

# MEGA-PURE<sup>®</sup> Automatic Deionizer

## OPERATION MANUAL AND PARTS LIST

D440046 Series 680  
Single Cartridge Deionizer (D1)

D440066 Series 681  
Dual Cartridge Deionizer (D2)

Model #	Voltage
D440046	120
D440066	120

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## IMPORTANT INFORMATION

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.

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# Safety Information

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## Alert Signals



### **Warning**

Warnings alert you to a possibility of personal injury.



### **Caution**

Cautions alert you to a possibility of damage to the equipment.



### **Note**

Notes alert you to pertinent facts and conditions.

Your Barnstead MEGA-PURE® automatic deionizer has been designed with function, reliability, and safety in mind. It is the user's responsibility to install it in conformance with local electrical codes. For safe operation, please pay attention to the alert boxes throughout the manual.

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## Warnings

### **To avoid electrical shock, always:**

1. Use a properly grounded electrical outlet of correct voltage and current handling capacity.
2. Disconnect from the power supply prior to maintenance and servicing.
3. Ensure that the equipment is connected to electrical service according to local and national standards. Failure to properly connect may create a fire or shock hazard.
4. Do not mount Your MEGA-PURE® deionizer directly over equipment that requires electrical service. Routine maintenance of this unit may involve water spillage and subsequent electrical shock hazard if improperly located.
5. Do not connect unit to electrical service until instructed to do so.

### **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 which may ignite such materials.
2. Refer servicing to qualified personnel.

### **To ensure safe mounting:**

1. Wall composition and construction, as well as fastener type, must be considered when mounting this unit. The mounting surface and fasteners selected must be capable of sup-

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## SAFETY INFORMATION

porting a minimum of 41 lbs.; 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.

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# Introduction

Barnstead MEGA-PURE® Deionization Systems are designed to remove dissolved inorganic and/or organic materials from your water supply depending upon your deionizer and cartridge selection.

Resistivity is continuously monitored. A green light will indicate that the resistivity of the output water is greater than 50K ohm-cm. A red light comes on when the deionization cartridge requires changing.

The Flow Control Valve in this system is a precision needle valve for precise output flow rate control.

The improved drain system will drain cartridges fast and efficiently for no-spill cartridge replacement.

The optional Solenoid Valve Accessory (Barnstead Part No. 440375) will provide automatic shut-off of your water supply when the resistivity of the output water falls below 50K ohm-cm.

Another option, the Still Adapter Kit (Barnstead Part No. 440376), connects the MEGA-PURE® Deionization System to any Barnstead MEGA-PURE® Automatic Water Still. This kit allows the Deionization System to function automatically with the Water Still.

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## System Characteristics

The Barnstead MEGA-PURE® Model D1 Deionization System is a single cartridge deionizer designed to provide economic removal of inorganic contaminants from most water supplies. This system has been preset to a resistivity of 50K ohm-cm. A green light will be lit as long as the output water has a resistivity greater than 50K. The green light will go out and a red light will come on if resistivity falls below 50K. The D1 was primarily designed to utilize the Barnstead High Capacity Cartridge to provide Reagent Grade water for general laboratory use or as a water supply pretreatment to feed any Barnstead MEGA-PURE® Water Still.

The Barnstead MEGA-PURE® Model D2 Deionization System is a dual cartridge unit that provides all the features of the Model D1 with the addition of organic removal. The Model D2 is designed to use the Barnstead

Organic Removal Cartridge and the High Capacity Cartridge for economical removal of both organic and inorganic matter from most water supplies.

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## Dimensions

The Model D1 is 10 1/2" wide x 7 1/2" deep x 25 1/2" high and has an operational weight of 26 lbs.

The Model D2 is 16 3/4" wide x 7 1/2" deep x 25 1/2" high and has an operational weight of 41 lbs.

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## Deionization Cartridge Data

### **Barnstead High Purity Cartridge**

Barnstead High Purity Cartridges are designed for use in applications requiring extremely high resistivity and low organic product water. Barnstead High Purity Cartridges are manufactured using only the highest quality, nuclear grade, mixed bed resins. The result is a deionization cartridge that will remove 790 grains\* of dissolved solids, most organics, and produce water with a resistivity greater than 16 megohm-cm. This cartridge may be used in any Barnstead MEGA-PURE® Deionization System, but in the D1 and D2 we recommend that an external resistivity monitor be used to take full advantage of the High Purity Cartridge and its high resistivity capability.

### **Barnstead High Capacity Cartridge**

Barnstead High Capacity Cartridges are designed for efficient and economical removal of dissolved inorganic matter from most water supplies. The output from this cartridge may be used in most laboratory procedures or as the input for a Barnstead MEGA-PURE® Water Still. This cartridge is recommended for use in the Barnstead MEGA-PURE® D1 or D2 Deionization Systems. Approximate cartridge life (50K-ohm end point) can be calculated by using 1530 grain capacity in the formula listed below.

### **Barnstead Organic Removal Cartridge**

Barnstead Organic Removal Cartridges are designed to remove most organic impurities from water supplies. It will remove free chlorine and most color, odor, products of

vegetable decay and weak organic acids. Cartridge life is about 1500-1800 gallons for most water supplies. Periodic testing is recommended to determine life cycle for your application.

$$\text{Approx. Cartridge Life} = \frac{\text{Cartridge Capacity of 790 grains* (for output above 16 megohm-cm)}}{\text{Total dissolved solids in supply water (expressed in grains*/gallon)}}$$

\*Expressed as CaCO<sub>3</sub> equivalent.

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# Unpackaging

## **Package Contents Checklist**

MEGA-PURE® Deionizer Instruction Manual

Warranty Card

Feedwater Tube Fitting (1/4" O.D. X 1/8" N.P.T.)

Self Adhesive Operation Label

Rubber Gaskets (2 pcs. D1) (4 pcs. D2)

Inspect package contents. If any of the above items are damaged or missing, contact your Dealer for replacement.



# Setup and Assembly



## Warning

Wall composition 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 41 lbs.; 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.

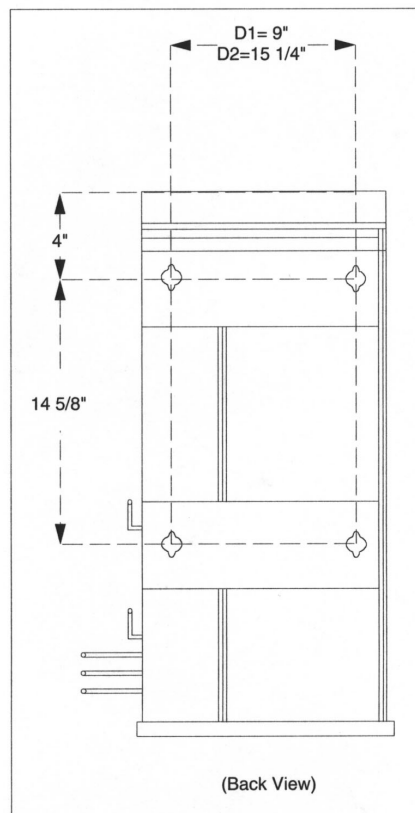
## Unit Location

### Bench Mounting

Units may be placed on any flat surface providing the space and weight requirements listed above.

### Wall Mounting

The back braces have keyhole slots for wall mounting. Choose wall anchors suitable for your wall construction and the unit operating weight. Allow 4-6 inches on the right side of unit for tubing and valve operation. See Figure 1 for mounting dimensions.



**Figure 1**  
Back View

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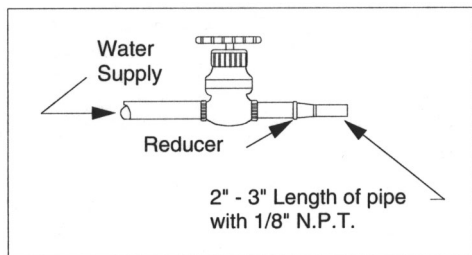
## System Drain

When the cartridge(s) needs changing, the water in the system must be drained. Barnstead has attached a 5 foot length of 1/4" I.D. Vinyl tubing for this purpose. This tubing may be routed to any open or atmospherically vented drain that is located such that draining can be accomplished by gravity. If no convenient drain is available, the tubing may be cut to an appropriate length for draining into a large bottle or beaker.

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## Product Water Output

Barnstead supplies a 5 foot length of 7/16" I.D. Vinyl tubing to deliver the Deionized water. This tubing may be routed to any Barnstead MEGA-PURE® Water Still or other suitable container. The end of this tube must be at least one foot higher than the base of the D1 or D2 or air may be drawn into the system causing degradation of the output water.



**Figure 2**  
Shut-off Valve

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## Power and Plumbing Requirements

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### Electrical

Barnstead MEGA-PURE® Deionizers will plug into any standard 3-prong, 120V, grounded receptacle. They operate on 50/60 HZ and current draw is less than 1/10 ampere. The power cord is 7 feet long.

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### Water Supply

Demineralizers require a 5 — 100 psig water supply. Input water temperature must not exceed 40°C. Sodium (NaCl) regenerated pretreatment systems (water softeners) are not acceptable. The high sodium content will reduce cartridge life by as much as 80%.

Barnstead has supplied a 5 foot, 1/4" O.D., High Pressure tubing and a 1/8" N.P.T. fitting to attach to your water supply.

Customer must supply the Shut-off Valve shown in Figure 2, and also the appropriate fittings to match the Barnstead supplied 1/8" N.P.T. fitting.

## Assembly Instructions

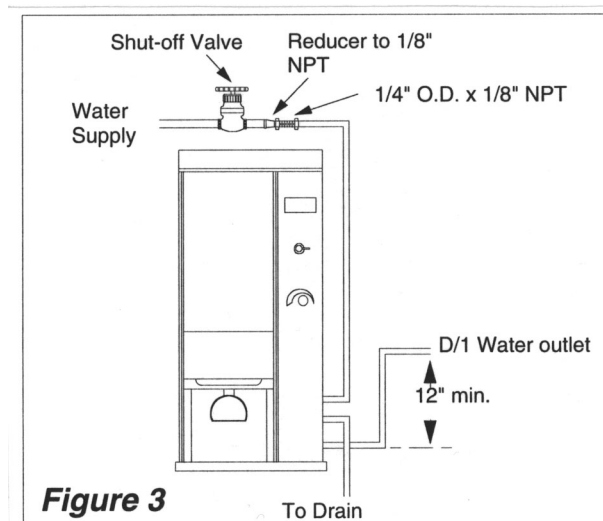
### Deionizer only setup - Figure 3

1. Locate the 1/4" OD x 1/8" NPT. plastic fitting in the parts box.
2. Install the plastic fitting at your water source.
3. Refer to Figure 6 and instructions and install 1/4" O.D. High Pressure tubing to plastic fitting from step 2.
4. Route the 1/4" I.D. Vinyl tubing to your drain or shorten for use on appropriate drain vessel.
5. Route the 7/16" I.D. Vinyl tubing to your point of use. Remember that the end of the tubing must be at least one foot higher than the base of the deionizer.
6. Go to Final Assembly Instructions on page 14.



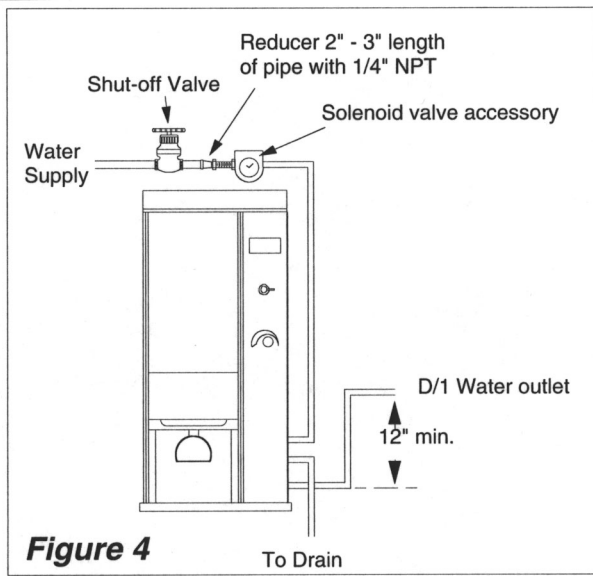
**Note**

Review the setups shown below and proceed with instructions that fit your application.



**Figure 3**

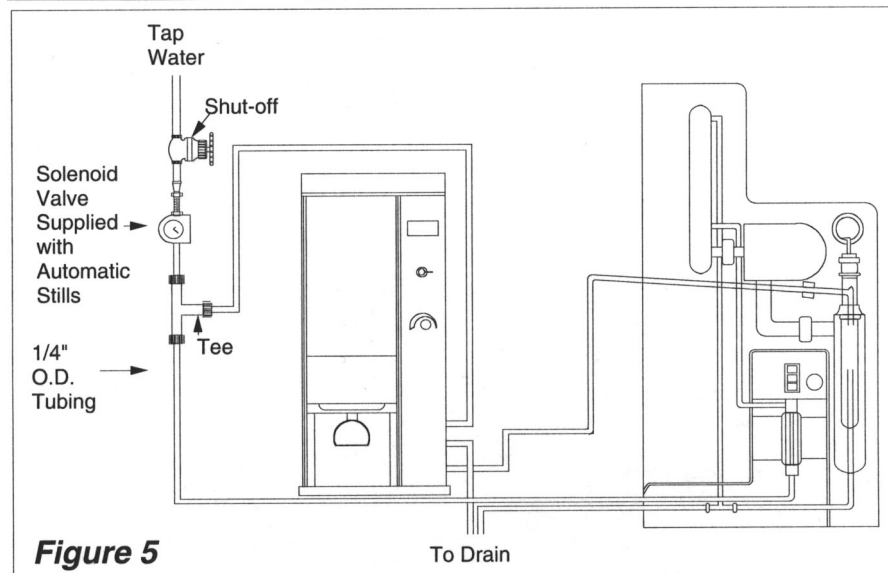
## SETUP AND ASSEMBLY



**Figure 4**

### Deionizer with solenoid valve accessory - Figure 4

1. Unpack Part No. 440375 Solenoid Valve Accessory Kit (ordered separately).
2. Note the "IN" side and connect that side to your water source.
3. Install the 1/4" N.P.T. plastic fitting from the parts box to the "OUT" side of the solenoid valve.
4. Refer to Figure 6 and instructions and install 1/4" O.D. High Pressure tubing to plastic fitting from step 3.
5. Go to steps 4, 5 and 6 of DEIONIZER ONLY SETUP. Deionizer to a Barnstead MEGA-PURE Still - Figure 5



**Figure 5**



**Note**

This setup assumes that your Barnstead MEGA-PURE Water Still is now connected to your water source and that you have Part No. 440376 Still Adapter Kit (purchased separately).

**Deionizer to a Barnstead MEGA-PURE Still - Figure 5**

1. Refer to Figure 5 and instructions and install plastic "T" fitting from Still Adapter Kit into the source water line now feeding your Still as shown in Figure 5. Locate as desired.
2. Connect the 1/4" O.D. High Pressure tubing to this "T" fitting as shown in Figure 5.
3. Route 1/4" I.D. Vinyl tubing to same drain as water still.
4. Route 7/16" I.D. Vinyl tubing to constant level chamber of still as shown. Go to Final Assembly Instructions on page 14.

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### Tube Fitting Instructions

1. Cut the 1/4" O.D. tubing cleanly, at a slight angle, to make insertion of end easy.
2. Loosen the nut on the fitting until about three threads are visible, moisten the tubing and insert into the nut opening until it stops. (See Figure 6).
3. Tighten the nut by hand; additional tightening should not be necessary.

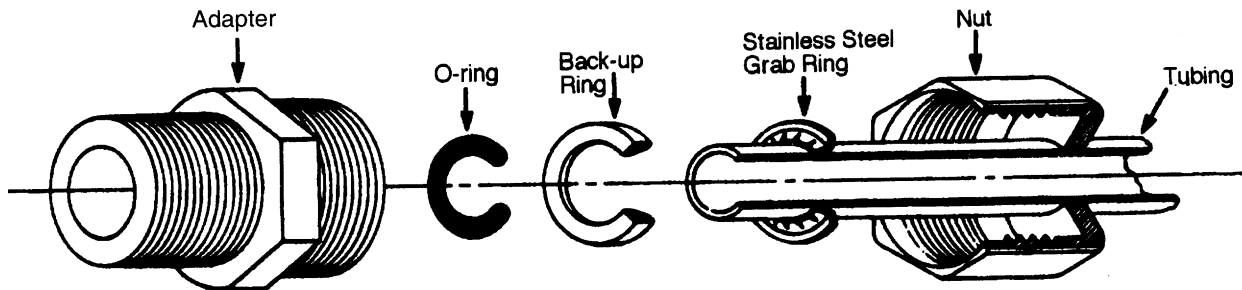


Figure 6

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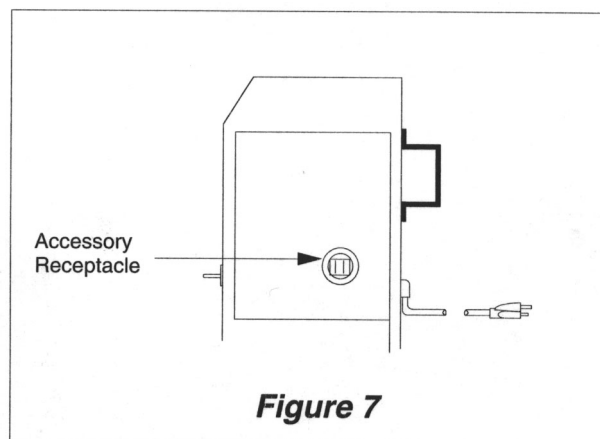
### Final Assembly Instructions

1. Remove "Operation" label from parts box. Peel off paper backing and apply label at any convenient location on Deionizer.
2. If setup is for Deionizer Only, proceed to Cartridge Installation.
3. Remove the hole plug from the end panel (See Figure 7).
4. Install the rectangular plug from either the Solenoid Valve or Still Adapter Cord into the rectangular accessory receptacle.
5. Plug the phone jack end of the Still Adapter Cord into the control box on the MEGA-PURE® Water Still.



**Note**

NOTE: Cable to Accessory Receptacle not supplied. Order as an option.



**Figure 7**



**Caution**

Always install the organic cartridge in the right-hand housing of the model D2. Installation of the organic cartridge in the D1 or the wrong side of the D2 will cause red light to be always on.

## Cartridge Installation

1. Locate rubber gaskets in parts box. Remove paper backing and install (sticky side to metal) in upper and lower recesses in cartridge holder.
2. Remove plastic bag from one organic Cartridge and place on the lower gasket in the RIGHT-HAND housing of the Model D2.
3. Turn knob to move cartridge upward until it just makes contact with the upper gasket. Center cartridge on upper gasket and tighten knob firmly to seal cartridge in place. DO NOT OVERTIGHTEN.
4. Repeat steps 2 & 3 with a High Capacity Cartridge. Place this in only the LEFT housing of the Model D2

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# Operation



## Note

Pretreatment feedwater-flow rate to be adjusted so as to “just maintain a full boiler.” Too fast a flowwater will exhaust pretreatment cartridges prematurely.



## Caution

The Flow Control valve is a precision needle valve designed to give stable flow control at low flow rates. Never use this valve to shut off water to the system. If clogging occurs in this valve, we recommend the Barnstead Part No. D5839 filter housing with a Part No. 440087 prefilter to remove particulate matter prior to the deionizer.

1. Turn WATER SUPPLY valve to "off" and DRAIN valve to "closed".
2. Plug power cord into a grounded 110/120V receptacle. Place OPERATION MODE SWITCH to the "purge" position. BOTH PURITY LIGHTS will be on at this time.
3. Open the customer shut-off valve and turn the WATER SUPPLY valve to "on".
4. Turn the FLOW CONTROL 2-3 turns counter-clockwise and allow the system to run. Discard the first 3-4 liters of treated water.
5. Turn the MODE SWITCH to "normal." The "RED" light will go to very dim condition and the "GREEN" light will remain lit indicating water purity greater than 50K ohm-cm. When the water purity has slipped to below 50K ohm-cm, the "RED" light will be bright. Turn WATER SUPPLY valve to "off". Check system for leaks. System is now ready for use.



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# Maintenance and Servicing

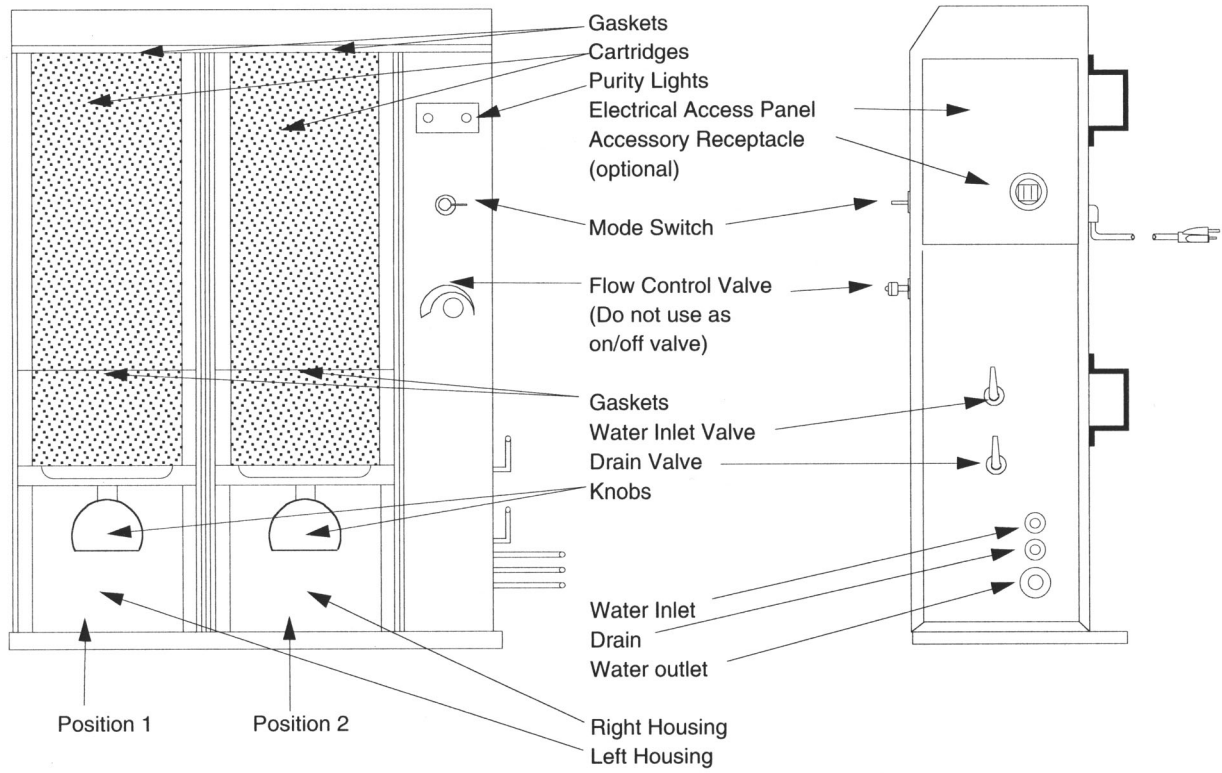
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## Cartridge Replacement

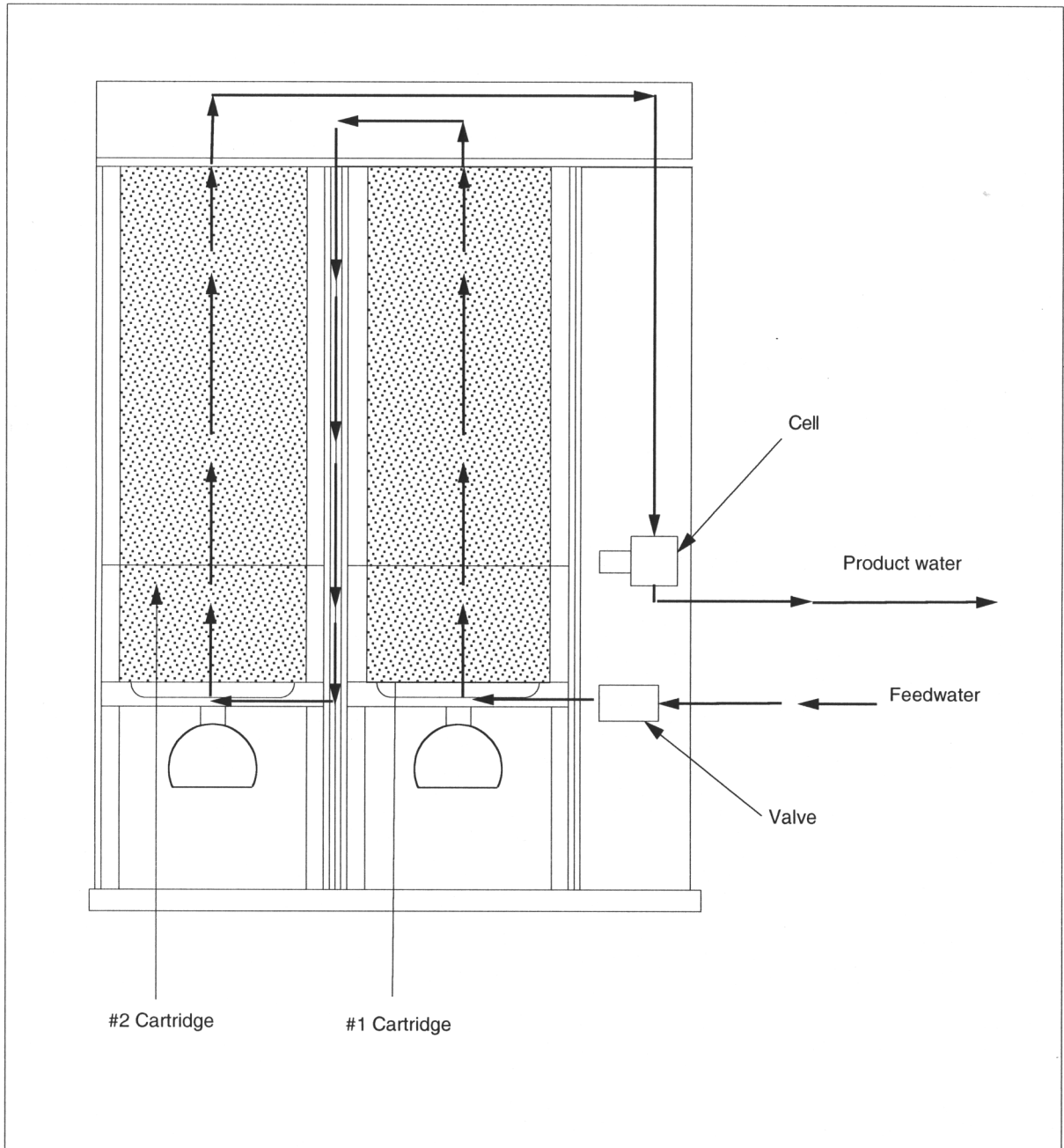
If the system has been idle for a period of time, the red change cartridge light may have come on. Place the Mode Switch in the PURGE position and run 1-2 liters of water through the system. Place the Mode Switch back in the RUN position. If the red light does not go out, the deionization cartridge needs to be changed. Replace as follows:

1. Disconnect power cord.
2. Turn drain valve to "open" then turn water supply valve to "off".
3. When water stops flowing from the drain hose, loosen the bottom knob, remove the deionization cartridge and discard.
4. Check gaskets and replace if necessary.
5. Replace cartridges per steps 2 & 3 under Cartridge Installation.
6. Refer to Operation Sequence for start-up.

# MAINTENANCE AND SERVICING



**Figure 8**  
Controls and Parts Locations



**Figure 9**  
Flow diagram  
Flow is right to left. Cartridges are all up-flow configured.

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# Replacement Parts and Cartridges

**Part Number**

D400377

D400499

D440265

**Description**

High Purity Cartridge

High Capacity Cartridge

Organic Removal Cartridge

410671

410126

410228

410229

440119

Rubber Gaskets (4/case)

1/4" O.D. High Pressure Tubing (5 foot length)

Flow Adjust Needle Valve Assembly

Ball Valve (Water supply or Drain)

Resistivity Monitor Assembly (PCB and Cell)

**Optional Accessories****Part Number**

440375

440376

**Description**

Solenoid Valve Accessory Kit (Solenoid Valve and Cord)

Still Adapter Kit

410535

413934

410164

9-Liter Pyrex® Storage Bottle w/Spigot

13-Liter Pyrex® Storage Bottle w/Spigot

45-Liter Pyrex® Storage Bottle w/Spigot

For more information on these accessories and other Barnstead MEGA-PURE® products, please contact your Laboratory Distributor.

MEGA-PURE is a trademark of Barnstead|Thermolyne.

PYREX® is a registered trademark of Corning, Incorporated.

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# Ordering Procedures

Please refer to the Specification Plate 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 Barnstead International dealer from whom you purchased this unit or can be obtained promptly from the factory. When service or replacement parts are needed we ask that you check first with your dealer. If the dealer cannot handle your request, then contact our Customer Service Department at 563-556-2241 or 800-553-0039.

Prior to returning any materials to Barnstead International, please contact our Customer Service Department for a "Return Goods Authorization" number (RGA). Material returned without a RGA number will be refused.



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# One Year Limited Warranty

Barnstead International (“BARNSTEAD”) warrants that if a product manufactured by Barnstead shall be free of defects in materials and workmanship for one (1) year from the first to occur of (i) the date the product is sold by BARNSTEAD or (ii) the date the product is purchased by the original retail customer (the “Commencement Date”). Except as expressly stated above, BARNSTEAD MAKES NO OTHER WARRANTY, EXPRESSED OR IMPLIED, WITH RESPECT TO THE PRODUCTS AND EXPRESSLY DISCLAIMS ANY AND ALL WARRANTIES, INCLUDING BUT NOT LIMITED TO, WARRANTIES OF DESIGN, MERCHANT ABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

An authorized representative of BARNSTEAD must perform all warranty inspections. In the event of a defect covered by BARNSTEAD’s warranty, BARNSTEAD shall, as its sole obligation and exclusive remedy, provide free replacement parts to remedy the defective product. In addition, for products sold by BARNSTEAD within the continental United States or Canada, BARNSTEAD shall provide provide free labor to repair the products with the replacement parts, but only for a period of ninety (90) days from the Commencement Date.

BARNSTEAD’s warranty provided hereunder shall be null and void and without further force or effect if there is any (i) repair made to the product by a party other than BARNSTEAD or its duly authorized service representative, (ii) misuse (including use inconsistent with written operating instructions for the product), mishandling, contamination, overheating, modification or alteration of the product by any customer or third party or (iii) use of replacement parts that are obtained from a party who is not an authorized dealer of BARNSTEAD.

Heating elements, because of their susceptibility to overheating and contamination, must be returned to the BARNSTEAD factory and if, upon inspection, it is concluded that failure is due to factors other than excessive high temperature or contamination, BARNSTEAD will provide warranty replacement. As a condition to the return of any product, or any constituent part thereof, to BARNSTEAD’s factory, it shall be sent prepaid and a prior written authorization from BARNSTEAD assigning a Return Goods Number to the product or part shall be obtained.

IN NO EVENT SHALL BARNSTEAD BE LIABLE TO ANY PARTY FOR ANY DIRECT, INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, OR FOR ANY DAMAGES RESULTING FROM LOSS OF USE OR PROFITS, ANTICIPATED OR OTHERWISE, ARISING OUT OF OR IN CONNECTION WITH THE SALE, USE OR PERFORMANCE OF ANY PRODUCTS, WHETHER SUCH CLAIM IS BASED ON CONTRACT, TORT (INCLUDING NEGLIGENCE), ANY THEORY OF STRICT LIABILITY OR REGULATORY ACTION.

The name of the authorized Barnstead International dealer nearest you may be obtained by calling 1-800-446-6060 (563-556-2241) or writing to:

