Cartridge packs will come bagged with four manifold connection caps. Each cartridge pack includes one 0.2 micron absolute final filter.

1. Open right side door. Remove the four caps from the top of the cartridge pack.
2. Verify that each of the four posts on the cartridge pack has an o-ring, as demonstrated in Figure 3-22.
3. Remove the sanitization block and do not discard it. You'll use this at a later date for sanitization purposes.
4. Lift unit manifold upward, insert cartridge pack and align the pack so that it mates with the unit manifold.
5. Lower unit manifold until it is flush with the top of the cartridge pack.
6. Hand-tighten wing head screw securely.
7. Close door.
8. DO NOT install the 0.2 micron filter and bell assembly at this time.



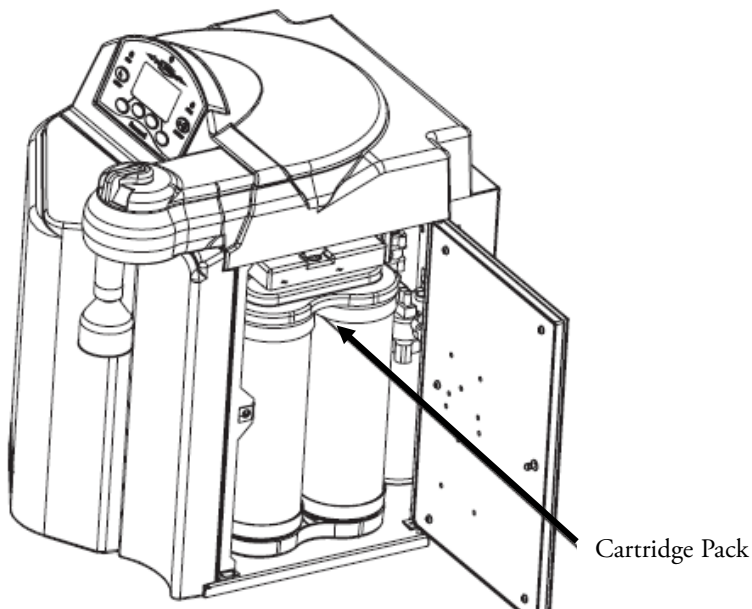


Figure 3-21. Cartridge Pack Installed

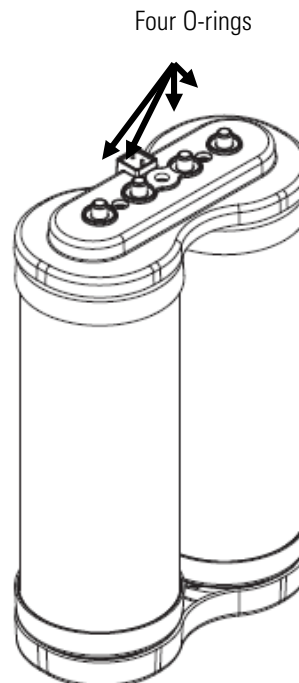


Figure 3-22. Dual Cartridge Pack

## Cartridge Pack Rinse-Up

1. If not already installed, install the hose barb into the fitting in the dispense valve.
2. Turn unit on STANDBY. The RO system will automatically turn ON, flush the RO membrane for 30 seconds, and then fill the reservoir. The reservoir needs at least three liters of RO water to perform the flush.
3. With at least three liters of water in the reservoir, turn unit on and from STANDBY press the START/STOP button to begin unit operation. NOTE: It may take another minute or two for the water to fill the new cartridge pack and begin flowing out the dispense valve.
4. Rinse approximately three liters of water through the dispense valve to drain.
5. Close the dispense valve.
6. Remove the hose barb from the dispense valve and proceed to the 0.2 Micron Final Filter Replacement section of this manual. Retain hose barb for future use.
7. Place unit in RUN mode until desired purity is achieved (>15 megohm-cm).

## Control Panel Wall Mount Bracket

For your convenience, the control panel can be removed from the unit and mounted at a convenient location within 10 ft. (3.1 m.) of the unit. To remove the control panel from the unit:

1. Turn the unit OFF and disconnect it from the power supply.
2. Slide the control panel upward about 1/4" (0.64cm) to 3/8" (0.95 cm) just enough to clear connector on top cover, pull forward, and remove. The control panel fits tightly in the unit so it may be difficult to remove.
3. Replace the control panel with the blank panel provided with the unit to protect the electrical connector as shown in Figure 3-24.
4. Using the display wall bracket as a template, locate and drill the mounting holes in the wall. A minimum of two (customer-supplied) fasteners will be required. Attach the wall bracket to the wall using the customer-supplied fasteners as shown in Figure 3-25.
5. Locate the 25-pin connector on the left side of the unit. Remove the protective cover and store it for future use if the control panel is returned to the top cover.
6. Locate the 10 ft. (3.1 m.) 25 pin M-F cable included with the unit; attach the male end to the 25 pin connector on the left side of the unit, and the other end to the connector on the bottom of the control panel.
7. Tighten the cable screws on each end to secure the cable to the unit and control panel.
8. The control panel may now be mounted on the wall.
9. An accessory bench mounting display bracket (AY1367X2) can be used. Contact Technical Services to order.



**Figure 3-23.** Control Panel Mounted in Remote Location

**Caution** Repeated removal and replacement of the control panel from the top cover may eventually cause it to become damaged. ▲



**Figure 3-24.** Blank Control Panel



**Figure 3-25.** Wall Mount Bracket

## Optional Accessories

Optional accessories for this unit include a standard remote dispenser, Accudispense volumetric remote dispenser, dispense overflow cutoff float and printer. For ordering information, refer to Ordering Information - TII Accessories. If you purchased a standard or Accudispense volumetric remote dispenser, refer to their respective operator's manuals for installation instructions.

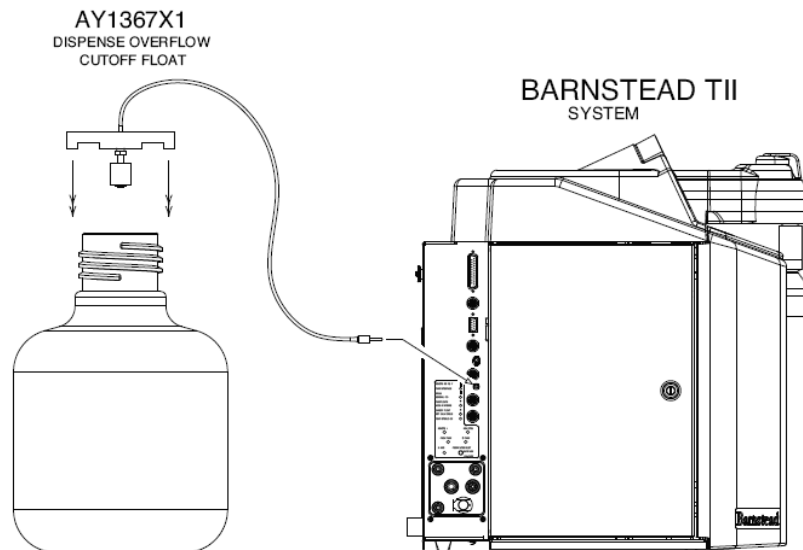
## Dispense Overflow Cutoff Float

The dispense overflow cutoff float (AY1367X1) ships with a 6 ft. [1.83 meter] cable and is designed as a user option to ensure automatic dispensers (time or volumetric) do not overflow carboy style containers. This accessory can be especially helpful if the actual volume of a container is unknown. It can also protect against overflows if the entered/stored volume of a previous container has not been changed and is set for a volume greater than the carboy being filled. Finally, the accessory can be useful for automatic time dispenses as it is usually difficult to ensure the set time will equal a specific volume of water. If the auto dispense is stopped by the overflow float, the Barnstead TII will change modes to normal recirculation.

1. Prior to initiating an automatic dispense (timed or volumetric), plug AY1367X1 into connector on the back left side of the Barnstead TII as shown in Figure 3-26.
2. Position carboy to be filled and place float assembly on open neck of carboy. Position float assembly such that it will not interfere with product water stream being dispensed into carboy.
3. Initiate Auto Dispense as described in the "Automatic Dispensing" section of this manual. If, during the auto dispense, the float is lifted by the rising water, the auto dispense will immediately be stopped and an error message will be displayed momentarily.

**Caution** This accessory is not intended for use with small containers as its weight could cause small, lightweight containers to tip over. ▲

## Dispense Overflow Cutoff Float (continued)



**Figure 3-26.** Dispense Overflow Cutoff Float

## Computer/Printer Setup

Connect Barnstead TII to a computer through the RS-232 port using hyperterminal or procomm.

### One Hyperterminal

#### RS-232 Capture Instructions

1. Connect the 9 pin serial cable (part no. WHX18) from the Barnstead TII RS-232 port on the back left side of the unit to (COM2:) port or (COM1:) port on back of computer.
2. Press MENU and use the up and down arrows until display reads, "SYSTEM OPTIONS."
3. Press OK.
4. From the "Printer Attached" display, press the up or down arrow for "NO".
5. Press OK.
6. Now, during the normal recirculation mode, date, time, purity and temperature readings will be sent to the computer once per minute.
7. Run your Microsoft Windows program. Open Hyperterminal (located in the accessories directory), give your setting a name and choose a symbol.

## One Hyperterminal (continued)

8. In the “Connect Using:” box, select (COM2:) or (COM1:), depending on your computer, and press OK.
9. Using the selection boxes in the next screen, configure the options as 9600 baud, 8-bit, No parity, 1 stop bit, Flow Control: None.
10. To receive data to a file, select Transfer and capture text. Accepting default will put the file which you name in the c:/windows directory called capture.txt and the file will be an ASCII text file.
11. You should see the data on the computer screen.
12. When you are finished storing data from the Barnstead TII, save your file. You can exit.
13. Hyperterminal or set up a new experiment.
14. Hyperterminal data can be manipulated and graphed in Excel®.

**Note** Due to character set differences, hyperterminal may display the  $\Omega$  symbol as  $\hat{e}$ . Also, the  $^{\circ}$  symbol may be displayed as  $\emptyset$ . ▲

## Procomm

1. Connect the 9 pin serial cable from the Barnstead TII RS-232 port on the back left side of the unit to (COM2:) port or (COM1:) port on back of computer.
2. Press MENU and use the up or down arrows until the display reads, “SYSTEM OPTIONS.”
3. Press OK.
4. From the “Printer Attached” display. Press the up or down arrows for “NO”.
5. Press OK.
6. The unit will now, during the normal Recirculation mode send a purity and temperature reading to the computer once per minute.
7. Open DOS window and change directory to procomm directory.
8. Open procomm executable.

## **Procomm (continued)**

9. Press ALT-F10 for configuration screen.
10. Enter into Line Settings screen by typing ALT-P.
11. Type in 11 <Enter>, sets parameters as 9600, 8, N, 1.
12. Type in 21 <Enter>, sets to (COM2:) or (Type in 20 <Enter>, sets to (COM1:), depending on your computer.
13. Type in 24 <Enter>, saves settings.
14. Press ESC to exit setup menu.
15. Procomm is now ready to accept input from the Barnstead TII.
16. To begin downloading a file, Type ALT-F1, and give the file an appropriate name when prompted.

The optional printer (part no. AY1137X1) provides a paper tape record for future reference. During normal recirculation, the printer prints date, time, purity and temperature readings once every minute.

## **Connecting and Starting the Printer**

1. Make sure the printer and Barnstead TII are turned OFF.
2. Connect the Barnstead TII to the printer via the RS232 port on the back left side of the unit. Use the tan printer cable included with the Epson printer. Plug the printer power cord into an electrical outlet.
3. Turn power on to the Barnstead TII and printer.
4. Press MENU and use the up or down arrows until display reads, "SYSTEM OPTIONS."
5. Press OK.
6. From the "Printer Attached" display, press the up or down arrow for "YES".
7. Press OK.
8. Press the BACK arrow twice to return to the STANDBY mode.
9. During normal recirculation mode, a purity and temperature reading will be printed once every 12 minutes.



## Section 4 Using Your TII

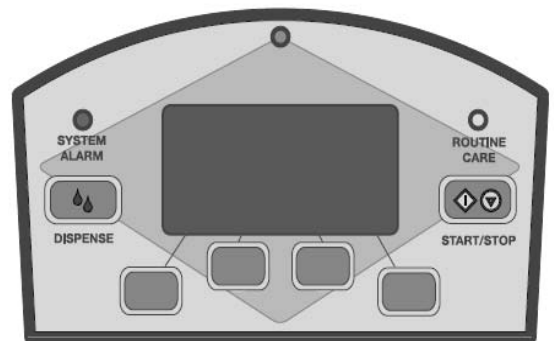
### Normal Operation

1. Turn the system power ON by depressing the main power switch to the “I” position.
2. The system electronics will initialize and check its calibration. All units have been factory calibrated.
3. The unit will enter STANDBY mode.
4. From STANDBY, press the START/STOP switch on the control panel to enter the RUN mode. The unit’s RO pump will begin to run.
5. The display will then begin reading resistivity of the system product water. Initially, it will read “PROCESSING” while the DI meter is initializing. The DI section will not operate until the tank is 25% full.
6. Allow the water’s resistivity to rise to the desired purity before dispensing water.
7. The system should be left in RUN during the workday.
8. If the Barnstead TII is to be shut down for an extended period of time, the unit should be completely drained and the cartridges and membrane(s) removed and refrigerated to prevent the growth of bacteria.

### Control Panel

The Barnstead TII is controlled through a panel that incorporates buttons to control its functions. This control panel utilizes a graphical display to show system information and the purity of the product water. The intensity of the display may be adjusted according to user preference. Refer to “Setting System Options.”

**Warning** Do not use in the presence of flammable or combustible materials; fire or explosion may result. This device contains components that may ignite such materials.



**Figure 4-1.** Barnstead TII Control Panel



## **LED System Lights**

Three LED's located on the control panel will illuminate to inform you of the system status as follows:

- Green LED (top center of the display):  
  
Solid ON -system is running  
  
Blinking -system is in STANDBY
- Red “System Alarm” LED:  
  
Solid ON - Something in the system is causing an error and must be corrected. To diagnose, press MENU and select System Alarm.
- Yellow “Routine Care” LED:  
  
No error exists, but care of product is recommended at this time. To diagnose, press MENU and select Routine Care.

The control panel can be removed from the unit and remotely mounted. Please refer to “Installing the Control Panel in a Remote Location” in the “Installation” section of this manual for more information about how to remove the control panel from the unit.

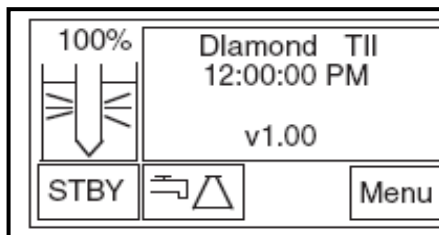
## **Buttons**

When the main power switch is on, the buttons on the control panel function as follows:

1. START/STOP – When the unit is in the IDLE Mode or STANDBY Mode, pressing the START/STOP switch will put the DI operation of the unit in the RUN Mode, turning the DI pump and UV lamp on if the water level in the reservoir is above 25%. The RO operation will automatically turn on in RUN Mode to fill the reservoir as needed. When the unit is in the RUN Mode pressing the START/STOP switch will put the DI and RO operation of the unit into the Idle Mode. When the unit is in any of the flush or auto dispense modes, pressing the START/STOP switch will return the unit to the mode it was in prior to initiating a flush.
2. DISPENSE – Allows you to automatically deliver water from the unit. Refer to “Automatic Dispensing” in the “User Settings” section of this manual for more information. Four blank buttons appear on the control panel and perform various functions as defined on the display throughout operation. See the “Operation” section for more detailed descriptions.

## Idle Mode

When the unit is first powered on, it will be placed in IDLE mode. IDLE mode indicates the unit is powered and waiting to be placed into STANDBY by pressing the STBY button, or placed in RUN by pressing the START/STOP button.



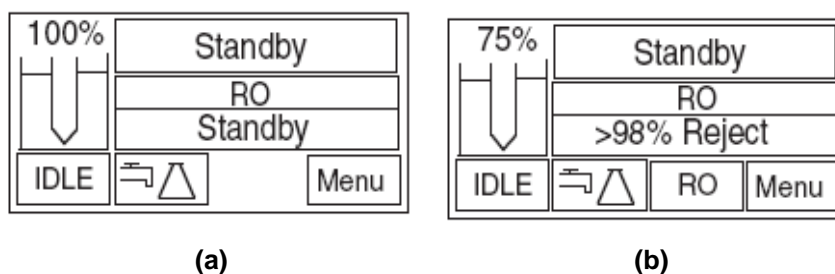
**Figure 4-2.** Idle Mode Screen

**Note** Do not put unit into IDLE mode or turn off the Barnstead TII during non-work hours. Doing so will allow bacterial growth and other contamination of the water in the system. As a result, the system will require a lengthy rinse-up period at the beginning of the workday to achieve high-quality product water. ▲

## DI Run Mode

In RUN mode, the pump recirculates water through the cartridges and the UV lamp. It is recommended that the Barnstead TII be left in RUN mode during the day. In RUN mode, the purity meter display indicates the resistivity (temperature compensated to 25°C) of the water available for dispensing.

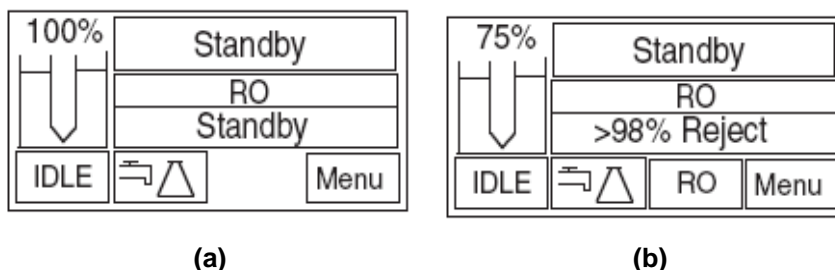
1. From IDLE or STANDBY, press the START/STOP button to put the unit in RUN mode. The Barnstead TII's pump will begin to run and display the purity of the product water if the water level is above 25%.
2. Allow the water's purity to rise to the desired level before dispensing water. Also, in the RUN mode, the RO operation automatically turns on to fill the reservoir as needed. When the reservoir is full, the RO system will automatically return to STANDBY.



**Figure 4-3.** DI Run Mode Screens - a) DI system in Run and RO system in Standby, b) RO and DI systems both in Run.

## DI Standby Mode

In STANDBY Mode, the DI pump will operate for ten minutes out of every hour (i.e 50 minutes off, 10 minutes on). Every fourth time that the pump turns on, the UV lamp will also turn on for 10 minutes (i.e 3 hours 50 minutes off, 10 minutes on). This will allow the unit to produce high quality water quickly upon being placed in the RUN Mode. It is recommended that the Barnstead TII be placed in STANDBY mode during non-work hours. At the end of the work day, press the STANDBY switch to place the unit in STANDBY mode. Also, in STANDBY mode, the RO operation automatically turns on to fill the reservoir as needed, and the RO system returns to STANDBY once the reservoir is filled.



**Figure 4-4.** DI Standby Mode Screens - a) DI and RO systems both in Standby, b) DI system in Standby and RO system in Run.

**Note** Each time the RO system automatically turns ON, in RUN or STANDBY mode, the RO membrane will flush water to the drain for 30 seconds prior to filling the reservoir. ▲

**Note** If the unit is in STANDBY and power to the unit is turned off or lost, the unit will return to STANDBY once power is restored. ▲

## Automatic Flush (RO Membrane)

In the Standby Mode, the Barnstead TII will initiate a four minute automatic flush of the RO membrane once every three hours and fifty-six minutes of operation. This prevents buildup on the RO membrane. A timer in the Barnstead TII counts the hours power is applied to the unit. When the timer reaches three hours and fifty-six minutes, the Barnstead TII initiates a four minute flush if the unit is in the RUN or STANDBY Modes. If the unit is in IDLE, the automatic flush will occur immediately after the START/STOP switch is pressed and RUN Mode entered. The timer will reset to zero when the four minute automatic flush is completed.

**Note** Press the START/STOP switch to cancel a flush. ▲

## Manual Flush (RO Membrane)

A four minute manual flush of the RO membrane can be initiated through the RO Options in the MENU. During the four minute flush, water is sent to drain through the drain tubing and the display will show remaining minutes. After the timed flush has ended, the Barnstead TII will return to the mode (IDLE, RUN or STBY) it was in when you initiated the flush. To initiate a flush:

1. Choose MENU and scroll to RO Options. Press OK.
2. Choose Manual Flush and press OK.

## Dispensing Water

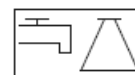
Use the dispense knob for manual dispensing or press the DISPENSE switch for volumetric or timed dispensing.

## Automatic Dispensing

This feature is accessible from any screen when the volumetric dispensing icon is an available switch.

**Note** When “UNIT UNDER COUNTER” is set to “ON,” Auto Dispense will not be available from the main unit dispenser although the manual dispense knob will work. Volumetric dispensing is based upon total fluid volume entering the Barnstead TII. Point of dispensing accuracy will be compromised if you are dispensing water volumetrically while simultaneously dispensing water manually through the remote dispenser accessory. Once Volumetric or Timed Dispensing values are set, they will remain in memory until changed by the user. To turn the dispense method OFF, select “OFF” in the “Dispense Method” menu. ▲

1. Place a container under the dispenser.



2. Press the volumetric dispensing icon.

The screen will show current settings for Remote Volumetric, Unit Volumetric, Timed Dispense or OFF. Press MODE to choose setting and use the up and down arrows to set volume or time.

3. Press DISPENSE.

## Timed Dispensing

UP arrow: . . . . . Increments by 5 minutes  
DOWN arrow: . . . . . Decrement by 1 minute  
Maximum: . . . . . 30 or 60 minutes depending on reservoir volume  
Minimum: . . . . . 1 minute

## Volumetric Dispensing

UP arrow . . . . . 250ml up to 1 liter, then increments of 5L  
DOWN arrow . . . Decrement by 250 ml up to 1L, then decrement by 1L  
Maximum . . . . . 30L or 60L depending on reservoir volume  
Minimum: . . . . . 250 ml

## Reservoir Replenishment

If the water level is below 75%, the external reservoir will begin automatically refilling in either RUN mode or STANDBY mode by the self-contained RO system. The water level in the reservoir is determined by internal sensors in the reservoir. Once the water level fills up to the full level, the RO system will enter STANDBY mode.

**Note** When the RO operation is automatically turned on, RO water will be put into the reservoir. Anytime the RO purity falls below the user-selected % rejection setting, the System Alarm LED will illuminate. ▲

## Setting the Displayed Languages

1. Upon power up, press any of the four buttons below the display when the display shows LANGUAGE.”
2. Press the UP or DOWN arrow to select the language desired and press OK.

## Setting the Time and Date

1. Press MENU and scroll to the SET TIME screen and press OK. Using the arrow keys, select time and press OK.
2. Scroll to the SET DATE screen and press OK. Using the arrow keys, select date and press OK.

**Note** Time format is 12 hour, and date format is day/month/year. ▲

## Setting the Low Product Purity Alarm

The Low Product Purity Alarm monitors the purity of the product water at the system dispense point. The alarm is adjustable from 1.0 MΩ-cm (1.0μS/cm) to 15.0 MΩ-cm (0.067μS/cm), the factory default is 1.0 MΩ-cm. To adjust the alarm:

1. Press MENU. Scroll to DI Options and choose Purity Alarm.
2. Use the up and down arrows to set the low alarm. Press OK to accept settings.

The alarm will alert the user when the product purity falls below the product purity alarm level by illuminating the SYSTEM ALARM LED, but does not shut the unit off. See details by pressing MENU and choosing System Alarm. See the “Error Conditions” section later in this manual to interpret the error.

## Setting the RO % Reject Alarm

The RO % Reject Alarm monitors RO membrane performance and can be set between 65% and 90% reject. Factory default is 75%. To adjust the alarm:

1. Press MENU. Scroll to RO Options and choose Low Reject Alarm.
2. Use the up and down arrows to set the low alarm. Press OK to accept settings.

The alarm will alert the user when the RO % reject falls below the % reject alarm level by illuminating the SYSTEM ALARM LED. See details by pressing MENU and choosing System Alarm. See the “Error Conditions” section later in this manual to interpret the error.

## Setting the Feedwater Chlorine Level

To ensure that the RO membrane(s) in the Barnstead TII are not damaged by free chlorine in the feed water, the system electronically tracks the amount of chlorine processed by the carbon prefilter (D502115) and alerts the user when the carbon capacity is exhausted. There are three selectable levels of free chlorine content; the factory default is the highest level (>1.41). If you know the free chlorine level of your feed water supply, you can set this level through the Barnstead TII menu:

1. Press MENU. Scroll to RO Options and choose Chlorine Level.
2. Use the up and down arrows to set the appropriate chlorine level in ppm. Press OK to accept settings.

If you do not know the free chlorine level of your feed water, the setting should be left at the factory default highest level (>1.41) to avoid damage to the RO membrane(s).

## Setting System Options

See procedures in the table below to choose system options. Setting up the Auto Standby is highly recommended.

Options	Procedure
Auto Standby	MENU → SYSTEM OPTIONS → AUTO STANDBY → AUTO STANDBY STATE → Choose ON or OFF → OK → Scroll to and enter RUN mode → OK → Scroll to and enter STANDBY mode → OK
Unit Under Counter	MENU → SYSTEM OPTIONS → UNIT UNDER COUNTER → Choose ON or OFF → OK
Display Contrast	MENU → SYSTEM OPTIONS → DISPLAY CONTRAST → Adjust up and down to desired contrast → OK
Set Units	MENU → SYSTEM OPTIONS → DI UNITS, RO UNITS or PRESSURE UNITS → Choose desired units → OK
Printer Attached	MENU → SYSTEM OPTIONS → PRINTER ATTACHED → Choose YES or NO → OK
Reservoir Type	MENU → SYSTEM OPTIONS → RESERVOIR TYPE → Choose DIAMOND TII or ALTERNATE → OK

### Auto Standby Timer

The AUTO STANDBY Timer can be set so that the unit will automatically be placed in STANDBY and come back out of STANDBY and be placed into RUN mode at a specific time each day.

### Unit Under Counter (Factory set to "OFF")

This option will lock out any type of automatic dispense out of the unit (Accudispense accessory D13661 will still operate normally.) This will prevent accidental dispensing from the unit if it is located under a counter or similar area such that the unit dispenser is not in site of the user but the display is (i.e. remote mounted display.)

**Note** When "UNIT UNDER COUNTER" is set to "ON," Auto Dispense will not be available from the main unit dispenser, though the manual dispense knob is still operational. ▲

### Display Contrast

The Barnstead TII display can be adjusted based on user preference.

**Set Units** The Barnstead TII can display readings in a variety of units. Use this option to set desired units.

**Printer Attached** The Barnstead TII can print readings to an optional printer accessory (AY1137X1).

**Reservoir Type** The Barnstead TII has been designed to interface with the Barnstead TII storage reservoir, as well as other reservoirs. If a reservoir other than a Barnstead TII storage reservoir will be used, the Reservoir Type must be set to “Alternate.” This will configure the Barnstead TII system to communicate with two floats, 1 medium and 1 high. The float configuration must be configured with the bottom float (medium) NORMALLY CLOSED – makes contact when there is no water in the tank – and the top float (high) NORMALLY OPEN – does not make contact when there is no water in the tank.

- Bottom float closed and top float open – “LOW”
- Bottom float open and top float open – “MED”
- Bottom float open and top float closed – “HIGH”
- Bottom float closed and top float closed – “Alt Res Float Err”

Optional accessories AY1403X2, AY1403X4 and AY1403X5 are available for connecting alternate reservoirs to the Barnstead TII. Contact Technical Services for connection details.

## **Connecting TII to NANOpure System**

See the instruction manual for the Barnstead TII storage reservoir to connect the reservoir to both the TII and the Nanopure system.





## Section 5 Maintenance and Servicing

Clean the exterior of the unit by wiping surfaces with a lightly dampened cloth containing a mild soap solution. Rinse and wipe dry.

### Prefilter Replacement

The prefilter is designed to remove particles from your incoming water source. The lifetime of the filter depends on the quality of the feed water. If a pressure drop is detected by the unit, the display will alert the user to replace prefilter. All pressure sensor data can be obtained in the RO Options screen. The pressure differential represents the difference between the prefilter inlet pressure and the prefilter outlet pressure.

Before replacing the prefilter, ensure that all power and water are disconnected from the unit.

1. Open the front left door.
2. Remove the prefilter (see Fig. 8) by first pressing the upper and lower thumb buttons on the quick disconnect fittings.
3. Remove the prefilter by pulling the cartridge straight out.
4. Replace the prefilter by following the instructions located in the “Prefilter Installation” section of this manual.
5. Reset the prefilter timer by following the “Timers” section of this manual.

## MPS Replacement

The MPS cartridge incorporated in your Barnstead TII is designed to prevent scale buildup on the membrane(s). This cartridge must be replaced when the anti-scalant level is approximately half dissolved. At this point, the quantity of anti-scalant entering the water is insufficient to effectively prevent scale accumulation on the membrane(s). Before replacing the MPS cartridge, ensure that all power and water are disconnected from the unit.

1. Open the front left door (Figure 5-1).
2. Remove the MPS cartridge by pressing the upper and lower thumb buttons on the quick disconnect fittings.
3. Remove the MPS cartridge by pulling the cartridge straight out.
4. Replace the MPS cartridge by following the instructions located in the “MPS Cartridge Installation” section of this manual.



**Figure 5-1.** Cartridge Installation:(left to right) prefilter, MPS, and carbon

## Carbon Replacement

The carbon filter incorporated in your Barnstead TII provides a combination of filtration and chlorine removal. There is a timer built into the Barnstead TII which will alert you when the carbon requires replacement. When the “Routine Care” light illuminates the carbon filter may need to be replaced.

To find out the reason for the lit LED, choose MENU, scrolling to the “Routine Care” screen. Before replacing the carbon filter, ensure that all power and water are disconnected from the unit.

1. Open the front left door (Figure 5-1).
2. Remove the carbon filter by first pressing the upper and lower thumb buttons on the quick disconnect fittings.
3. Remove the carbon filter by pulling the cartridge straight out.
4. Replace the carbon filter by following the instructions located in the “Carbon Filter Installation” section of this manual.
5. Reset the carbon timer by following “Timers” section of this manual.

## Cartridge Pack Replacement

The frequency with which you will need to clean your unit and replace your cartridge pack is dependent on your feed water's characteristics, your purity requirements and your usage. Clean your Barnstead TII and replace the cartridge pack when the product water purity drops below acceptable levels of resistivity, when organic levels become too high, or if a new 0.2 micron filter clogs rapidly after installation even though the cartridge pack was thoroughly rinsed before the 0.2 micron filter was installed.

The simple-to-use cleaning block is available (Catalog No. BK1403X2). This is used to effect a complete cleaning.

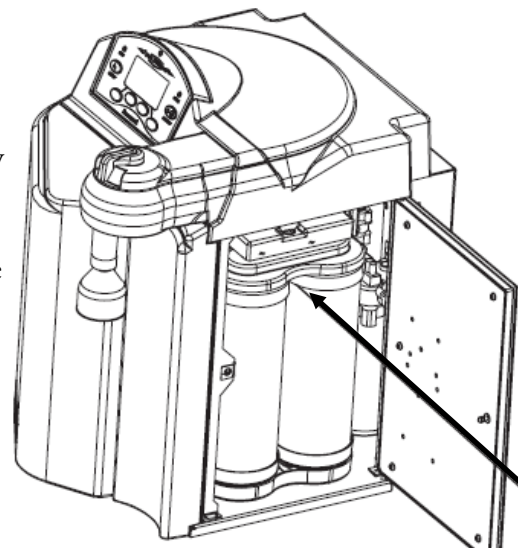
1. Turn off the Barnstead TII and disconnect it from the power supply.

2. Open the right side door (Figure 5-2).

3. Loosen the wing head screw on the cartridge manifold.

4. Remove exhausted cartridge pack by lifting the unit manifold and pulling the cartridge pack out.

5. Clean the system per the instructions in System Cleaning Procedure of this manual.



**Figure 5-2.** Cartridge Pack Installed

6. Install new cartridge pack according to the instructions in the "Installation" section.

7. Reset the cartridge pack timer by following the "Timers" section of this manual.

8. Proceed to "Cartridge Pack Rinse Up" in the "Operation" section of this manual.

## Membrane Replacement

It is recommended to replace RO carbon prefilter when replacing the RO membrane. Refer to the “Carbon Filter Installation” section of this manual.

1. Turn off the Barnstead TII and disconnect it from the power supply.
2. Disconnect inlet feed water connection.
3. Locate the RO membrane(s) inside the left door (see Fig. 9).
4. Remove the old membrane(s) by disconnecting the reject and product tubing from the top of the membrane and the feed water connection from the bottom. See “Water Connection Details” for tubing removal instructions.
5. Install new membranes per the “RO Membrane Installation” section of this manual.
6. Reattach power cord and feed water supply.
7. Reset the membrane timer by following the “Timers” section of this manual.
8. Proceed per “Membrane Rinse Up” section earlier in this manual.

## Micron Final Filter Replacement

Replace the 0.2 micron final filter whenever any of the following conditions occur: the product water flow rate is reduced, when you experience bacteria break through, when cartridges are replaced, or when system is sanitized. The 0.2 micron final filter is shipped assembled with a bell. To replace the 0.2 micron final filter assembly:

1. Remove the old 0.2 micron final filter assembly by turning it to the left to unscrew it from the dispense valve.
2. Remove the new 0.2 micron final filter assembly from its bag and insert it into the dispense valve. Gently tighten, turning the filter to the right.
3. Open the dispense valve and flush at least 3 liters of water through the 0.2 micron final filter.

**Note** It is suggested that PTFE tape be applied to the threads of the 0.2 micron final filter to ensure a tight seal. ▲

## Fuse Replacement

1. Turn off the Barnstead TII and disconnect it from the power supply.
2. Pull out the fuse drawer located in the power entry module.
3. Remove old fuses and replace with fuses of the same type and rating. (See Replacement Parts section.)
4. Replace fuse drawer.
5. Reconnect the unit to the power supply.
6. Operate normally.

## UV Lamp Replacement

The ultraviolet lamp requires periodic replacement. Lamp life will vary according to the number of times the Barnstead TII is turned on and off. Lamp life is based on the Barnstead TII being operated in the normal recirculating mode during regular working hours and then placed in the Standby mode during off hours. Every fourth time the pump goes on in the Standby mode, the UV light will go on. If the Barnstead TII is cycled between the RUN and STANDBY modes during the workday, this will result in a shorter lamp life. Therefore, it is recommended that the Barnstead TII be left in the normal RUN mode during regular working hours.

To replace the UV lamp, see “UV Lamp Installation” procedure in this manual.

**Note** When lamp is burned out or disconnected, the System Alarm LED will illuminate. Press MENU and scroll to System Alarm for details. ▲

## Resetting Routine Timers

Procedures to reset all routine timers follow.

### Prefilter, MPS, Carbon, Membrane, Pack Timers

These timers record service time to ensure the reliability and to reduce the risk of bacterial contamination. The Prefilter, MPS, Carbon, Membrane and Cartridge Pack Timers must all be reset prior to initial operation and after cartridge replacement. See “Routine Care Alerts” for more details.

## Reservoir Vent Timers

The Reservoir Vent Timer will alert the user when the reservoir vent filtering capacity has expired, six months from initial use or when the timer has been reset. The user must reset the Reservoir Vent Timer each time the Ventgard filter element (25001-DB) is replaced.

## System UV Timer

The user must reset the System UV Timer each time the UV lamp in the Barnstead TII is replaced. This will reset the UV timer for approximately six months calendar time.

## Reservoir UV Timer

The user must reset the UV Timer each time the UV lamp in the Barnstead TII storage reservoir is replaced. This will reset the UV timer for approximately one year calendar time.

## Sanitization Timer

The Cleaning Timer will automatically reset itself after a successful cleaning procedure. If the user decides to manually reset the cleaning timer, follow procedure in table below. This will reset the cleaning timer for approximately one year calendar time.

## Procedures to Reset Routine Timers

Timer	Procedure
Prefilter Timer	MENU → TIMERS → PREFILTER → [Display shows time remaining in days] RESET → Are you sure? → YES/NO
MPS Timer	MENU → TIMERS → MPS → [Display shows time remaining in days] RESET → Are you sure? → YES/NO
Carbon Timer	MENU → TIMERS → CARBON → [Display shows time remaining in days] RESET → Are you sure? → YES/NO
Reservoir Vent Timer	MENU → TIMERS → RESERVOIR VENT → [Display shows time remaining in days] RESET → Are you sure? → YES/NO
Membranes Timer	MENU → TIMERS → MEMBRANES → [Display shows time remaining in days] RESET → Are you sure? → YES/NO
Cartridge Pack Timer	MENU → TIMERS → CARTRIDGE PACK → [Display shows time remaining in days] RESET → Are you sure? → YES/NO
System UV Timer	MENU → TIMERS → SYSTEM UV → [Display shows time remaining in days] RESET → Are you sure? → YES/NO
Reservoir UV Timer	MENU → TIMERS → RESERVOIR UV → [Display shows time remaining in days] RESET → Are you sure? → YES/NO
System Sanitization (Cleaning) Timer	MENU → TIMERS → SANITIZATION → [Display shows time remaining in days] RESET → Are you sure? → YES/NO

## Troubleshooting

Message	Possible Causes	Action
Barnstead TII completely inactive (pump and display not operating.)	No electrical power to Barnstead TII.	Ensure Barnstead TII power cord is connected to a live power source and completely plugged into electrical outlet as well as power entry module on the unit. Make sure on/off switch is in the "I" (on) position.
	Main fuse(s) blown.	Replace the main fuse(s) as indicated in "Fuse Replacement."
	Display not connected or remote display cable is loose.	Check display connection.
	Power supply fuse blown	Contact Technical Services concerning power supply fuse replacement.
RO system is operating but no water is exiting out the atmospheric drain connection.	Flush solenoid plugged.	Perform a system flush.
	No water to unit.	Check the water supply and connection.
Increase in time required to replenish reservoir.	Membranes fouled.	Check % rejection rate. Replace membranes.
	Low feed water pressure.	Verify feed water pressure is 30 psi minimum.
	Decrease in feed water temperature.	Install a hot water mixing valve (D7427) in the feed water line.
Short DI cartridge pack life.	Cartridge pack is beyond expiration date.	Check the expiration date. Cartridge packs begin to lose capacity after being stored for 2 years from the date of manufacture. Replace the cartridge pack with an unexpired one.
	Poor quality feed water.	Check that RO membrane(s) is functioning properly.
	Water usage is too high.	Request H2O Select kit to test tap water.



## Troubleshooting (continued)

Message	Possible Causes	Action
Water is leaking between the manifold and the cartridge pack.	Wing head screw is not tight enough.	Hand-tighten wing head screw on unit manifold.
	New cartridge pack: o-ring missing from post (each of the 4 posts must contain an o-ring.)	Turn off power to system. Disconnect quick connect fitting in tube from reservoir. Disconnect the manifold and verify/replace missing o-ring. Reinstall cartridge pack as indicated in "Cartridge Pack Replacement."
Leaks at membrane, drain connections, tank connections, or remote connections.	Burrs on tubing.	Remove tubing as shown in "Tubing Removal." Check tubing for burrs.
	Tubing not installed in fitting completely.	Mark tubing and re-install per "Tubing Installation."
Reduced or no product flow from the dispense arm or remote dispenser, if attached (low DI dispense flow).	Plugged 0.2 micron final filter.	Replace final filter (Part no. D3750) as indicated in "0.2 Micron Filter Replacement" section.
	Reservoir not connected.	Reconnect reservoir. Ensure quick connect fitting in tube from reservoir is fully engaged.
	Reservoir improperly located too low.	Verify reservoir outlet is located at or above system inlet.
	DI pump not functioning.	Replace pump (Part no. PU1190X1)
	Pinched tubing.	Check tubing inside system and between reservoir and system.
	Air purge not complete.	Allow up to 24 hours of recirculation for purging all air from the fluid path.

## System Alarms and Errors

If an error occurs in the Barnstead TII system, the System Alarm LED will illuminate and an error message will appear on the display.

Message	Possible Causes	Action
Res Interface Error (12C comm)	Reservoir interface cable not attached at both ends.	Check cable connections.
	Interface board not connected.	Check cable connection to control board.
	Interface board, control board, or reservoir board out of tolerance.	Replace board (PC1403X2, PC1403X3, PC1406X1, or PC1406X2.)
	Alternate reservoir in use.	Using Barnstead TII menu screens, set reservoir type to "Alternate" (in "System Options").
TII Res Float Err	Float cable not securely connected.	Check float cable connection.
	Float not operating correctly.	Check float operation.
	Floats not wired correctly.	Check float wiring.
	Floats not installed correctly.	Check float installation.
	Alternate reservoir in use.	Using Barnstead TII menu screens, set reservoir type to "Alternate" (in "System Options").
Alt Res Float Err	Float cable not securely connected.	Check float cable connection.
	Float not operating correctly.	Check float operation.
	Floats not wired correctly.	Check float wiring.
	Floats not installed correctly.	Check float installation.
	Barnstead TII reservoir in use.	Using Barnstead TII menu screens, set reservoir type to "Barnstead TII" (in "System Options"). Ensure interface connector is securely connected to the Barnstead TII and the Barnstead TII storage reservoir.

## System Alarms and Errors (continued)

Message	Possible Causes	Action
Purity Meter Error	Control board out of tolerance.	Replace control board (PC1403X3).
Meter Check Failed	Meter on control board out of calibration.	Calibrate meter using NIST module.
	Meter on control board out of tolerance.	Replace control board (PC1403X3). Follow the enclosed calibration instructions.
DI Temp Error	Resistivity cell not connected to board.	Check resistivity cell lead connection on board.
	Resistivity cell temperature sensor out of tolerance.	Replace resistivity cell (E1403X6).
	Reservoir water temperature outside of allowable range.	Check the temperature of the storage reservoir water.
	Control board out of tolerance.	Replace control board (PC1403X3).
	Check cell tolerance	Ensure that reading on tag agrees with reading in software.
Low DI	Cartridge pack near exhaustion.	Install a new cartridge pack (D502137) and reset timer.
	Cartridge pack not in place (sanitization block installed?).	Check that cartridge pack is installed.
	DI cell out of tolerance.	Replace resistivity cell (E1403X6).
	DI meter on control board out of tolerance.	Replace control board (PC1403X3).
	Check cell tolerance	Ensure that reading on tag agrees with reading in software.
DI Over-range	Air in system.	Allow system to recirculate to purge air and look for possible suction leak.
	Resistivity cell not connected to control board.	Check resistivity cell lead connections on control board.
	Resistivity cell out of tolerance.	Replace resistivity cell (E1403X6).
	Check cell tolerance	Ensure that reading on tag agrees with reading in software.

## System Alarms and Errors (continued)

Message	Possible Causes	Action
RO Temp Error	RTD not connected to board.	Check RTD connection.
	RTD out of tolerance.	Replace RTD (RSX432).
	Feed water temperature outside of allowable range.	Check feed water temperature.
	Control board out of tolerance.	Replace control board (PC1403X3).
	Check cell tolerance	Ensure that reading on tag agrees with reading in software.
High RO Feed Purity	Improper feed water (unit being fed pretreated water).	Analyze feed water - check that system is being used for correct application.
	RO feed cell not connected to control board.	Check connection of feed cell.
	Feed cell fouled or out of tolerance.	Replace RO feed cell (E1403X7).
	Check cell tolerance	Ensure that reading on tag agrees with reading in software.
High RO Prod Purity	RO product cell not connected to control board.	Check connection of product cell.
	Product cell fouled or out of tolerance.	Replace RO product cell (E1403X7).
	Check cell tolerance	Ensure that reading on tag agrees with reading in software.
Low RO Purity	RO membranes are fouled.	Replace RO membrane(s) (FL1265X1).
	RO cell connections to control board are unplugged.	Check connections.
	RO cells are fouled or out of tolerance.	Replace RO cells (E1403X7).
	Check cell tolerance	Ensure that reading on tag agrees with reading in software.

## System Alarms and Errors (continued)

Message	Possible Causes	Action
Inlet Solenoid Err	No inlet water supply.	Check inlet water connection. Ensure feed water is turned on.
	Inlet solenoid not connected to board or connected improperly.	Check connection.
	Inlet solenoid not functioning.	Replace inlet solenoid (RY1265X2).
	Regulator not functioning properly.	Replace regulator (PM1403X1).
Pressure Sensor Er1	Pressure sensor not connected to board, or improperly connected.	Check connection.
	Pressure sensor not functioning.	Replace pressure sensor(s) (TD1403X1) and recalibrate.
	Check calibration tag	Ensure that reading on tag agrees with reading in software.
Pressure Sensor Er2	Pressure sensor not connected to board, or improperly connected.	Check connection.
	Pressure sensor not functioning.	Replace pressure sensor(s) (TD1403X1) and recalibrate.
	Possible leak, prefilter installed incorrectly or faulty prefilter.	Check for water spillage. If none, check installation of pre-filter or replace prefilter (D502113) if necessary.
	Prefilter and membrane pressure sensors not connected to control board or improperly connected.	Check connections.
	Check calibration tag.	Ensure that reading on tag agrees with reading in software.
Pressure Sensor Er3	Pressure sensor not connected to board or improperly connected.	Check connection.
	Pressure sensor not functioning.	Replace pressure sensor(s) (TD1403X1) and recalibrate.
	Possible leak, or MPS or carbon filter installed incorrectly or faulty.	Check for water spillage. If none, check installation of MPS (D502114) and carbon filter (D502115)
	Check calibration tag.	Ensure that reading on tag agrees with reading in software.

## System Alarms and Errors (continued)

Message	Possible Causes	Action
Low Memb Pressure	MPS (D502114) or carbon cartridge (D502115) is plugged.	Move cartridge to first position and check pressure. Replace cartridge and reset timer.
	Membrane failure or incorrect installation.	Check membrane connections; replace membrane(s) (FL1265X1) if necessary.
	Membrane pressure transducer out of calibration.	Recalibrate membrane pressure transducer.
	RO pump failure.	Replace RO pump (PU1190X1).
	Reject solenoid out of calibration or stuck open.	Perform manual flush. If error persists, replace solenoid (RY1265X1).
Check UV interlock (Reservoir UV)	Reservoir UV cover not in place.	Recheck UV cover position.
	UV interlock actuator or sensor out of position.	Check that the actuator is attached to the cover and the sensor is mounted to reservoir.
	UV interlock cable not connected.	Check cable connections at the reservoir circuit board.
	UV interlock sensor not functioning.	Replace interlock sensor (SW1406X1 for 30L, or SW1407X1 for 60L).
Check Res UV	Reservoir UV lamp cable not plugged in.	Plug reservoir UV lamp cable into control board.
	Reservoir UV lamp burnt out or inadequate UV output.	Replace reservoir UV lamp (LMX31) and reset timer.
	Reservoir UV lamp not properly connected to UV cable connector.	Check connection to UV cover and inside UV cover.
Check Res Ballast	Reservoir UV ballast out of tolerance.	Replace ballast (TN1406X1). Call Technical Services.
Check System UV (TII UV)	System UV lamp cable not plugged into control board.	Plug system UV lamp cable into control board.
	System UV lamp burnt out or inadequate UV output.	Replace system UV lamp (LMX13), and reset timer.
	Chamber seal is compromised and system UV lamp is getting wet.	Replace quartz sleeve and o-rings (TU733X1 and GSX62)
	System UV lamp not properly connected to UV cable connector.	Check connection at UV chamber.

## System Alarms and Errors (continued)

Message	Possible causes	Action
Chk System Ballast	System UV ballast out of tolerance.	Replace system ballast (TN1403X1). Call Technical Services.
Flow Sensor Error	Check tank level.	Tank must be filled 25% or higher.
	No water flow to DI loop.	Check reservoir connections. Check for air lock at DI pump.
	Pinched tube preventing water flow through DI loop (no water is being dispensed).	Check tubing and repair as necessary.
	Flow sensor not connected to control board or connection is bad.	Check connection.
	Flow sensor failure.	Replace sensor (ME1190X1).
	Has the tank been emptied and refilled?	Possible air in the line, allow the unit to sit for several hours in RUN mode to allow lines to refill.
Insufficient Volume (second line will display what portion of the requested auto-dispense remains)	Insufficient water volume in reservoir to complete the requested auto-dispense. This could be the result of insufficient reservoir volume at start of dispense, or other drainage of reservoir (manual dispense from spigot, or dispense from distribution loop) during auto dispense.	Wait for reservoir to sufficiently refill, then reprogram auto dispense for remaining volume or time and complete the dispense.
Unit will not finish Sanitization mode	Float switch(s) aren't registering	Make sure float switches are registering on the display.
	Pre-filter, MPS, and/or carbon cartridges are not connected.	Check to see if the pre-filter, MPS, and/or carbon cartridges are connected.
Tank indicator reading is in liters instead of %.	Float switch connection is interrupted	Make sure the float switch connector is inserted all the way into the receiver in the TII.
I2C error	Display remoted from unit.	Error can occur if display is remoted. Information error only, press any key or turn unit off/on to clear.

## Routine Care Alerts

**Note** When the Routine Care light is illuminated, you will need to scroll down the list of message errors to determine which routine alert error is signaling. ▲

Message	Possible Causes	Action
Replace Carbon	Chlorine capacity of the carbonpre-filter has been reached, or 1 year service life has expired.	Replace Carbon Prefilter (D502115) and reset carbon prefilter timer.
Check Prefilter	System has sensed that the prefilter is plugged.	Replace the RO Prefilter (D502113) and reset prefilter timer.
Replace Prefilter	1 year service life of the prefilter has expired.	Replace the RO Prefilter (D502113) and reset the pre-filter timer.
Replace Membrane	1 year service life of the membrane(s) has expired.	Replace the RO membrane(s)(FLX1265X1) and reset the membrane timer.
Replace Res Filter	6 month service life of vent filter has expired.	Replace vent filter element (25001) and reset the vent filter timer.
Replace MPS Cart	1 year service life of the MPS cartridge has expired.	Replace the MPS cartridge (D502114) and reset the MPS cartridge timer.
Replace DI Pack	1 year service life of the cartridge pack has expired.	Sanitize the system, replace the cartridge pack (D502137), and reset the sanitization and cartridge pack timers.
Replace System UV	6 month peak service life of the system UV lamp has expired.	Replace the system UV lamp (LMX13) and reset the system UV lamp timer.
Replace Res UV	1 year peak service life of the system UV lamp has expired.	Replace reservoir UV lamp (LMX31) and reset reservoir UV lamp timer.
Sanitize System	1 year system sanitization/cleaning reminder has expired.	Clean the system and reset the sanitization timer.





## Section 6 Ordering Information

Please refer to the Specification Plate located on the TII unit near the power switch for the complete model number, serial number, and series number when requesting service, replacement parts or in any correspondence concerning this unit.

All parts listed herein may be ordered from the Thermo Scientific dealer from whom you purchased this unit or can be obtained promptly from the factory. When service or replacement parts are needed, check first with your dealer. If the dealer cannot process your request, then contact our Technical Services Department.

Prior to returning any materials, please contact our Technical Services Department for a “Return Materials Authorization” number (RMA). Material returned without an RMA number will be refused.

### Ordering Consumables and Supplies

Consumable parts are those required to support the day-to-day operation of this equipment. We establish two types of consumables; those items that must periodically be replaced to maintain performance (filters, resin cartridges, etc.) and other items of limited life (fuses, etc.) that you can expect to replace on a more or less random basis. Where practical, we recommend the frequency of replacement, or provides information on life expectancy from which you may calculate a replacement interval compatible with your usage pattern.

The replacement of consumable parts is discussed in the Maintenance and Servicing section to assist you in accomplishing your own service. Consumables may be ordered separately and in some cases, as an expendables kit. Check with a Technical Services representative for additional information on the expendables kit.

## Basic Consumables

Description	Catalog No.	Recommended Qty.	Max. Shelf Life
Barnstead TII Cartridge Pack	D502137	1	2 years <sup>1</sup>
RO Carbon Prefilter	D502115	1	2 years <sup>1</sup>
MPS Cartridge	D502114	1	2 years <sup>1</sup>
1 Micron Prefilter	D502113	1	2 years <sup>1</sup>
0.2 Micron Final Filter and Bell Assembly	D3750	2	N/A
Ultraviolet Lamp (Barnstead TII) LMX13	1	5 years	
Barnstead TII RO Membrane	FL1265X1	D14031 (1), D14041 (2)	N/A
Fuse, Power Entry:			
100-120 volt (slow blow 1.6 amp)	FZX47	2	N/A
240 volt (IEC127 time lag 0.63 amp)	FZX54	2	N/A

<sup>1</sup>This is reference information. Please check actual expiration dates on individual cartridges for shelf life end dates. Cartridges used past the shelf lifetimes will exhibit decreased capacity.

**Note** Shelf life will be inaccurate if products are taken from their original packaging. ▲

## General Maintenance Supplies

General maintenance parts are defined as laboratory level repair parts that do not require great expertise or special tools for installation. We recommend that you stock the general maintenance parts as an aid to ensuring the continued operation of this equipment.

**General Maintenance  
Supplies (continued)**

Description	Catalog No.	Recommended Quantity
Quick Disconnect Inlet	CUX8	1
Quick Disconnect Insert -3/8" tube	CUX9	1
Quick Disconnect Inlet -3/8" tube	CUX11	1
Cartridge Pack O-rings	GSX68	4

**Safety Stock**

For critical applications where performance with minimum downtime is required, we recommend that you maintain a local stock of those parts listed in the GENERAL MAINTENANCE SUPPLIES and SAFETY STOCK sections.

Description	Catalog No.	Recommended Quantity
Replacement Control Board *	PC1403X3	1
Replacement Interface Board	PC1403X2	1
Pump Ass'y	PU1190X1	2
DI Resistivity Cell **	E1403X6	1
RO Resistivity Cell **	E1403X7	2
Resistivity Cell O-ring	GSX29	1
RO Temperature Sensor	RSX432	1
Ballast	TN1403X1	1
Quartz Sleeve	TU733X1	1
Quartz Sleeve O-rings	GSX62	2

(continued)

*\* If replaced, all calibration values (DI Cell, RO Cell, Pressure Gauges) will have to be entered for proper operation.*

*\*\* If replaced, pertinent calibration values in PC1403X1 will have to be updated.*

## Safety Stock (continued)

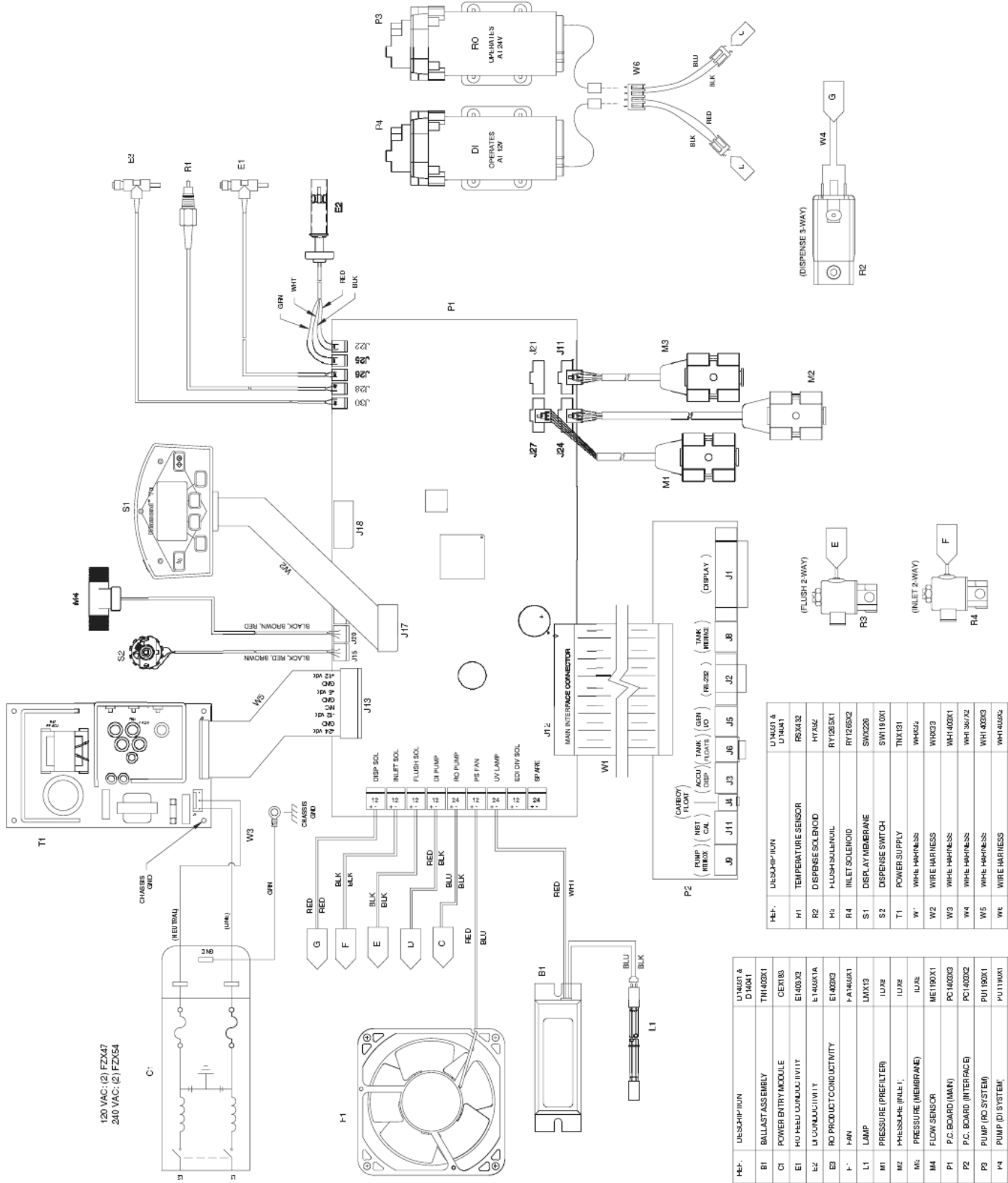
Description	Catalog No.	Recommended Quantity
Power Supply	TNX131	1
Inlet Solenoid Valve	RY1265X2	1
Flush Solenoid Valve	RY1265X1	1
Pressure Transducer **	TD1403X1	3
Pressure Reducing Valve	PM1403X1	1
Display	SW1403X1	1
External Display Cable	WHX20	1
Dispense Manifold with Solenoid	BKX46	1
Dispense Switch	SW1190X1	1
Cartridge Pack Manifold	BK1403X1	1
Power Supply Fan	FA1403X1	1

*\*\* If replaced, pertinent calibration values in PC1403X1 will have to be updated.*

## TII Accessories

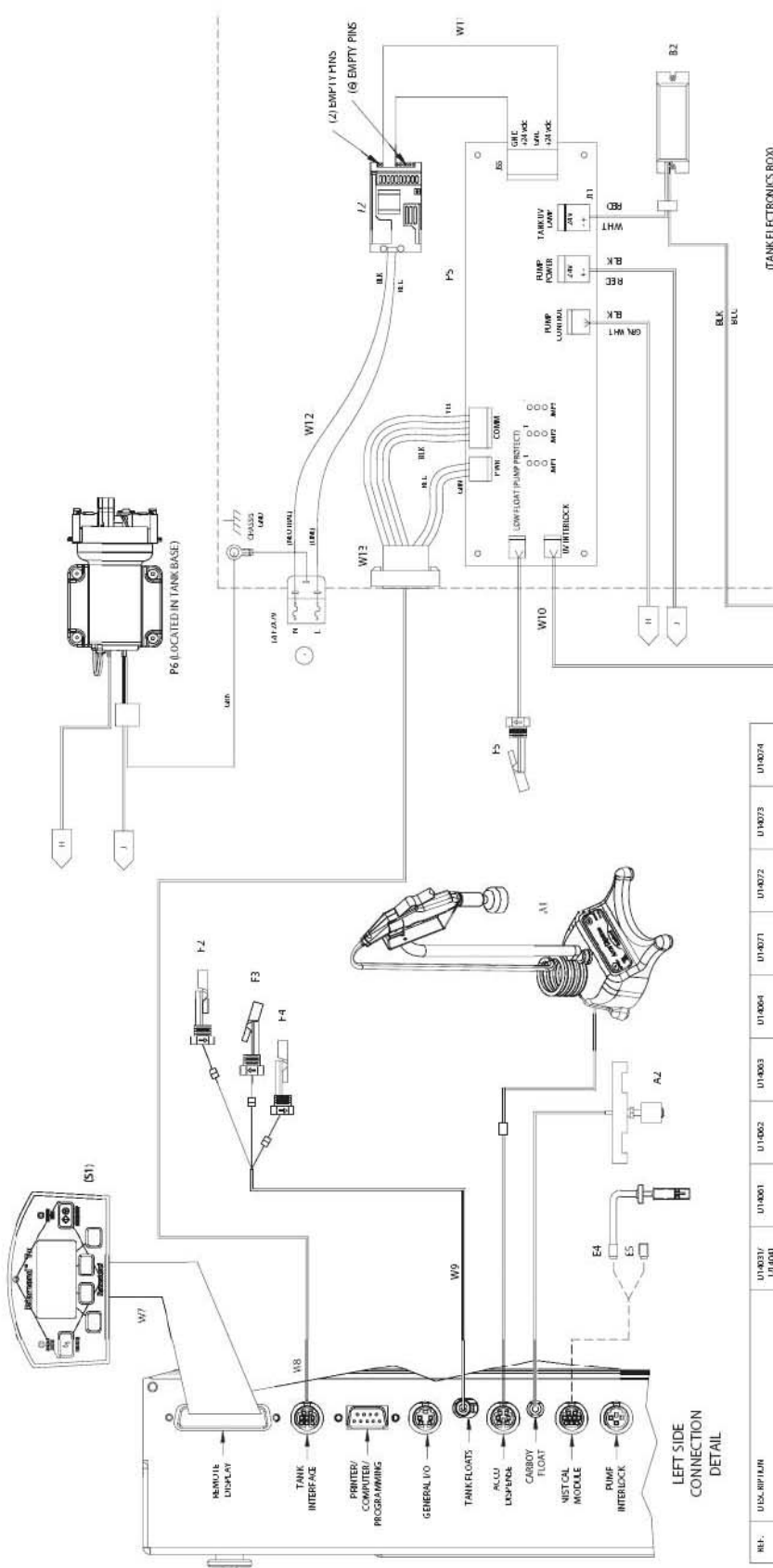
Description	Catalog No.
Remote Dispenser (Manual)	D11981
Accudispense Volumetric Remote Dispenser	D13661
Serial Cable for Communication with Computer (nine pin)	WHX18
Printer (120-240 VAC system)	AY1137X1
Printer Replacement Paper Roll	AY669X4
Dispense Overflow Cutoff Float	AY1367X1
Bench Top Display Holder	AY1367X2
Hot Water Mixing Valve	D7427
Pump Interlock Cable for Barnstead Nanopure	AY1403X3
Sanitization Block with Tubing	BK1403X2
Alternate Tank Float Assembly	AY1403X2
Alternate Tank Float Communication Cable	AY1403X4
Alternate Tank Jones Plug Communication Cable	AY1403X5

# WIRING DIAGRAMS



Part #	Description	Part #	Description
B1	BALLAST ASSEMBLY	U14001 & D14001	DI/SHIP-TION
C1	POWER ENTRY MODULE	RSX132	TEMPERATURE SENSOR
E1	HU-REU CONDUCTIVITY	HY582	DISPENSE SOLENOID
E2	UI CONDUCTIVITY	RY126X1	F-LUSH SOLENOID
E3	RO PRODUCTIVITY	RY126D2	SOLENOID
FAN	FAN	SNX228	DISPLAY/AMBER ANE
L1	LAMP	SW119001	DISPENSE SWITCH
M1	PRESSURE (PRE-FILTER)	THX131	POWER SUPPLY
M2	PRESSURE (MEMBRANE)	WHF522	WIRE HARNESS
M3	FLOW SENSOR	WHQ33	WIRE HARNESS
P1	P.C. BOARD (MAIN)	WH1400X1	WIRE HARNESS
P2	P.C. BOARD (INTERAC E)	WH1367A2	WIRE HARNESS
P3	PUMP (RO SYSTEM)	WH1400X3	WIRE HARNESS
P4	PUMP (DI SYSTEM)	WH1400X4	WIRE HARNESS

**Section 7**  
Wiring Diagrams



LEFT SIDE CONNECTION DETAIL

REF.	DESCRIPTION	U14003/ U14004	U14001	U14002	U14003	U14004	U14071	U14072	U14073	U14074
A1	ACQUICENTRE ASSEMBLY									
A2	D DEFENSE OVERFLOW CUTOFFLOAT	ATI307A1								
B2	TANK BALLAST ASSEMBLY		WH1400A1			WH1400A1				WH1400A1
L4	CALIBRATION GOLD CELL	E1402A4								
E5	CALIBRATION RES MODULE	E1402A5								
F2	TANK FLUORIDE (FLU) PU		SW1400C2	SW1400C2	SW1400C2	SW1400C2	SW1400C2	SW1400C2	SW1400C2	SW1400C2
F3	TANK FLUORIDE (FLU) FLU		SW1400C2	SW1400C2	SW1400C2	SW1400C2	SW1400C2	SW1400C2	SW1400C2	SW1400C2
F4	TANK FLUORIDE (FLU) FLU		SW1400C2	SW1400C2	SW1400C2	SW1400C2	SW1400C2	SW1400C2	SW1400C2	SW1400C2
F5	PUMP PROTECTIVE FLUOR. PRO.		SW1137A1	SW1137A1	SW1137A1	SW1137A1	SW1137A1	SW1137A1	SW1137A1	SW1137A1
L2	LAMP (TANK UV)		LMX31	LMX31	LMX31	LMX31	LMX31	LMX31	LMX31	LMX31
M5	WATER FLOW LOW LUMP ROSSHABT		SWX228	SWX228	SWX228	SWX228	SWX228	SWX228	SWX228	SWX228
P5	TANK CONTROL BOARD		PC1400C1	PC1400C1	PC1400C1	PC1400C1	PC1400C1	PC1400C1	PC1400C1	PC1400C1
P6	DISTRIBUTION SMART PUMP ASSEMBLY		PU1400C1	PU1400C1	PU1400C1	PU1400C1	PU1400C1	PU1400C1	PU1400C1	PU1400C1
T2	ZOMER SUPPLY		TMC129	TMC129	TMC129	TMC129	TMC129	TMC129	TMC129	TMC129
W7	WIRE HARNESS	WH1403A4								
W8	WIRE HARNESS		WH1400A6	WH1400A6	WH1400A6	WH1400A6	WH1400A6	WH1400A6	WH1400A6	WH1400A6
W9	WIRE HARNESS		SW1400A1	SW1400A1	SW1400A1	SW1400A1	SW1400A1	SW1400A1	SW1400A1	SW1400A1
W10	WIRE HARNESS		WH1400A4	WH1400A4	WH1400A4	WH1400A4	WH1400A4	WH1400A4	WH1400A4	WH1400A4
W11	WIRE HARNESS		WH1400A5	WH1400A5	WH1400A5	WH1400A5	WH1400A5	WH1400A5	WH1400A5	WH1400A5
W12	WIRE HARNESS		WH1400A3	WH1400A3	WH1400A3	WH1400A3	WH1400A3	WH1400A3	WH1400A3	WH1400A3
W13	WIRE HARNESS		WH1400A1	WH1400A1	WH1400A1	WH1400A1	WH1400A1	WH1400A1	WH1400A1	WH1400A1
W14	WIRE HARNESS		WH1400A2	WH1400A2	WH1400A2	WH1400A2	WH1400A2	WH1400A2	WH1400A2	WH1400A2
W15	WIRE HARNESS		WH1400C2	WH1400C2	WH1400C2	WH1400C2	WH1400C2	WH1400C2	WH1400C2	WH1400C2

PC BOARD	CONNECTION	JMP1	JMP2	JMP3
PC1400C1/PC1400C2	TANK SIZE 30L	X	X	X
PC1400C1/PC1400C2	TANK SIZE 60L	X	X	X
PC1400C2	UV OPTION	1 0	2 0	3 0
PC1400C2	PUMP OPTION	1 0	2 0	3 0
PC1400C2	PUMP + UV OPTION	1 0	2 0	3 0

## Maintenance Log

<b>Date</b>	<b>Description</b>	<b>Parts Needed (Part #)</b>	<b>Notes</b>





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