

MEGA-PURE®
12A Water Still
OPERATION MANUAL
AND PARTS LIST
Series 678

Model #	Voltage
A442012	208V
A442011	240V

Table of Contents

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.

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 Barnstead products. The specific safety notes pertinent to the Barnstead MEGA-PURE® 12A Water Still are listed in the Warnings section.

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Safety Information

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 water still 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.

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® 12A Water Still 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. For continued protection against possible fire hazard, replace fuses only with the same type and rating of fuse.
6. 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. "Caution - Hot Surface. Avoid Contact." Glass portions of still become hot when still is operating. To avoid burns, do not touch hot glass.
3. Wear eye and hand protection when using acid for cleaning, as acid spattering may occur.

SAFETY INFORMATION

4. Use this device with water feed only. Failure to comply with the above could result in explosion and personal injury.
5. Ensure all piping connections are tight to avoid leakage of chemicals.
6. Always depressurize chemical lines before disassembly.
7. Follow carefully the manufacturers' safety instructions on labels of chemical containers and Material Safety Data Sheets (M.S.D.S.).
8. 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 supporting a minimum of 150 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.

Introduction

The Barnstead MEGA-PURE 12A Water Still is a compact, all glass and Teflon® unit designed to provide 12 liters per hour of high purity distilled water. The product water, as produced, is non-pyrogenic per U.S.P. XIX and will have a resistivity up to 10 megohm-cm or higher at the product outlet using most tap water as feed. The Barnstead MEGA-PURE 12A Water Still has a built-in deionization system designed to pretreat the boiler feed water. Each unit also has a product cooler to reduce the temperature of the distilled water from 85°C to about 55°C for ease of handling. Pretreatment may be required to achieve >1.0 megohm/cm water. This Water Still can be used as a discrete unit, or it can also be connected to the Barnstead Automatic Collection System for complete automatic operation.

**Warning**

Do not connect unit to electrical service until instructed to do so.

**Warning**

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

The Barnstead MEGA-PURE 12A is rated at 240V, 50/60 Hz, 10,000 watts, single phase. It is also available in 208V. Changing the unit for use on either 240V or 208V operation requires only replacing the four Vycor® immersion heaters with heaters having the required voltage rating. The electrical controls have been designed to operate on voltages between 208 and 240 volts A.C.

The cabinet and glassware are protected against damage from overheating by two thermal switches. Restoration of operation requires allowing the unit to cool down for 5 – 15 minutes and restarting.

Choice of a location for your MEGA-PURE 12A Water Still is primarily a matter of convenience. This unit may be located on a bench or wall mounted. This water still may be connected to the Barnstead Automatic Collection System for complete automatic operation.

Electrical Requirements

To operate the Barnstead MEGA-PURE 12A Water Still, the customer must provide a power source of single phase, 50/60 Hz, 60 amp, 208 — 240VAC.

Your water still is supplied with a power cord and plug. A certified electrician should install a receptacle box within 5' of the still. The correct receptacle to match the supplied plug is a Hubbel #9461C. Figure 1 shows proper wiring for this receptacle. As an alternate method, your electrician may remove the supplied plug and wire the cord to a 60A-250V breaker box as shown in Figure 2.

INTRODUCTION

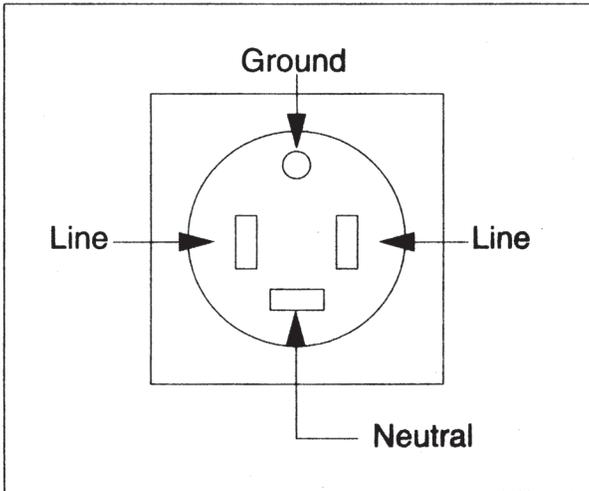


Figure 1: Hubbel #9461C Receptacle

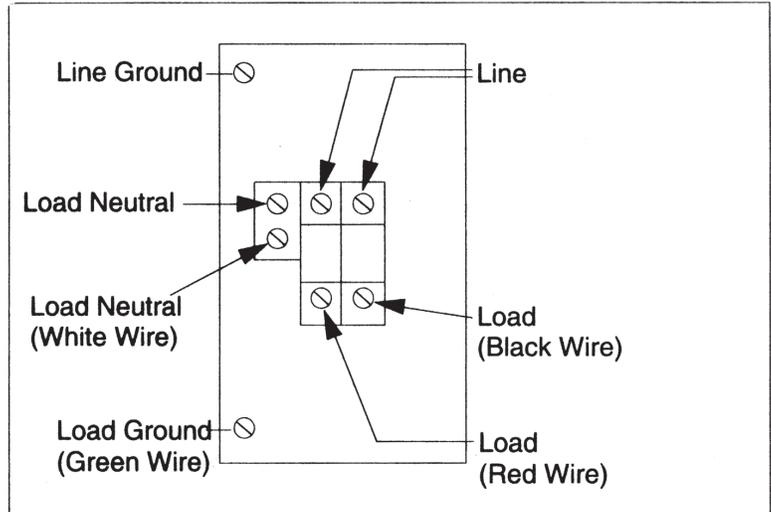


Figure 2: 60A - 250V Breaker Box



Caution

Never use 208V heaters on voltage higher than 208 volts as premature heater failure will occur.

The Vycor immersion heaters will be labeled either 208V or 240V, according to your order. The 240 volt heaters may be used at 208V, 220V, 230V, or 240V, but at the lower voltages, there will be some reduction in the volume of distilled water produced. Exchange improperly ordered heaters with your dealer. You cannot exchange heaters that have been used.

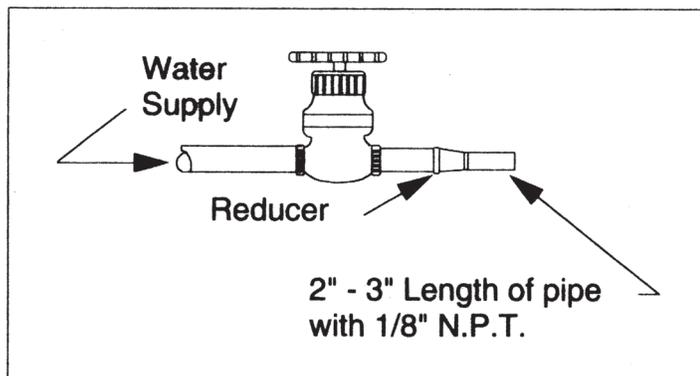


Figure 3: Shut-off Valve

Water Supply Requirements

Barnstead recommends one of the following options for supplying water to operate your MP-12A Water Still.

OPTION #1

A single, untreated cold water supply. The supply must be capable of providing a minimum of 30 gallons per hour at a pressure of 20-100 psi and be located within 4 feet of the water still. You must provide a shut off valve and reducer as shown in Figure 3.

With Option #1, approximately 30 gallons of untreated water will be used per hour in the cooling section of the still, 3 – 4 gallons of this water will be used as boiler feed after pretreatment in the deionizer section. Water connections are discussed on page 14.

OPTION #2

An untreated cold water supply plus a source of RO, demineralized or previously distilled water. The untreated supply must be capable of providing a minimum of 26 gallons per hour at a pressure of 20-100 psi and be located within 4 feet of the water still. The treated supply must be capable of providing 3 – 4 gallons per hour and be located within 4 feet of the water still. You must provide a shut-off valve and reducer at each water supply (see Figure 3).

With Option #2, approximately 26 gallons of untreated water will be used each hour for cooling. The second (treated) water supply of 3 – 4 gallons per hour will be used as boiler feed after polishing in the demineralizer section of the MP-12A. Water connections are discussed on page 14.

Drain

An open or atmospherically vented drain located lower than the still is necessary to allow for gravity flow. Barnstead supplies a 5 foot length of 1/2" I.D. vinyl tubing for the drain. Additional tubing may be purchased from your laboratory dealer.

**Caution**

Do not use NaCl regenerated water softeners to supply boiler feed as alkali attack will shorten heater life.

Unpacking

Tools required for unpacking and assembly: 7/16" open end wrench, common screwdriver, diagonal cutting pliers. (See Figure 12.)

1. Remove parts box and still from shipping carton and place on workbench.
2. Remove the two (2) shipping screws located on upper back of unit and discard. Turn two (2) cover fasteners located on the lower front of unit 1/4 turn counterclockwise, and lift cover out and up to remove. Set cover aside.
3. Check glassware inside the main cabinet for damage. Check parts in the accessory box for damage. Identify any broken or damaged parts and report them to your dealer immediately.
4. Using diagonal cutting pliers, cut and remove the seven (7) plastic shipping ties. Do not remove the tape from the hoses inside the cabinet until instructed to do so. The shipping tie locations are: Two (2) on the condenser **F**, two (2) on the boiler **A**, two (2) on the product cooler **G** and one (1) on the trap **E**.

Refer to Figure 4 for the following steps:

5. Using a 7/16" wrench, loosen the bolt (all the way) on coupling **R**. While holding onto condenser, remove springs **Y**. Carefully remove condenser from coupling and cabinet.
6. Remove tape from the condenser outlets. Allow the salt used as packing to flow into the plastic bag around the condenser. Discard the bag and salt. Rinse the remaining salt residue from the condenser.

Assembly

Refer to Figure 4 for the following steps:

1. Re-install the condenser **F** into the coupling **R** and clamp condenser in place with springs **Y**.
2. Check orientation of trap **E**. If it is not level or tilted back toward the boiler as shown in Figure 4, move the condenser **F** up in its bracket. This will tilt trap as shown in Figure 4.
3. Tighten coupling **R** using 7/16" wrench. Coupling should be just tight enough to prevent rotation with moderate hand pressure.
4. In the following steps, use warm water on connections for ease of assembly.
 - A. Remove tape from 3/8" I.D. vinyl hose and connect to upper right condenser outlet at Point **A** (Figure 4).
 - B. Remove tape from 3/8" I.D. vinyl hose and connect to lower right condenser outlet at Point **B** (Figure 4).

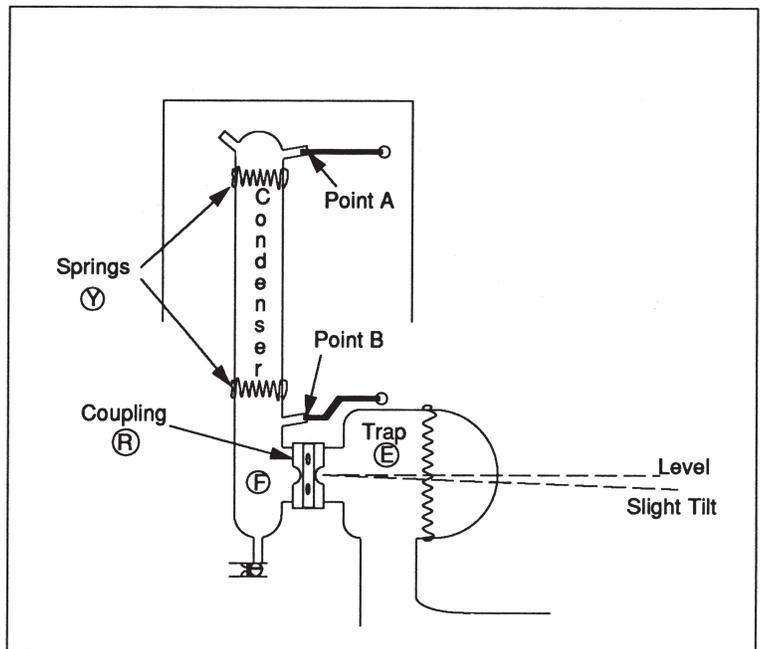


Figure 4

ASSEMBLY

Refer to Figure 5 for the following steps:

5. Remove the two (2) springs **Y** from the product cooler **G** and remove cooler from cabinet.
6. Remove salt and rinse (refer to Step 6, page 8).
7. Re-install product cooler in cabinet with the two (2) springs **Y**. Outlet on upper left hand side of cooler should be lined up with hole in cabinet .
8. Remove tape from 3/8" I.D. vinyl hose and connect to lower right product cooler outlet Point D (Figure 5). Use warm water for ease of assembly.

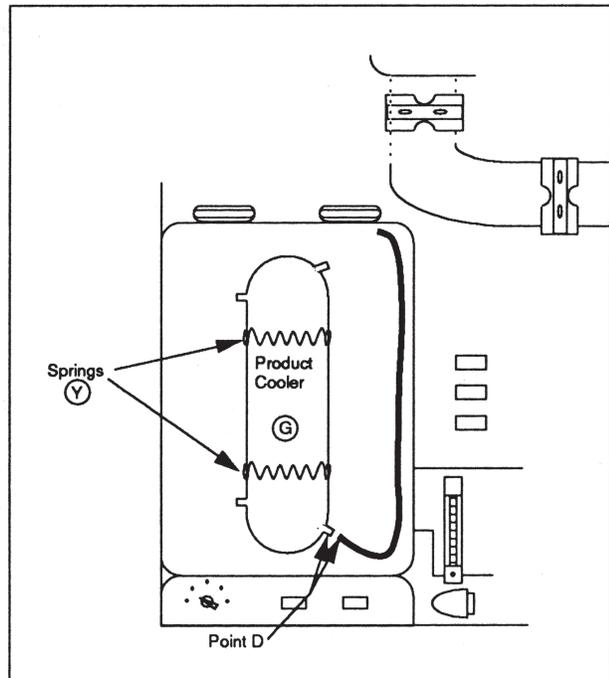


Figure 5

Refer to Figures 6 and 7 for the following steps.

9. In the following steps, glass tubing will be assembled using Teflon connectors **S**. The Teflon connectors have been factory installed on one end of the glass tubing. Tubing has been numbered for ease of identification. To ease assembly, use warm water on glassware and Teflon connectors.
 - A. Locate condenser/cooler tubes **K** and **L** in parts box, assemble ends marked "1" with Teflon connector. See Point 1 on Figure 7.
 - B. Route condenser/cooler tube assembly (from Step 1) up through the cabinet hole at top of demineralizer. Connect End 2 to the lower left outlet of the product cooler with a Teflon connector. See Point 2 on Figure 7.
 - C. Connect socket joint End 3 to the lower condenser **F** outlet using a #18-A Thomas clamp **W** from the parts box. Do not overtighten clamp. See Point 3 on Figure 7. Product Cooler may be adjusted up or down as required.
 - D. Locate product outlet tube **J** in parts box. Route through cabinet holes as shown in Figure 6. Connect end labeled "4" to the upper left tubulation on the product cooler **G**. See Point 4 on Figure 7.
 - E. Locate boiler fill tubes **H** and **I** in the parts box and assemble the ends labeled "5" with Teflon connector. See Point 5 on Figure 7.
 - F. Route boiler fill tube assembly from last step as shown in Figure 7. Connect end labeled "6" to upper right outlet on product cooler. See Point 6 on Figure 7. Unmarked end of assembly is routed to constant level chamber and supported at boiler fill tube clip AA as shown.

ASSEMBLY



Caution

Do not remove the Teflon sleeve covering the molded rubber sleeve on heater element.

10. Unpack the four (4) Vycor immersion heaters **C** and check the voltage rating on the top cap. It should agree with the voltage of your power supply. If it does not, contact your dealer and order correct heaters. Do not run 208V heaters on voltages greater than 208V.
11. Insert the four (4) heaters into the top openings of boiler **A** as shown in Figure 7.
12. Thread heater plugs and cords through the 3" hole above the boiler **A**, then back through the hole below the control box **M**. Plug one plug into each heater receptacle on bottom of control box. Plugs are twist-lock type and require 1/4 clockwise turn to lock in place.

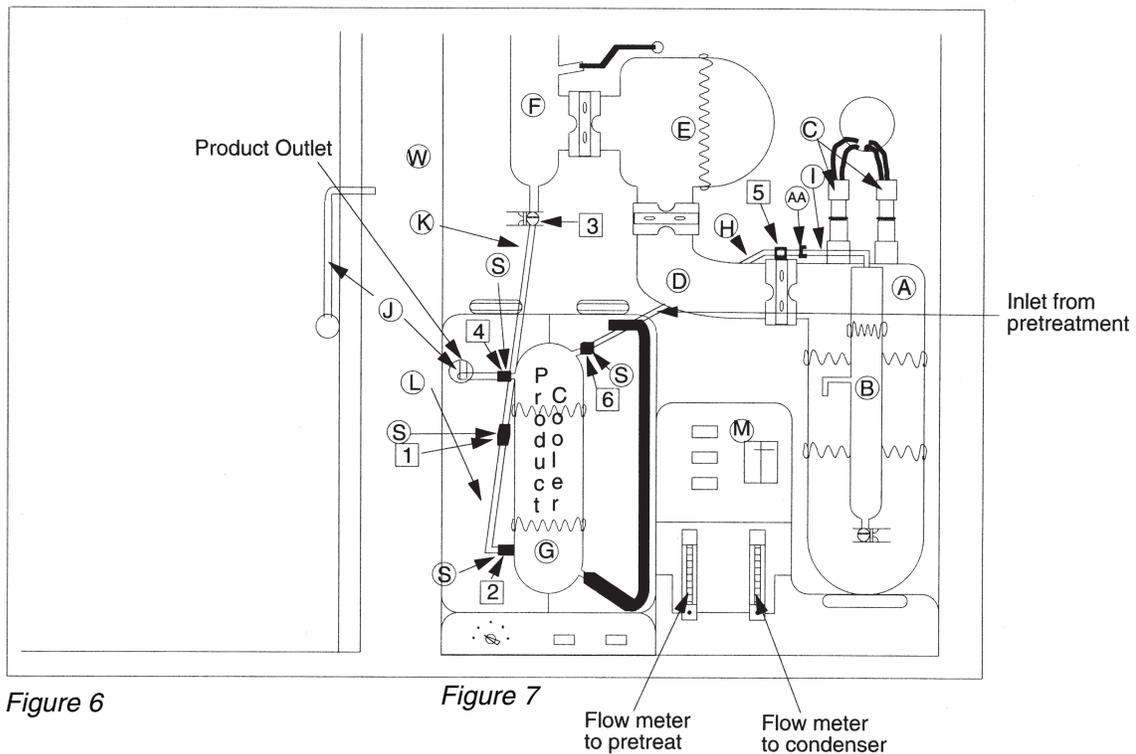


Figure 6

Figure 7

Flow meter
to pretreat

Flow meter
to condenser

Refer to Figure 8 for the following steps.

13. Remove tape from all hoses on the back of the cabinet and route the two (2) nylon high pressure hoses **T** through the holes in the side of the cabinet as shown in Figure 8.
14. Route the 4' length 1/2" vinyl hose through the lower hole as shown in Figure 8. This tubing will serve as the drain for the system. If longer length is needed, order 1/2" I.D. x 1/16" wall vinyl tubing from your dealer.
15. Your MEGA-PURE 12A Water Still is now ready to be moved to its final location. Visually check for loose connections.
16. Move the assembled water still to its final location. Refer to Installation Instructions and bench or wall mount the water still.

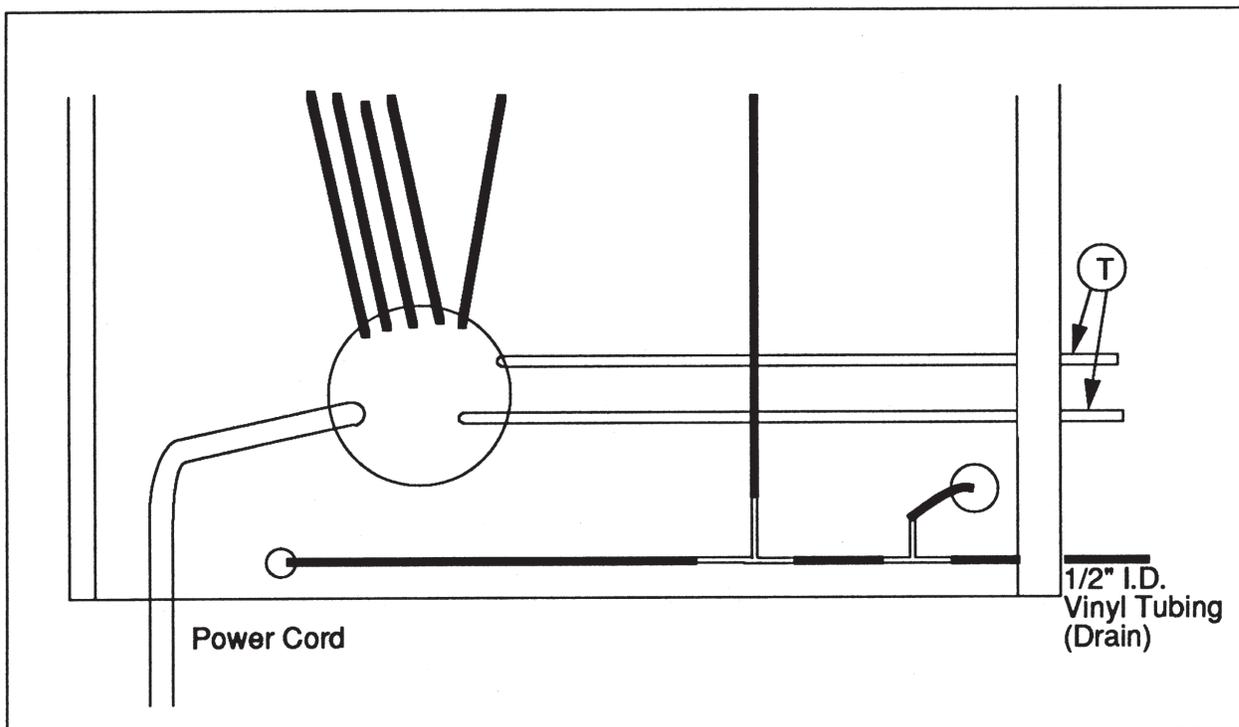


Figure 8

Plumbing Details

1. Select Method A or B to connect the water supply lines to your MEGA-PURE 12A Water Still.

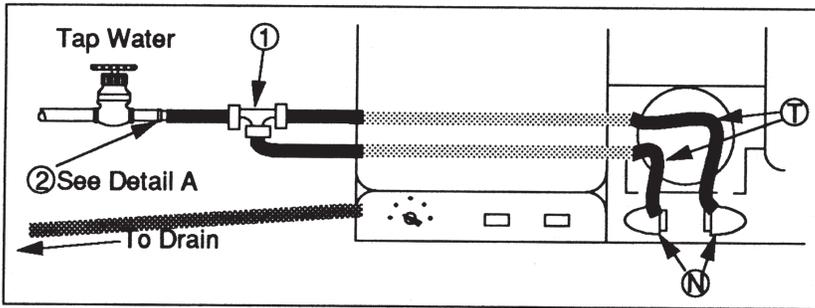
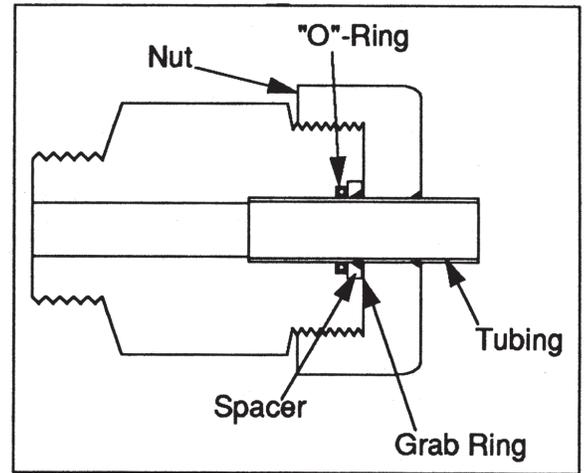


Figure 9



Detail A

Method A – Single supply of untreated tap water available to feed water still — See Figure 9.

- A. Locate "T" connector (1) and threaded connector (2) in the parts box.
- B. Connect the "T" connector (1) to the two high pressure hoses **T**. These hoses connect to solenoid valves **N** and may be shortened to a suitable length. Hand tighten nuts on "T" connector.
- C. Thread connector (2) into your water supply and tighten. Connect length of high pressure hose between "T" connector (1) and threaded connector (2). Hand tighten nuts on both connectors.
- D. Route 1/2" I.D. vinyl tubing to vented drain.

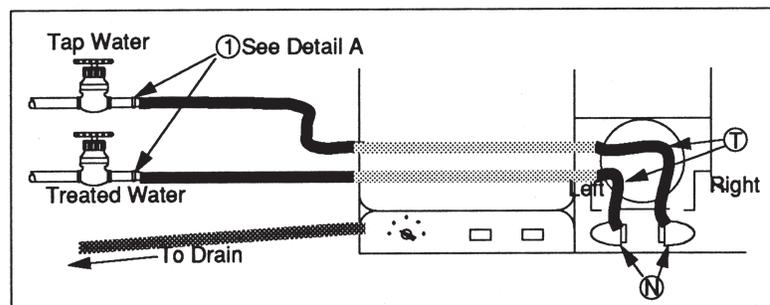


Figure 10

Method B – Supply of untreated tap water for cooling and supply of previously distilled, deionized or R.O. water for boiler feed — See Figure 10.

- A. Locate two (2) threaded connectors (1) in the parts box.
 - B. Thread one connector into each water supply and tighten.
 - C. Connect high pressure hose **T** from left solenoid valve **N** to treated water supply and hand tighten nut.
 - D. Connect high pressure hose **T** from right solenoid valve **N** to tap water supply and hand tighten unit.
 - E. Route 1/2" I.D. vinyl tubing to vented drain.
2. Locate the demineralizer cartridges (purchased separately) and unpack two (2). Remove the plastic bag and end caps. Place one cartridge in each holder as shown in Figure 12. Be sure labels on cartridges are upright and firmly seat cartridges against gaskets in holders by tightening knobs above holders. Figure 11 shows two D400499 high capacity cartridges in place.
 3. Tighten cartridge drain clamps located behind lower cartridge holders. Clamps are accessible through the left side of the cabinet.
 4. To connect your MEGA-PURE 12A Water Still to the Barnstead Automatic Collection System, refer to Figure 11 on page 14 for location. Connect the ACS tube from the parts box to still product outlet tube **J** with a Teflon connector **S**. The other end of the ACS tube connects to the automatic collection system inlet using a #18-A Thomas clamp. The long connecting tube packed with the collection system will not be used. Plug ACS input jack into ACS receptacle on bottom of still control box.

Installation

**Warning**

Do not mount your MEGA-PURE 12A Water Still directly over equipment that requires electrical service. Routine maintenance of this unit may involve water spillage and subsequent electrical shock hazard if improperly located.

**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 150 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.

Location of Unit

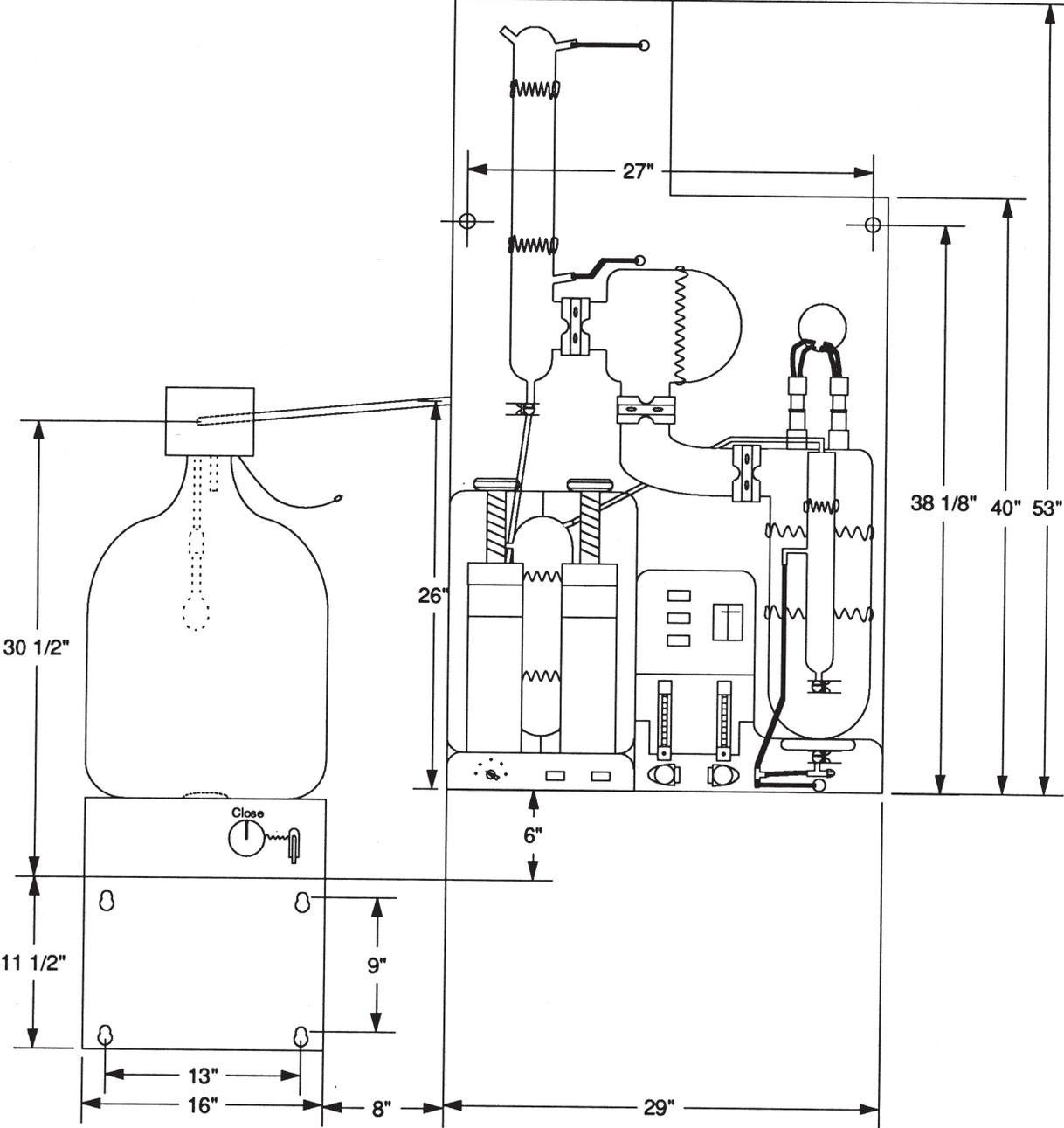
Space allotment for a still should include a 6" clearance at the sides and top to allow for cover removal and air circulation. Unit must be placed within 4 feet of water supply and should not be mounted over electrical equipment to avoid shock hazard (see warning above).

Wall mounting

The MP-12A Water Still has slotted holes for wall mounting. To support the weight of this unit, use 1/4" x 1-1/4" lag bolts for mounting. An optional wall mounting bracket is available for the Automatic Collection System.

Bench mounting

No special consideration for a "still only" setup. When used with the ACS, the Water Still must be placed on a 6" platform to allow for gravity feed of distilled water to the ACS.



Operation



Warning

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.

Use this device with water feed only. Failure to comply with the above could result in explosion and personal injury. To avoid electrical shock, always use a properly grounded electrical outlet of correct voltage and current handling capacity.

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.

"Caution - Hot Surface. Avoid Contact." Glass portions of still become hot when still is operating. To avoid burns, do not touch hot glass.



Note

Pretreated feedwater flow rate should be adjusted so as to "just maintain a full boiler." Flow water that is too fast will exhaust pretreatment cartridges prematurely.



Note

Under most feedwater conditions, the 450 cc/min. flow rate will provide greater than 60°C at the condenser vent. Very cold feedwater may require slightly less than 450 cc/min. to maintain vent temperature above 60°C. To optimize product water purity, use a thermometer to verify vent temperature to >60°C.

Plug electrical power cord into 208V, 220V or 240V, 60 amp receptacle (Hubbel #9460).

Refer to Figure 12.

1. Close drain plug **V** on bottom of boiler **A**.
2. Open valve at tap water source (and treated water source if so installed).
3. Turn power on and switch on the main power breaker on control box **M**. Do not use main power breaker to turn still on and off.
4. Switch purity selector on deionizer control **O** to purge position. Green light should be on.
5. Push "WATER" switch on control box **M**. Light will light and water will flow through solenoids.
6. Adjust left flowmeter **P** to approximately 280 cc/min and allow boiler **A** to fill until water is overflowing to the drain tube on constant level chamber **B**.
7. Push "OFF" switch and open drain plug **V** on bottom of boiler **A**. When boiler is empty close drain plug **V**.
8. Push "WATER" switch and allow boiler to fill. Set right flowmeter to approximately 25 GPH.
9. Set purity selector on demineralizer control to 50 KΩ.
10. Push "OPERATE" switch. Light will light and heaters will come on.
11. Allow still to operate for 15–20 minutes then check the flow meters **P** and **Q**. The right hand flowmeter should be adjusted until only a light wisp of steam is visible exiting from the condenser vent on the upper left of condenser **F**. Adjust left flowmeter to allow minimum overflow in constant level chamber **B**.

**Caution**

Do not use the main power switch as an "OFF" switch.

Do not use the flow meters to turn the water off.

Replace front protective cover before proceeding.

12. Your MEGA-PURE 12A Water Still should now be operational. Run the still for 4–5 hours to cleanse itself before collecting water for use. Resistivity will reach 10 megohm-cm after the initial 12–24 hours of operation.
13. To shut your water still off, push the "OFF" switch. This will shut the water supply and the heaters off.
14. If any difficulties are encountered in operating this water still, check all operating and assembly steps to be sure the still was assembled and is being operated correctly. If difficulty still exists, consult the Troubleshooting section of this manual.

Demineralizer Cartridge Changing

When one of the disposable demineralizer cartridges expires, the red "CHARGE CARTRIDGE" light will come on and the water still will shut down. Replace the cartridge as follows:

1. Turn off still and water supply.
2. Open the cartridge drain pinch clamp located behind the cartridges. Knobs on the cartridge holders may be loosened to speed up draining.
3. Remove and discard left hand cartridge.
4. Remove right hand cartridge and install in left hand holder. Tighten cartridge holder knob.
5. Place new cartridge upright in the right hand holder and tighten cartridge holder knob. Close drain pinch clamps.
6. Proceed through steps 4–10 in the operating instructions. Flow meters should not need adjustment.



Caution

Always allow the unit to cool completely before resuming operation. Cool water on hot glass could cause boiler damage.

High Temperature Cutoff Switch

Your MEGA-PURE 12A Water Still is protected against overheating by two thermal switches, located in the black "V" shaped bracket at the left hand side of the boiler, that will shut off both the water supply and power to the heaters when activated. Always allow the unit to cool completely (5–15 minutes) before resuming operation. Cool water on hot glass could cause boiler damage. When unit has cooled, press "WATER" and OPERATE" switches to restore normal operation. Check boiler occasionally for proper water level.

Maintenance and Servicing



Warning

To avoid electrical shock, always disconnect from power supply before maintenance and servicing. Refer servicing to qualified personnel.

For continued protection against possible fire hazard, replace fuses only with the same type and rating of fuse.



Warning

Wear eye and hand protection when using acid for cleaning, as acid splattering may occur.

Cleaning

For top performance and efficiency the MP-12A Water Still should be kept clean and free of scale. The MP-12A has a built-in deionization system to pretreat the boiler feed water and eliminate scale build-up. It is recommended that the boiler be drained and refilled with fresh water daily to flush the boiler of the concentration of contaminants from the previous day's run.

If cleaning is desired after extended operation or boiler scale is visible due to bypassing the deionizer system, the unit should be cleaned with a hydrochloric acid solution. This is done as follows:

1. Push unit "OFF" switch.
2. Disconnect the product outlet tube **J** from the product cooler **G** at Point 4 (see Figure 7). Connect 4' length of 3/8" I.D. vinyl tubing from parts box to product cooler at Point 4. Route vinyl tubing to drain.
3. Drain boiler 2/3 by opening stopcock **V**. Close stopcock **V** after boiler has drained.
4. Use the spare pinch clamp from the parts box to shut off overflow tube from constant level chamber **B** as close as possible to overflow stem.
5. Carefully pour approximately 800 ml of 10% hydrochloric acid solution into top of constant level chamber **B**. You may need to add water to the boiler to bring solution level up to scale level.
6. Wait approximately 10 minutes or until residue disappears. If additional cleaning is required, drain boiler down 1 inch and turn unit on for a few minutes until residue disappears. **Do not boil**. If scale remains that the 10% hydrochloric solution will not remove, rinse boiler three times with feed-water (fill and drain). Add 800 ml of 6% NaOH to boiler and let stand for 30 minutes. Flush boiler several times after draining.
7. Carefully drain the unit, remove clamp from overflow tube and refill with fresh water and operate for 30 minutes. Turn still off, drain boiler and refill with fresh water. Remove vinyl tubing from product cooler **G** and reconnect product outlet tube **J** at Point 4.

Troubleshooting

General

<u>Problem</u>	<u>Causes</u>	<u>Solution</u>
Frozen Teflon Stopcock Plug	Teflon has an expansion much greater than that of Borosilicate glass. A plug installed too tightly will freeze in its glass shell.	Use cold water or ice to cause the Teflon to shrink and loosen. Never use heat.
Leaks.	The most common leak is one occurring in the vinyl drain tubing. Hot water causes softening and pulling loose at the plastic barbed connectors.	Runs of vinyl tubing should be supported to reduce the pull on the plastic connectors. Small clamps may be used to firmly hold the vinyl tubing to the plastic connectors.
Rough Boiling.	Rough boiling is the result of alkali attack to the matte finish on the heaters. The most common cause is using water pretreated with NaCl regenerated water softeners.	Remove heater and lightly roughen surface with 150 grit sandpaper.
Scale Build-up.	A brownish-white scale in the boiler indicates that the demineralizer is not being used or the cartridges need changing.	Clean boiler per cleaning instructions. Scale should not be allowed to accumulate as heaters may be damaged.
Heater Failure. <i>Heater failure due to scale build-up or alkali attack will not be replaced under warranty.</i>	<p>Short life on Vycor immersion heaters can usually be attributed to use of water pretreated with NaCl regenerated water softeners or excessive scale buildup.</p> <p>Softened water used as a boiler feed causes a concentration of sodium ions and alkaline attack of the Vycor glass. Rough boiling will be the first indication of alkaline attack. At failure, the heaters will usually pinhole and water entering will short out the element.</p> <p>Scale build-up will occur when boiler feed is not being deionized.</p>	<p>If softened water must be used, heater life can be prolonged somewhat by draining boiler every day.</p> <p>When using the still without the deionizer, scale build-up must be removed after every 15-20 hours of operation (see "Cleaning Instructions"). Failure to do so will cause heaters to build up heat internally and fail or cause glass envelope failure near the air/water interface.</p>

General (cont.)

Problem	Causes	Solution
Steam at condenser vent.	A slight wisps of steam exiting at the condenser vent is normal. Gases in the steam are also being removed.	If there is an excessive amount of steam leaving the condenser vent, increase the cooling water flow rate at flowmeter Q .
No steam at condenser vent.		If no steam is visible, decrease flow rate at flowmeter Q .
Water pressure variations.	Pressure fluctuations in your tap water line will cause erratic reading in the flowmeter and may cause water level in boiler to drop.	Have a plumber install a pressure regulator in your tap water line and regulate to 20-25 psi.
Output less than 12 liters/hr.	Heaters rated 208V or 240V will produce in excess of 12 L/hr. of distilled water when run at the rated voltage. At lower voltages, output will drop accordingly. Also see "Steam at Condenser Vent" as excess steam at this point will reduce output.	
Leaking around demineralizer cartridges.	Improperly seated gaskets or loose cartridge.	Check system to be sure cartridge is seated on gaskets and that securing knob has been screwed down tight. If leak persists, replace gaskets.
Premature cartridge failure.	NaCl regenerated water softeners. Chlorine in feedwater Silica or dirt in water supply. Can reduce cartridge life by clogging the resins. Silica will also carry over into the boiler and be brown or tan in color.	The D400499 cartridges were designed for use in hard water applications. Use on soft water sources will reduce cartridge life by 30-70% (depending on softness). The D400499 cartridge will remove some chlorine, but heavily chlorinated water supplies will trip the "Change Cartridge" light prematurely. Addition of an activated carbon filter to your water supply will extend cartridge life. Connect per Figure 10. If this appears, addition of a 5 micron filter to your water supply will eliminate silica and extend cartridge life.

TROUBLESHOOTING

Electrical

Before troubleshooting can begin, the problem component must be determined. That is accomplished as follows:

1. Disconnect the demineralizer and Automatic Collection System jacks from the still control box and attempt to run the still. If still fails, see "Still Troubleshooting." If still runs, go on to the next step.
2. Connect the demineralizer input jack back up to the still control box and attempt to run the still. If still fails to run see "Demineralizer Troubleshooting." If still runs, see "Automatic Collection System Troubleshooting."

Still Troubleshooting

Problem	Causes	Solution
Heaters and water will not stay on.	Hi-temp cut-off switch open.	Remove control box and black "V" shaped switch bracket and replace both switches.
Heater not working.	Heater burnt out.	Replace heater (unit can be operated on less than four heaters.)
Water will not come on, but light works.	Solenoid valve not working.	Check plug for connection. Replace solenoid valve.
No lights in switches.	Lights burnt out.	Replace switches (switches will operate without lights).
Main breaker opens.	Heater shorted.	Check heater (19Ω for 208V or 22Ω for 240V) and replace.
Unit off, but water still flowing.	Wrong voltage.	Check input voltage against heater rating. Correct.
Unit off, but water still flowing.	Solenoid valve installed backwards.	Solenoid labeled "in" on input side. Check.

Demineralizer Troubleshooting

<u>Problem</u>	<u>Causes</u>	<u>Solution</u>
Still will not operate.	Cartridge expended. Red light burnt out. Relay contacts open. No power.	Change cartridge. Check light & replace. If operational, clean contacts. If not, replace. Check fuse.
No green light.	Green light burnt out.	Check & replace.
Still on with red light on demineralizer.	Relay contacts closed. Input jack not plugged in.	Check and replace relay. Check and reconnect jack.
Both lights on, or good lights will not light, or erratic light operation.	Printed circuit board.	Replace.

Automatic Collection System Troubleshooting

<u>Problem</u>	<u>Causes</u>	<u>Solution</u>
Will not turn still on or off as it should.	Float stuck. Switch not working. Input jack not plugged in.	Remove level control cover and free-up float. Replace switch. Check and reconnect jack.

Replacement Parts

**Warning**

To avoid electrical shock, always disconnect from power supply before maintenance and servicing. Refer servicing to qualified personnel.

Glass Replacement Parts

Item	Description	Part Number
A	Boiler	401934
B	Constant Level Chamber	401923
C	Vycor® Immersion Heater—240V, 2500W	740883
	OR	
	Vycor® Immersion Heater—208V, 2500W	740895
D	90° x 3" Elbow	401924
E	Steam Trap	401925
F	Condenser	401926
G	Product Cooler	401927
H	Boiler Fill Tube (Cooler to Connector)	401928
I	Boiler Fill Tube (Connector to Boiler)	401929
J	Product Outlet Tube	401931
K	Condenser/Cooler Tube (Condenser to Connector)	401932
L	Condenser/Cooler Tube (Connector to Cooler)	401933
V	Boiler Drain Stopcock Assembly	410038
N/S	ACS Tube	401935

Electrical Replacement Parts

Still Control Box

Item	Description	Part Number
M	Complete Control Box	440378
N/S	Main Power Breaker	410138
N/S	"Water" or "Operate" switch	410916
N/S	"Off" Switch	410917
N/S	R-1 Relay	410473
N/S	R-2, 3 Relay	410552
N/S	Bridge Rectifier	410471
N/S	Transformer	410472
N/S	High Temp Cut-Off Switch	410137
N/S	Fuse, 5 amp	FZX16

Demineralizer Control Box

Item	Description	Part Number
O	Complete Control Box	440379
N/S	Conductivity Electrode	441938
N/S	Printed Circuit Board Assembly	PC678X1
N/S	Red Lamp Assembly	410122
N/S	Green Lamp Assembly	410123
N/S	Fuse	410124
N/S	DI & ACS Jack Assembly	CE677X1A

Hardware Replacement Parts

P	Flowmeter (0 - 600 cc/min)	410152
Q	Flowmeter (0 - 30 gal/hr)	400485
R	3" Coupling	409170
S	Glass Center, Teflon, 7/16" I.D.	401416
T	Tubing, Hi-Press, 1/4" O.D. x 5' Long	410126
U	Plastic "Hose Fitting" Assortment	410447
W	#18-A Thomas Clamp	410141
X	Boiler or Trap Spring	410528
Y	Condenser or Product Cooler Spring	410918
Z	Constant Level Chamber Spring	410211
AA	Boiler Fill Tube Clip	410921
N/S	Demineralizer Gaskets (4/case)	410671
BB	O-Ring	GSX29

N/S = Not Shown

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PYREX and VYCOR are registered trademarks of Corning, Incorporated.

MEGA-PURE is a trademark of Barnstead International.

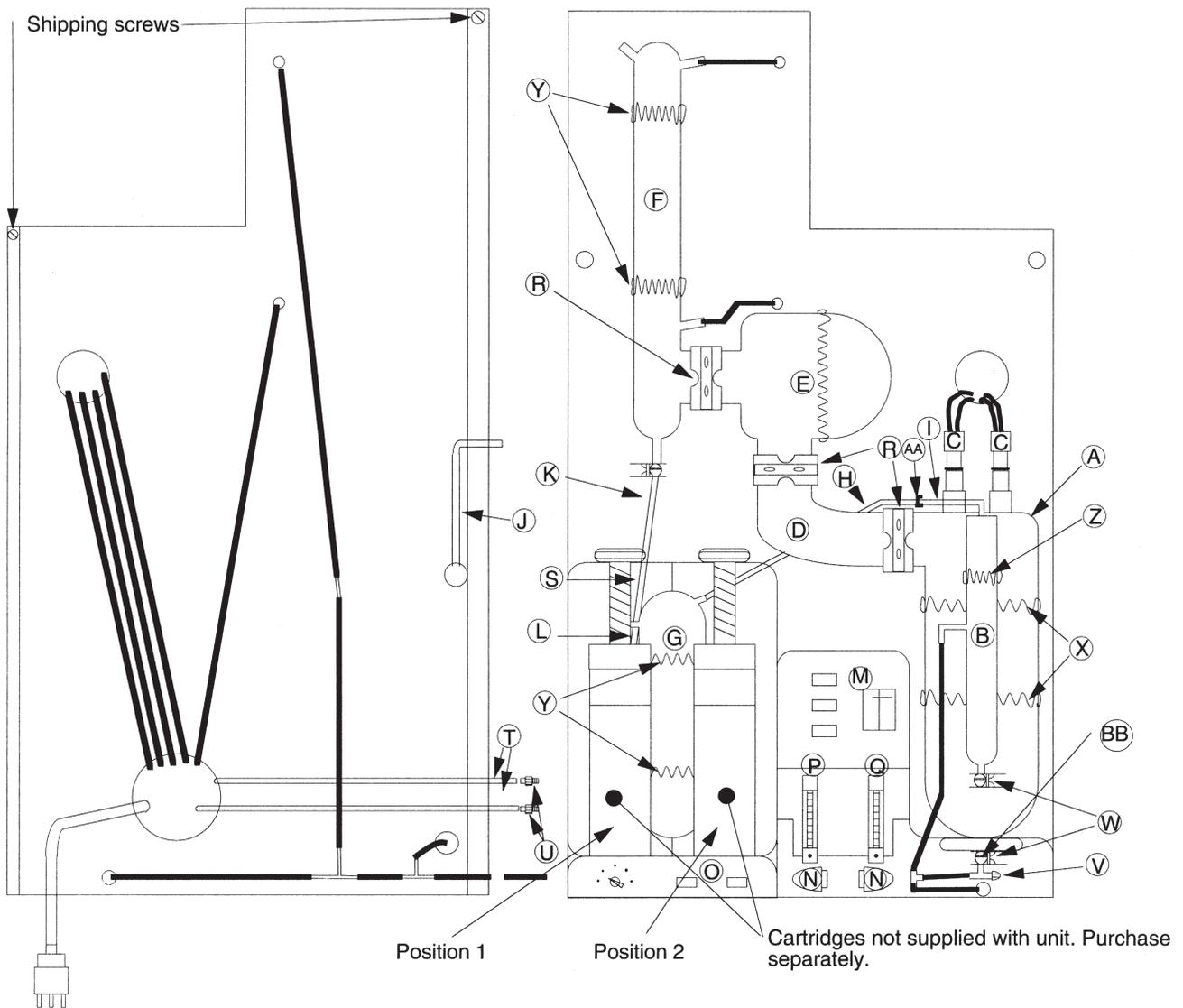
Schematic Diagrams

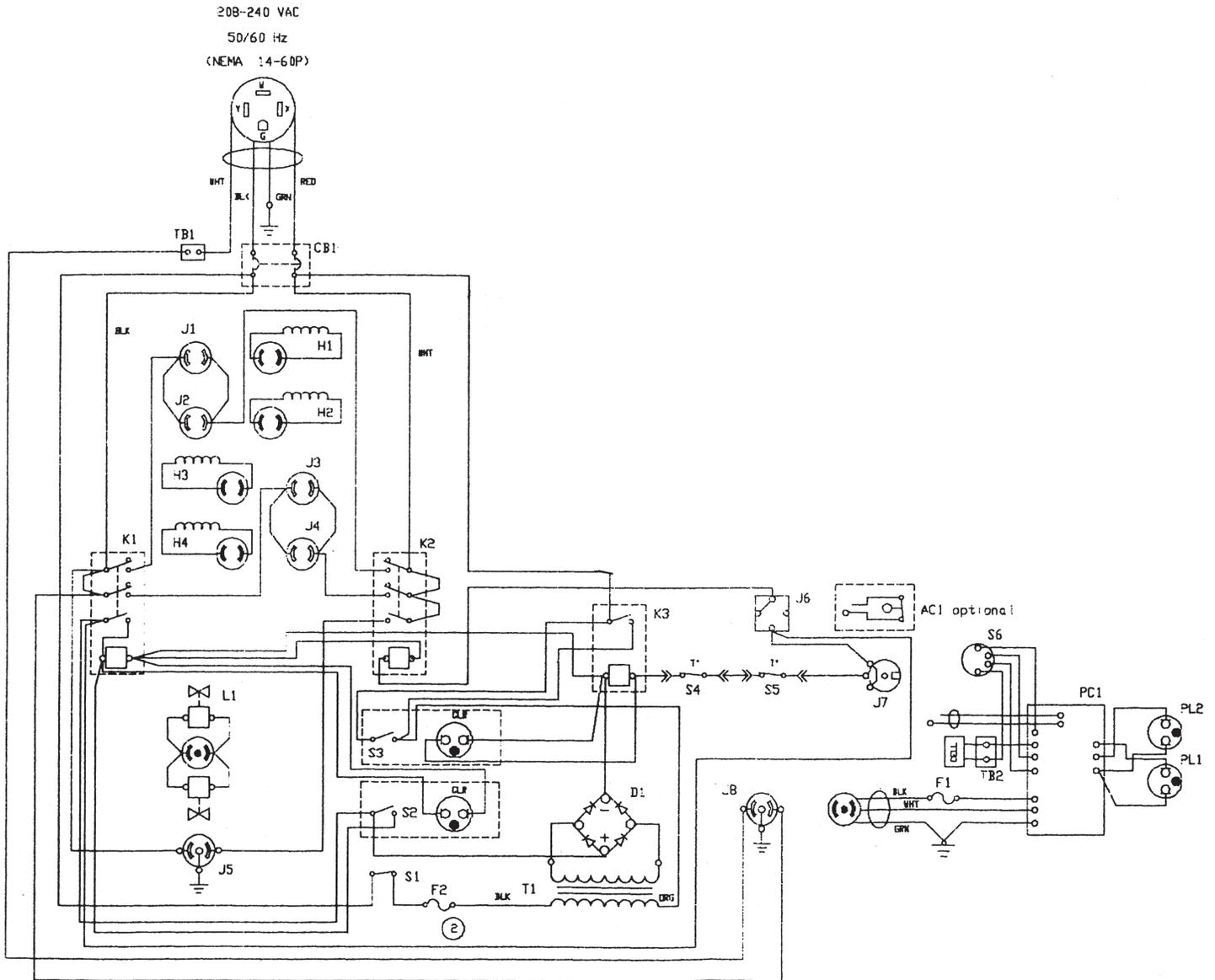
#3515 – AUTOMATIC COLLECTION SYSTEM (OPTIONAL)



NOTES:

1. CONTROL BOX SCHEMATICS ARE ILLUSTRATED WITH NO POWER APPLIED.
2. WHEN CONTROL JACKS FROM DEMINERALIZER AND ACS ARE CONNECTED TO STILL CONTROL BOX, STILL OPERATION IS CONTROLLED BY THE DEMINERALIZER AND ACS. DISCONNECT THESE JACKS TO ISOLATE PROBLEMS FOR TROUBLE SHOOTING.





Ref. No.	Description
CB1	Circuit Breaker
D1	Bridge Rectifier
H1	Heater Assembly, 2500 W
H2	Heater Assembly, 2500 W
H3	Heater Assembly, 2500 W
H4	Heater Assembly, 2500 W
J1	Heater Receptacle
J2	Heater Receptacle
J3	Heater Receptacle
J4	Heater Receptacle
J5	Water Solenoid Receptacle
J6	Water Level Jack
J7	Demineralizer Jack
J8	Demineralizer Receptacle
K1	Relay, with Aux. Switch
K2	Relay, with Aux. Switch
K3	Relay
L1	Dual Solenoid Valve Assembly

Ref. No.	Description
S1	Switch/Off
S2	Switch/Operate
S3	Switch/Water
S4	Switch/Thermal, Open 170° ±5°F Closed 140° ±9°F
S5	Switch/Thermal
S6	Rotary Selector Switch
T1	Transformer
TB1	Terminal Block, Part 1 " " Part 2
TB2	Terminal Block
AC1	Auto Collection System (Optional)
Cell	Cell
F1	Fuse
F2	Fuse, .5 Amp
PC1	Circuit Board
PL1	Pilot Light, Green
PL2	Pilot Light, Red

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.

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 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:



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