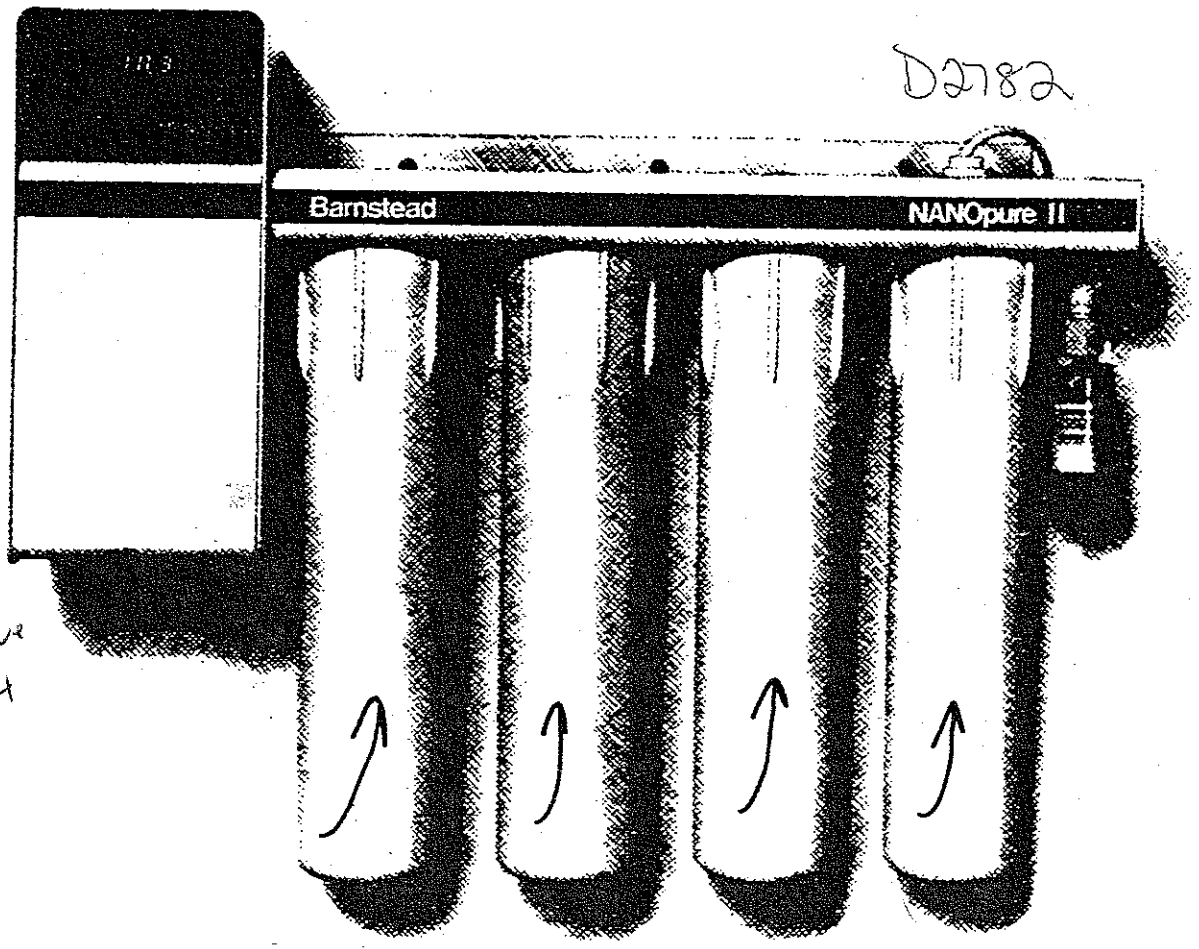
Barnstead NANOpure II

Owner's Manual

D2782



Check Valve
02214

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INTRODUCTION

It is the user's responsibility to read and understand the contents of this manual prior to installation and use of this equipment.

This manual contains the information you will need to install, operate, and maintain the NANOpure II, D3700 Series, cartridge deionization system manufactured by **Barnstead\|Thermolyne** Company.

The NANOpure II is designed to produce Type I Reagent Grade Water equal to or exceeding standards established by ASTM, CAP, and NCCLS.

Careful attention to the following instructions will assure that the NANOpure II runs properly and produces water to specification.

Illustrated parts list are attached inside the front and back cover and in the centerfold. Open the book at the centerfold and unfold the front and back drawings. Take a few minutes to familiarize yourself with the hardware before installation.

WARNING

THIS DEVICE IS TO BE USED WITH WATER FEEDS ONLY. SANITIZING/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.

Flow Diagram

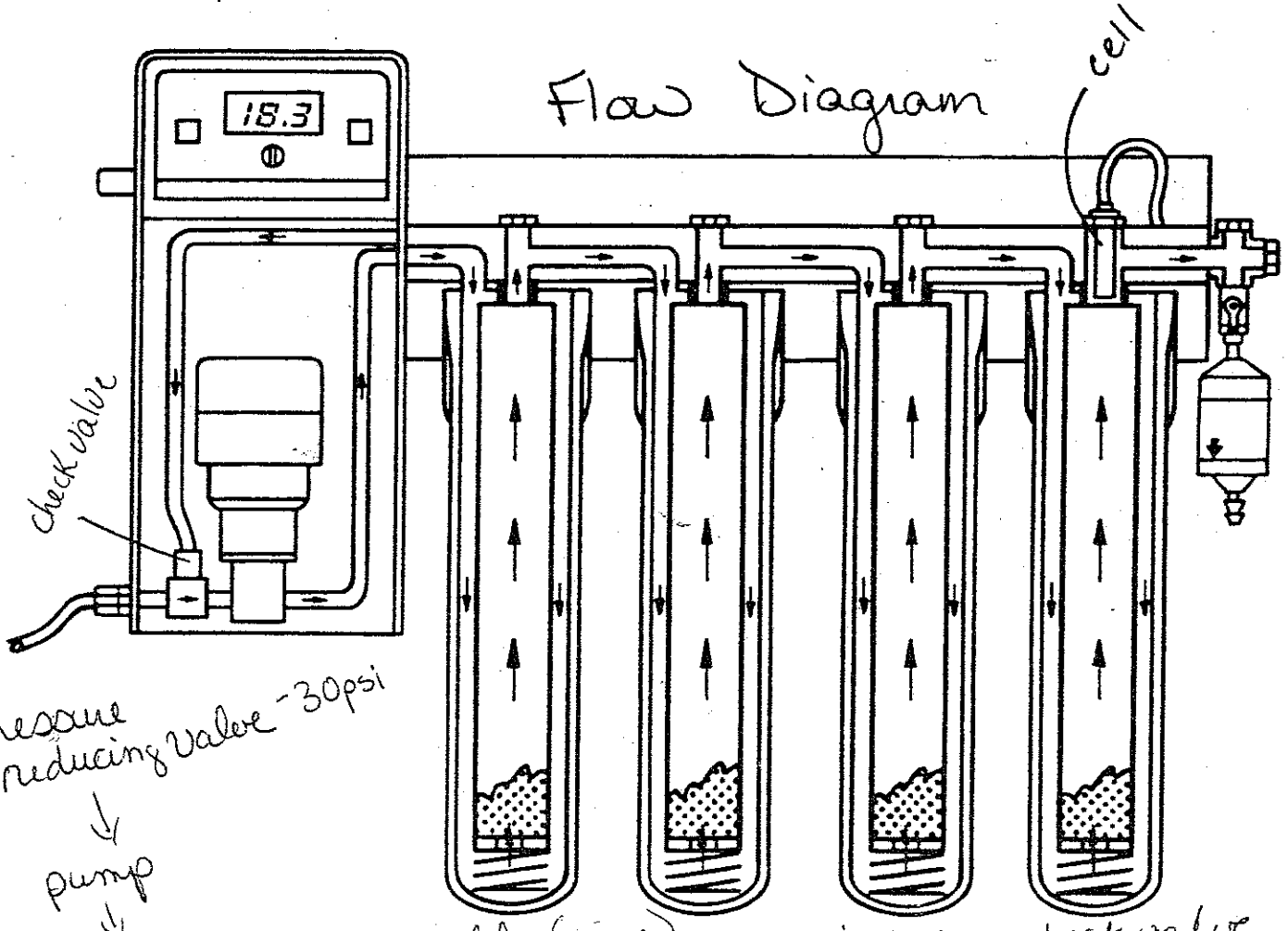


Figure B. System Flow Schematic

pressure reducing valve - 30psi
↓
pump
↓
1st cart - 2 - 3 - 4 ⇒ cell - (ions) ⇒ recirculates - check valve

change O ring w/ cartridge

leaks
- around heads
- canister - NOT up to purity

INSTALLATION

PRECAUTIONS BEFORE INSTALLATION

The NANOpure II deionization system can be used on pretreated or high quality tap water. Some municipal tap water supplies contain a very high concentration of suspended particulates, colloids, dissolved organic and inorganic materials that should be removed by pretreatment before the water is processed by the NANOpure II. The 4-Module unit is typically used with suitable tap water or for increased capacity with pretreated water. The 3-Module unit is typically used with water pretreated by reverse osmosis, distillation or deionization. If you plan to use tap water feed for your NANOpure II, **Barnstead/Thermolyne** encourages the use of our water analysis service to verify feedwater suitability. A sample collection kit may be obtained by contacting any of our offices, or your preferred laboratory supply dealer.

The NANOpure II requires expendable pretreatment and deionization cartridges and final filters which are not supplied with the unit and must be purchased separately. These expendables are available as individual components or in Expendables Kits, as follows:

Your NANOpure II is supplied with a pre-wired jumper (Item 4, Figure A) in the "pump interlock" connector. Installation of options D0603, D0606 (Float Switch) or D2706 (Pressure Switch) require removal of this jumper plug. DO NOT discard this plug, it will be needed for certain maintenance operations.

The 100/115 VAC version power cord is provided with a plug to be connected to a standard grounded electrical outlet. The 230 VAC version power cords are provided with a European type plug. Refer to TECHNICAL CHARACTERISTICS in this instruction for the electrical requirements, Table 2 and electrical wiring schematic on page 22 when either hard wiring or connecting the appropriate plug to the power cord. The power cord on NANOpure II is color coded to CEE* specifications.

TABLE 1. EXPENDABLES KITS

D3805 3-Module Expendables Kit Consisting of
1 ea. D0835 Pretreatment Cartridge 2 ea. D0809 Ultrapure Cartridges 4 ea. D3750 NANOpure Final Filters

D3804 4-Module Expendables Kit Consisting of
1 ea. D0835 Pretreatment Cartridge 1 ea. D0803 High Capacity Cartridge 2 ea. D0809 Ultrapure Cartridges 4 ea. D3750 NANOpure Final Filters

TABLE 2. POWER CORD COLOR CODE

CEE* Color Coding	North American Standard Color Coding	Function
Light Blue	White	N — Neutral
Brown	Black	L — Live
Green/Yellow	Green or Green/Yellow	E — Earth or Ground

*International Commission on Rules for the Approval of Electrical Equipment.

WARNING

ENSURE THAT THE EQUIPMENT IS CONNECTED TO ELECTRICAL SERVICE ACCORDING TO LOCAL AND NATIONAL ELECTRICAL CODES. FAILURE TO PROPERLY CONNECT MAY CREATE A FIRE OR SHOCK HAZARD.

UNPACKING

Unpack the NANOpure II carefully. The pump housing is packaged separately from the cartridge assembly. Remove the "NANOpure II Mounting Instructions and Template" from the inside back cover of this manual.

Screws and fasteners required for wall mounting are not supplied with unit. See mounting template for further information.

SYSTEM LOCATION

Unfold the template carefully and follow the instructions on the template to prepare for mounting the unit on the wall.

The NANOpure II must be mounted at a level where there can be easy access to controls and the digital display can be read.

WARNING

DO NOT MOUNT NANOpure II DIRECTLY OVER EQUIPMENT THAT REQUIRES ELECTRICAL SERVICE. ROUTINE MAINTENANCE OF THIS UNIT MAY INVOLVE WATER SPILLAGE AND SUBSEQUENT ELECTRICAL SHOCK HAZARD IF IMPROPERLY LOCATED.

MOUNTING AND UTILITY CONNECTIONS

CAUTION

DO NOT CONNECT UNIT TO ELECTRICAL SERVICE UNTIL INSTRUCTED TO DO SO.

Mount the NANOpure II unit by the following steps:

A. Remove the cartridge canisters (Item 1, Figure G) from the assembly by unscrewing them. Mount the cartridge assembly onto the wall using the holes marked T (for 3-Module) or F (for 4-module) on template.

B. Remove the plastic protective plug located on the left side of the first cartridge canister and remove the Fastner Pin at the top of this hole. Feed the resistivity cell cable behind the wall bracket so that the cable extends beyond the left side of the wall bracket.

C. Now place the pump housing on a table. The pump housing has a "push to open" type concealed latch. Press the door just under the resistivity meter until you hear a click. Release pressure and open the door. The door may stick because of packing material. If this happens, pull gently on the rubber band, holding the packing material in place. Remove packing material.

D. Remove the cloth bag of tools and plastic bag of Teflon® tape, feedwater tubing and fittjngs.

E. Remove the two screws that hold the resistivity meter in place.

F. With both hands, put your fingers behind the back of the bracket beneath the resistivity meter and press both thumbs against the front edges of the pump housing. Firmly, but carefully draw the resistivity meter assembly toward you until the printed circuit board is released from its connector.

CAUTION

THE METER ASSEMBLY AND PUMP HOUSING CONTAIN HAZARDOUS ENERGY COMPONENTS THAT CAN BE DAMAGED BY CARELESS HANDLING. EXERCISE CAUTION WHEN HANDLING THE METER ASSEMBLY OR WORKING INSIDE THE HOUSING.

G. Disconnect short piece of plastic tubing by unscrewing the nut (Item 16, Figure E) from the discharge side of the pump. Insert the round adapter (Item 24, Figure E) in the left side of the cartridge assembly. Make sure the O-Ring is in place in the hole before installing the Fastner Pin. Install and seat the Fastner Pin. This may require some gentle tapping with a hammer. The Fastner Pin is properly seated when it is at a level equal to the other Fastner Pins.

H. Holding the pump housing up next to the cartridge assembly, insert the plastic tubing from the cartridge assembly through the round hole in the pump housing.

I. Run the resistivity cell cable through the rectangular hole.

®Registered Trademark of DuPont

J. Maneuver the pump housing over the fitting attached to the cartridge assembly and then hang the housing on the fastener previously installed.

K. Unwrap the coiled tubing connected to the pressure regulator. **DO NOT REMOVE THE FITTING AT THE END OF THIS TUBE.** Snake the tubing through the rectangular hole and push through to the right side of the wall bracket.

L. Reconnect the short tube from the cartridge assembly to the pump discharge. Finger tighten only. Do not use a wrench.

M. Make sure that the cable is placed behind cable guide (Item 28, Figure E) provided next to connector. No wires or tubing should cross in front of connector strip.

N. Connect the resistivity cell wires to the connector block using the following table. A small screwdriver is required to reach the screw heads in the connector block. Use established wiring as a guide for proper insertion of wires.

TABLE 3. WIRING TABLE

Wire Color	Pin Number
Clear	17
Red	19
Black	21

O. Install the remaining fasteners in the wall bracket of the pump housing. It is helpful here to lift the front door and check for alignment of the blue stripes. Adjust the housing up or down to achieve alignment and then tighten all fasteners.

P. Re-install the resistivity meter in the housing carefully. Make sure the meter is inserted straight. When the circuit board is properly seated, the front panel will be about ¼" behind the front edge of the pump housing cover. Secure this assembly with the two screws removed earlier.

NOTE

In some installations, Steps Q & R are more easily accomplished if the faucet block assembly is removed from the unit. If this is necessary, remove the block by prying up the Fastner Pin.

Q. Remove the rear ¼" plug from the faucet block. Remove excess tape in threads of faucet block. Remove the fitting from the tubing that extends from the wall bracket and screw fitting into the faucet block. Finger tighten and then tighten one turn with a wrench. Reconnect the tubing to the fitting in faucet block (finger tighten only).

R. If there is excess tubing, cut the tube to the correct length. Make sure you leave enough tube to allow for bends and a little slack. Disassemble the fitting from the short piece of tubing you cut off by backing the hex nut and the stainless steel grab ring off of the tube. The grab ring moves easily in only one direction (backwards). To re-install this fitting, see section, Tubing Connector Installation.

S. To make your feedwater connection, refer to Figure D on page 6 and locate your particular configuration. Make connections as shown with tubing and fittings provided in plastic bag.

TUBING CONNECTOR INSTALLATION

CAUTION

DO NOT TIGHTEN TUBE FITTING HEX NUT WITH A WRENCH. TIGHT CONNECTIONS CAN BE EASILY MADE BY HAND.

A. Completely disassemble the fitting. Refer to Figure C to familiarize yourself with the names of the component parts.

B. Make sure the tubing is cut off reasonably square and that no plastic burrs or ridges are present.

C. Place the grab ring and back up ring in the hex nut in the order and orientation shown in Figure C. Thread the nut onto the connector. DO NOT use the O-ring at this time.

D. Push the tubing through the nut until it bottoms out in the connector.

E. Remove the adapter nut and tubing. Place the O-ring over the tubing. Be careful not to push the backing ring or grab ring further back on the tubing when installing the O-ring.

F. Install the hex nut on the connector and hand tighten.

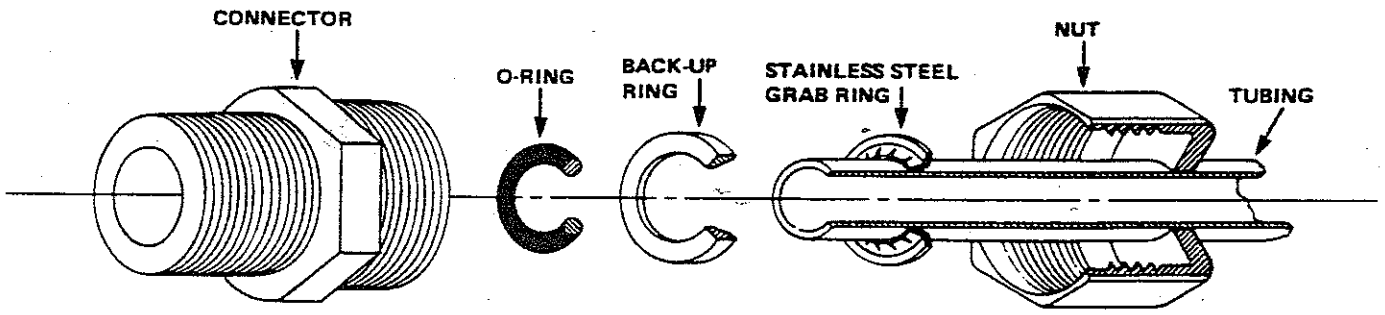


Figure C. Typical Polypropylene Tubing Connector Installation

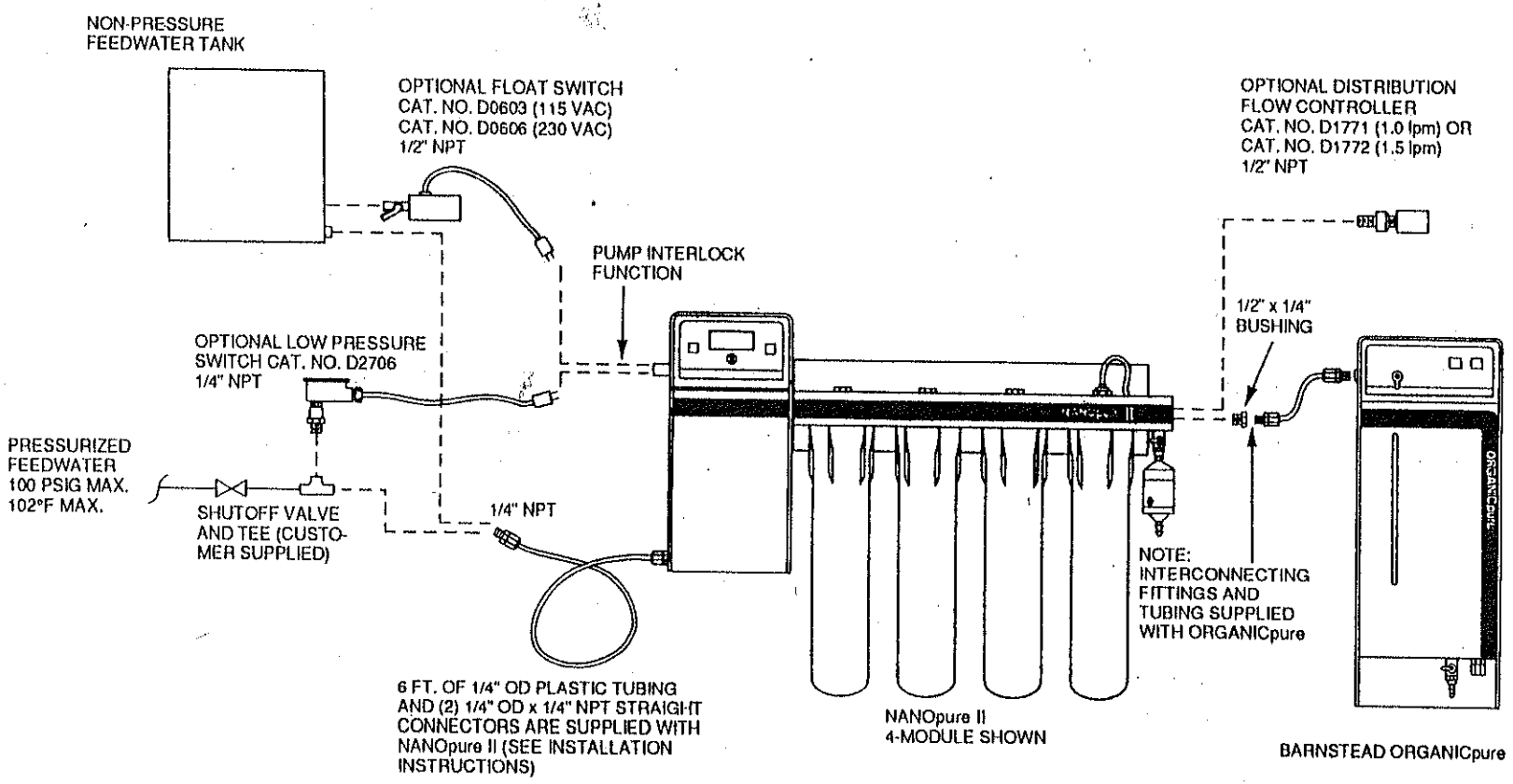


Figure D. Feedwater and Outlet Connection Options

OPERATION

INITIAL OPERATION

Install the cartridges from the Expendables Kit as follows:

A. Remove seals from both ends of the large blue cartridge.

B. Check to be sure a spring is installed in each canister.

C. Check to be sure that the small O-ring inside the head (Item 13, Figure G) is in place. This is important because water will bypass the cartridge if this O-ring is not in place.

D. Place cartridge(s) in canister with the LARGE OPENING DOWN.

E. Refer to Table 4 for the correct left to right positioning of cartridges. This information is also shown on the side of the Expendables Kit box.

NOTE

Because of the fragile nature of the macroreticular resin used in the D0835 Pretreatment Cartridge, it is possible that shipment may have caused fracturing of some of the resin particles. Resin fracturing will not degrade cartridge performance. However, it may reduce system performance as evidenced by premature clogging of the Final Filter. To insure optimum system performance and to prevent premature filter clogging, it is recommended that the D0835 Pretreatment Cartridge be rinsed to remove any fine particles. Install only the Pretreatment Cartridge in the first canister and run water to drain for ten minutes.

F. Insert the canister vertically upward so that the boss in the bottom of the head is inserted in the hole in the top of the cartridge. Screw the canister onto the head by hand until a tight connection is made.

CAUTION

IT DOES NOT TAKE MUCH FORCE TO MAKE A TIGHT SEAL WHEN TIGHTENING THE CANISTER ON THE HEAD. OVERTIGHTENING WILL RESULT IN O-RING DAMAGE AND LEAKAGE.

Do not install the NANOpure Final Filter at this time.

TABLE 4. CORRECT CARTRIDGE SEQUENCE

(Left to Right)

3-Module		4-Module	
Type	Catalog No.	Type	Catalog No.
1. Pretreatment	D0835 D0836	1. Pretreatment	D0835 D0836
2. Ultrapure	D0809	2. High Capacity	D0803
3. Ultrapure	D0809	3. Ultrapure	D0809
		4. Ultrapure	D0809

spring - 1-2" = exhausted

NOTE

The correct sequence of cartridges is important in producing the desired quality of water.

FILLING PROCEDURE

CAUTION

DO NOT RUN THE PUMP DRY. DRY RUNNING WILL DAMAGE THE PUMP. ALWAYS MAKE SURE YOU HAVE AN ADEQUATE VOLUME OF FEEDWATER.

After every cartridge exchange, some air will be trapped in the system. Air should be purged before routine use, by the following procedure.

A. Place a container or suitable drain under the faucet block.

B. Open all inlet valves and the outlet valve (handle in vertical position).

C. Plug the unit into the electrical service.

D. Press the "power" button on the resistivity meter. To understand the indications on the digital purity meter, refer to Smart Purity Meter section.

E. When there is a steady flow from the outlet valve, close the outlet valve.

F. Check all fittings for leaks and tighten as necessary.

G. Set the resistivity meter "setpoint" switch to the minimum resistivity setting ("1.0", "10.0", or "16.7" megohm-cm) required by your application.

H. Install final filter using instructions on final filter box or as follows:

1. Remove hex nut, backing ring and O-ring from adapter on faucet block.
2. Place hex nut on filter. Insert backing ring into hex nut. FLAT SIDE OF RING MUST FACE AWAY FROM FILTER.
3. Place O-ring on filter hose fitting and press O-ring to seat around first hose barb.
4. Insert filter into adapter and finger tighten hex nut. Finger tighten only. DO NOT tighten with a wrench.

I. Allow the pump to recirculate water before withdrawing any water from the unit. During this recirculation, the digital display will register a gradual improvement of water quality indicating that the ion exchange cartridges are functioning properly. After desired resistivity is reached, open the faucet valve and discard about 2 liters (½ gallon) of water into a container to rinse the filter.

J. While water is flowing, carefully open the vent on top of the final filter to release any air trapped in the filter. This is accomplished by turning the vent fitting counterclockwise until water flows from the vent, and then closing the vent. After venting there should be a continuous flow from the filter.

NORMAL OPERATION

It is recommended that the pump be left operating during the normal workday to eliminate the need of rinsing the unit up to purity each time product water is required from the unit.

For an immediate indication of the system water temperature, press the green "temp°C" pushbutton switch. When the green light is on, the meter is indicating temperature.

NANOpure II is ready to deliver Type I Reagent Grade Water.

SMART PURITY METER

SELF CHECK SEQUENCE

When the NANOpure II is first turned on, the resistivity meter automatically goes through a series of checks to assure you of proper performance.

A. To visually verify that all of the segments of the display are functional, all segments and decimals are illuminated, displaying three 8's and two decimal points.

B. The numeric portion will disappear leaving the two decimals displayed for a short period of time. During this time, the error detection program is being verified (see section on Error Indications if sequence does not continue).

C. The entire display will go blank for a short period. During this time, the circuitry is being verified for accuracy.

D. The display will then indicate the resistivity measurement.

NORMAL OPERATION

After completing the self check sequence, the meter will measure resistivity of the NANOpure II system water, automatically corrected to 25°C. At this time, you may also measure system water temperature in °C by depressing the green button.

The three setpoints, "1.0", "10.0", and "16.7" megohm-cm) correspond to the recommended minimum quality set forth by the following specifications:

ASTM (16.7 megohm-cm)
CAP/NCCLS (10.0 megohm-cm)
Barnstead (1.0 megohm-cm) endpoint

This feature is not a controller, but an indicator to alert the user when the ionic purity falls below selected limits. As long as the water resistivity is at or above the selected setpoint, the meter will function normally. A low resistivity condition will be indicated by a blinking display. The blinking will cease automatically when resistivity rises above the setpoint.

NOTE

This is not an error indication. A blinking display will show the correct water resistivity.

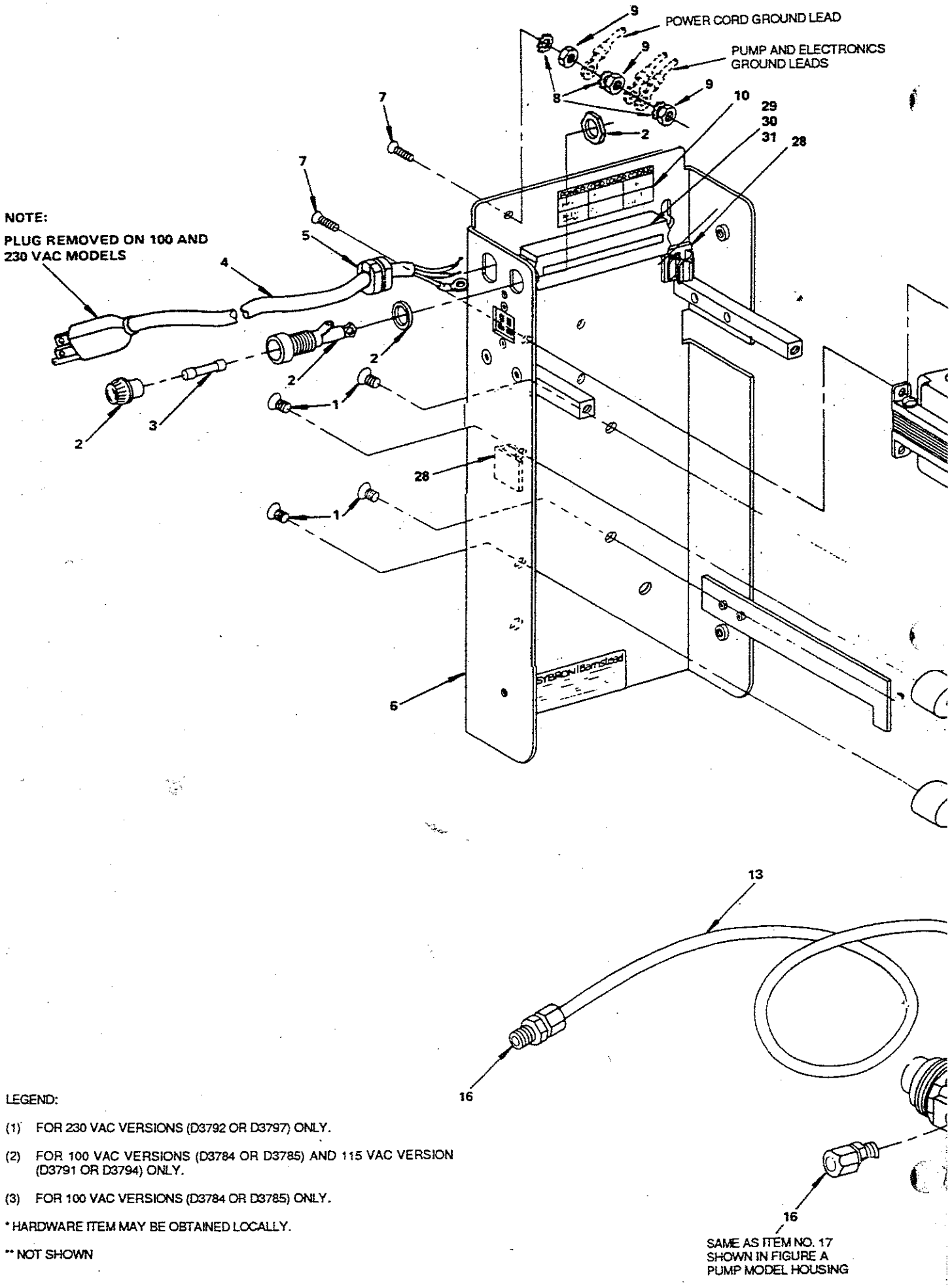
ERROR INDICATIONS

In addition to constantly measuring resistivity, the NANOpure II automatically verifies system performance and will give the following indications of malfunction.

Blinking Decimals (no numeric display)	Air in system. Refer to Initial Operation to purge. Broken or disconnected wire from the cell to the electronics.
Continuously Lit Decimals (no numeric display)	Temperature measuring device disconnected. Broken wire at cell. (Requires cell replacement.) This indication can also be caused by incorrect wiring of the cell to the printed circuit connector block. Check for proper wiring before replacing cell.
Lower Case "c" displayed autocalibration	Electronics not functioning. Return to factory. meter

ERR- air
cell
meter

* all 8's = cell
• meter board ~ cell for repair
• try to clean board
or cell



LEGEND:

(1) FOR 230 VAC VERSIONS (D3792 OR D3797) ONLY.

(2) FOR 100 VAC VERSIONS (D3784 OR D3785) AND 115 VAC VERSION (D3791 OR D3794) ONLY.

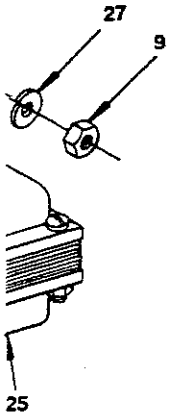
(3) FOR 100 VAC VERSIONS (D3784 OR D3785) ONLY.

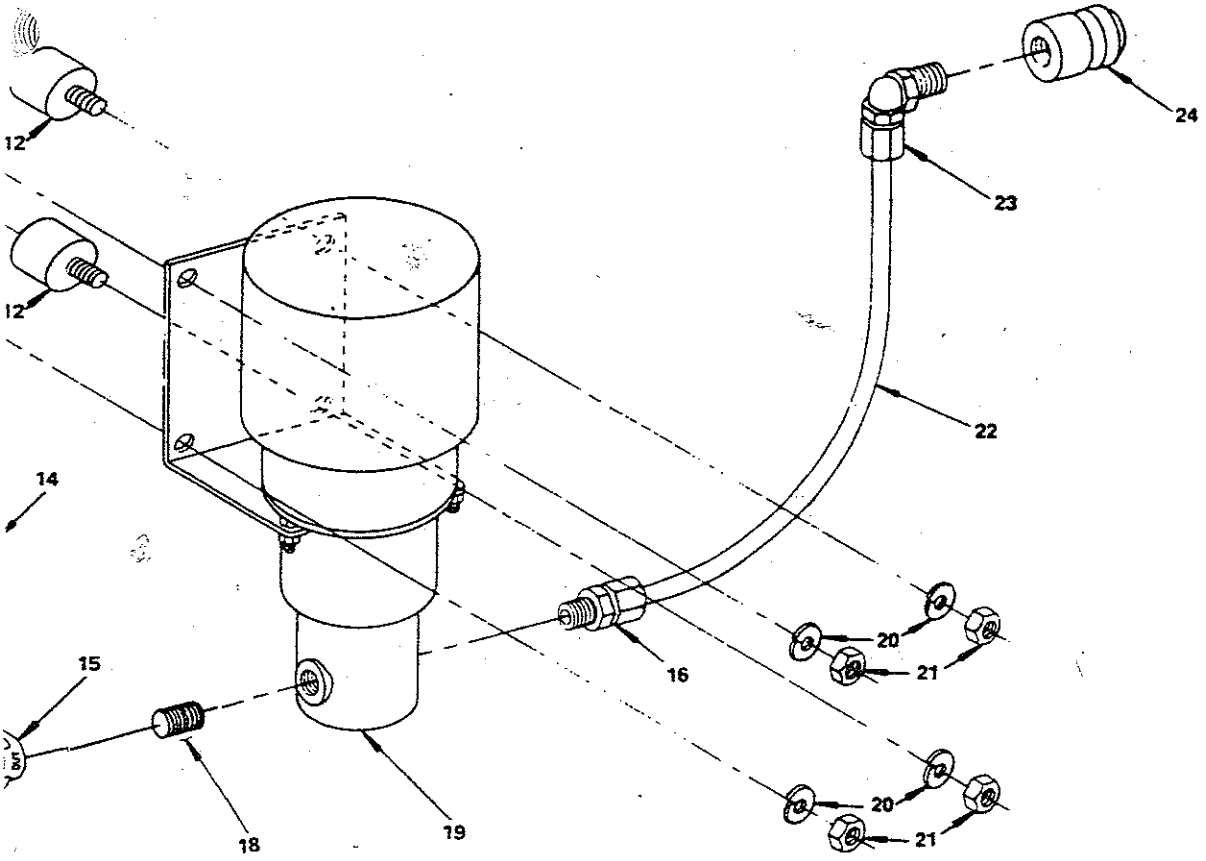
* HARDWARE ITEM MAY BE OBTAINED LOCALLY.

** NOT SHOWN

Figure E. Wall Bracket and P

ITEM NO.	DESCRIPTION	CATALOG NO.
* 1	SCREW, MACHINE , FLAT HEAD, 1/4 — 20 UNC x 3/8"	10451
2	FUSE HOLDER	FZX11
3	MAIN FUSE, SLOW BLOW, 2 AMPS	(1) 04420
	MAIN FUSE, SLOW BLOW, 3 AMPS	(2) 04455
4	POWER CORD, 100/120V CR494X3, 230V CR494X6	
5	STRAIN RELIEF, POWER CORD	SRX12
6	WALL BRACKET ASSEMBLY	16440
* 7	SCREW, MACHINE, FLAT HEAD, NO. 8 — 32 UNC x 3/4"	10316
* 8	WASHER, EXTERNAL TOOTH, NO. 8	FWX12
* 9	NUT, HEX, NO. 8 — 32 UNC	FNX5
10	DECAL, POWER CORD	06866
12	ISOLATION MOUNT	16432
13	TUBING, 1/4" OD x 40" LONG	TU494X3
14	VALVE, CHECK, 1/4" OD TUBE x 1/4" NPT	02214
15	VALVE, PRESSURE REDUCING, 1/4" NPT	02280
16	ADAPTER, POLYPROPYLENE TUBE FITTING, 1/4" OD x 1/4" NPT	05931
17	PLUG, PVC, 1/4" NPT	15784
18	NIPPLE, 1/4" NPT x 1/4" NPT	PM494X13
19	PUMP, MAGNETIC GEAR, 1/20 HP	PU494X1A Pump + motor
* 20	WASHER, LOCK, 1/4"	10277
* 21	NUT, HEX, 1/4 — 20 UNC	10257
22	TUBING, 1/4" OD X 11 1/2" LONG	TU498X5
23	ELBOW, POLYPROPYLENE TUBE FITTING, 1/4" OD X 1/4" NPT	05766
24	END FITTING ADAPTER	16238
25	TRANSFORMER, STEP UP AUTO, 100/115V, 50/60 Hz, 2 AMP OUTPUT	(4) 01363
* 27	WASHER, LOCK, NO. 8	10396
28	CABLE GUIDE	04454
29	PC CONNECTOR	04452
** 30	SCREW, MACHINE, FLAT HEAD, NO. 4 - 40	10467
** 31	NUT, HEX, NO. 4 - 40	10279





MAINTENANCE

WARNING

TO PREVENT ELECTRICAL SHOCK, DISCONNECT THE POWER PRIOR TO SERVICING NANOpure II.

Your NANOpure II is supplied with a tool kit consisting of:

1 ea. Lens Removal Tool
1 ea. Lamp Removal Tool
1 ea. 2.0 ampere or 3.0 ampere Fuse
1 ea. 0.2 ampere Fuse
1 ea. 14 volt Lamp

CARTRIDGE REPLACEMENT

When the resistivity of the water drops below the desired level, change all cartridges together.

A. Disconnect power to the system.

B. Close the shutoff valve on the inlet side of the system.

C. Place a container under the final filter and open the faucet valve to depressurize the system. Close the faucet valve.

D. Place a container under the cartridge canister to collect any spillage.

E. Carefully unscrew the canister from the head by rotating the canister from right to left. Drain the canister into the container and remove the exhausted cartridge.

F. Inspect the O-ring at the beginning of the threads on the head and replace the O-ring if worn.

G. Install a new cartridge as explained in INITIAL OPERATION.

NANOpure FINAL FILTER REPLACEMENT

It is recommended that the final filter be replaced every 15 working days, when there is an unacceptable high bacteria passage or when flow decreases to less than 1 liter per minute.

To replace the final filter, follow instructions on filter box.

Always run at least 2 liters (½ gal.) of deionized water through a new filter after installation.

FUSE REPLACEMENT

WARNING

FOR CONTINUED PROTECTION AGAINST POSSIBLE FIRE HAZARD, REPLACE FUSES ONLY WITH THE SAME TYPE AND RATING OF FUSE.

Main Fuse Replacement. The "main fuse" is located in a fuse holder at the upper left side of the pump module housing. Simply push in and twist the fuse holder cap counterclockwise as indicated on the cap. The fuse will be attached to the cap. Replace with a slow blow 2 ampere fuse for 230 VAC units and a slow blow 3 ampere fuse for 100 or 115 VAC units. The fuses are labeled. To reassemble simply insert the fuse in the cap, align the cap keys with the keyway in the holder, push the cap inward and twist the cap fully clockwise to lock the assembly in place.

Printed Circuit Fuse Replacement. The "printed circuit fuse" is located in a fuse holder on the top of the printed circuit board in the resistivity meter assembly. To remove assembly see Mounting and Utility Connections, Paragraphs E and F. Replace this device with a 0.2 ampere slow-blow.

BULB REPLACEMENT FOR TEMPERATURE AND POWER SWITCHES

Lens and lamp removal tools are supplied with your instrument.

Using the metal lens removal tool, grasp the slots in the side of the lens, squeeze gently and pull the lens out from the lighted indicator.

Using the smallest end of the rubber tool, push the rubber tool over the bulb so that the bulb is firmly inside the tool, then pull the bulb from its socket.

Insert the replacement bulb in the shoulder (largest) end of the rubber tool. Do not push the bulb too far into the tool; otherwise, it will interfere with the placement of the bulb in its socket.

Gently insert the bulb all the way into the socket, and gently pull the rubber tool from the bulb. The bulb is installed properly if the bulb remains in the socket when the tool is removed.

Push the lens back into the lighted indicator. The two tabs on the lens fit into slots in the indicator.

Nanopure II

SYSTEM SANITIZATION

Frequency of cleaning is difficult to determine because of the wide variety of feedwater supplies that can be used, but the need for cleaning can be easily determined. Whenever a cartridge is replaced, always examine the inside of the canister for any residual deposits. If residual deposits are observed, clean the system as follows:

A. Turn system off and disconnect power.

B. Shut feedwater valve.

C. Relieve system pressure by opening and closing the faucet valve.

D. With the cartridges and springs out of all the canisters, wash the inside of the canisters and the inside of the heads with soap or detergent, using a sponge or clean cloth. Rinse out the canisters and the heads with clean water several times to remove the detergent residues.

E. Make up the following disinfecting solution

Bleach: Add 1 liter (1 quart) of bleach (5.25% sodium hypochlorite) to 15 liters (4 gallons) of water to make a 0.3% solution.

WARNING

- AVOID SPLASHING DISINFECTING SOLUTIONS ON CLOTHING OR SKIN.
- ENSURE ALL PIPING CONNECTIONS ARE TIGHT TO AVOID LEAKAGE OF CHEMICALS.
- ALWAYS DEPRESSURIZE CHEMICAL LINES BEFORE DISASSEMBLY.
- ENSURE ADEQUATE VENTILATION.
- FOLLOW CAREFULLY THE MANUFACTURER'S SAFETY INSTRUCTIONS ON LABELS OF CHEMICAL CONTAINERS.

* couple capfulls

F. Partially fill each canister with the above disinfecting solutions, and reassemble the canisters on the unit.

G. In a sufficient amount of the solution, soak the springs from the canisters for 5-10 minutes. Remove from solution and rinse.

* recirculate 30-45 mins open dispenser

H. Remove the NANOpure Final Filter from the unit. Do not attempt to sanitize final filter with chemical solutions. Filter is autoclavable using standard autoclave procedure.

I. If an external pressure switch or pump protector is used, disconnect from the receptacle on the left side of the pump housing, and install the jumper provided.

J. Disconnect the feedwater line at the water source.

K. Connect the feedwater inlet line to the container holding the remaining disinfecting solution.

L. Connect power to the unit and start the pump.

M. Drain off some solution through the faucet valve until a steady flow is achieved. Discard this solution.

N. Recirculate the disinfecting solution for about one-half hour. Then open the faucet valve and allow the remaining disinfecting solution to enter the system, directing the output to drain.

CAUTION

DO NOT OPERATE THE PUMP DRY. DRY RUNNING WILL DAMAGE THE PUMP.

O. Turn the unit off, and disconnect the power.

P. Leave the faucet valve open to depressurize the system and to drain as much of the system as possible.

Q. Carefully remove all the canisters from the system, and discard the solution remaining from the canisters. DO NOT RINSE THE CANISTERS.

R. Install fresh cartridges in the system as indicated under Cartridge Replacement. DO NOT RE-INSTALL USED CARTRIDGES (they contain large amounts of bacteria).

S. Reconnect the feedwater line to the feedwater source, and reconnect the pump protector or pressure switch to the receptacle on the pump housing. Save the jumper for future use.

T. Open the feedwater shutoff valve, connect the power to the unit, and press the control panel "power" button to start the pump and fill the system. Run water through the system to drain any remaining disinfecting solution. A flush of 10 liters is sufficient.

U. Close the faucet valve, and allow the resistivity of the water to rise above the "set point" setting on the resistivity meter. Install a new NANOpure Final Filter at the faucet block, as indicated under NANOpure Final Filter Replacement. The system is now ready for use.

RESISTIVITY CELL CLEANING

Disconnect the cell wires from the pump housing connector block. Tie a piece of string 6 feet long to the wire while it is still in the pump housing. Gently pull on the cell cable at the right side of the unit until the string emerges from the wall bracket. Untie the string from the cable.

Remove the cell from the head assembly with a suitable wrench. Be careful not to twist the wire at the cell body during removal of the cell. Excessive twisting may break internal connections which will ruin the cell.

CAUTION

THE CELL ELECTRODES ARE ETCHED TO IMPROVE WETTING CHARACTERISTICS. DO NOT MECHANICALLY ABRADE OR DAMAGE THIS SURFACE.

Wash the cell in a mild detergent solution or a 10% inorganic acid solution (follow manufacturers recommended handling procedure). This may be done in an ultrasonic cleaner or with a soft brush. The cell must be **thoroughly** rinsed in deionized or distilled water following the detergent or acid cleaning.

CAUTION

DO NOT IMMERSE THE ENTIRE CELL ASSEMBLY IN CLEANING SOLUTION, ONLY THE ELECTRODE PORTION.

After cleaning, install the cell in the NANOpure II system. Remove old teflon tape from head and cell threads and apply a fresh wrap of teflon tape to cell body threads.

CAUTION

DO NOT OVERTIGHTEN CELL. EXCESSIVE TIGHTENING WILL CRACK THE HEAD.

After tightening, tie the string to the cell cable and gently pull the cable through the wall bracket into the pump housing. Remove the string. Re-connect the cell wires as shown in Table 3. Be sure to route the cable through the cable guide.

SHUTDOWN

If NANOpure II is to be shut down for an extended period of time, the system should be completely drained and the cartridges removed to prevent the growth of bacteria.

If the system has remained inactive and full of water, then the system should be drained, sanitized and new cartridges installed prior to use.

PARTS LIST

GENERAL

This section contains parts list information for the NANOpure II cartridge deionization system, Model D3700 Series. When ordering spare parts, specify part number and quantity desired. Also supply P/N and S/N shown on Items 21, 11, 19 – Figures A, E. G, respectively. When ordering electrical parts provide voltage and frequency information.

RECOMMENDED SPARES

Consumables. Consumable parts are those REQUIRED to support the day-to-day operation of this equipment. **Barnstead\|Thermolyne** establishes two types of consumables; those items that MUST periodically be replaced to maintain performance (filters, resin cartridges, etc.) and other items of limited life (indicator lights, fuses, etc.) that the USER can expect to replace on a more or less random basis. Where practical, **Barnstead\| Thermolyne** recommends the frequency of replacement, or provides information on life expectancy from which the USER may calculate a replacement interval compatible with his usage pattern.

The replacement of consumable parts is discussed in the Maintenance Section of this manual to assist the USER in accomplishing his own service.

Consumables may be ordered separately and in some cases, as an Expendables Kit. Check with your **Barnstead\|Thermolyne** representative for additional information on the Expendables Kit.

CONSUMABLES

Description	Cat. No.	Recommended Quantity	
		3-Module	4-Module
NANOpure Final Filter	D3750	1	1
Pretreatment Cartridge	D0835*	1	1
High Capacity DI Cartridge	D0803*	N/R	1
Ultrapure DI Cartridge	D0809*	2	2
3.0 ampere Slow Blow Fuse	04455**	1	1
2.0 ampere Slow Blow Fuse	04420***	1	1
0.2 ampere Slow Blow Fuse	04457	1	1
14 Volt Indicator Lamp	04458	2	2
Teflon Tape, Roll	06078	1	1

* NANOpure II Expendables Kit (see Table 1 in Installation Section).
** For 100 VAC and 115 VAC Models.
*** For 230 VAC Models.
N/R Denotes not required.

General Maintenance Parts. General maintenance parts are defined as laboratory level repair parts which do not require great expertise or special tools for installation. **Barnstead|Thermolyne** recommends that the USER stock the general maintenance parts as an aid to ensuring the continued operation of this equipment.

GENERAL MAINTENANCE PARTS

	Cat. No.	Recommended Quantity	
		3-Module	4-Module
O-Ring (between heads)	06440	2	2
O-Ring (large head seal)	06808	3	4
O-Ring (small cart. seal)	06411	3	4
Fastner Pin	FP550X1	1	1
Connector (head to head)	15853	1	1
Adapter (head end)	16238	1	1
Spring	06613	1	1
Valve	02215	1	1
Check Valve	02214	1	1
¼" O.D. x ¼" NPT Connector	05931	1	1
Filter Adapter	03162	1	1

Safety Stock. For critical applications where performance with MINIMUM downtime is required, **Barnstead| Thermolyne** recommends that the USER maintain a local stock of those parts listed under "General Maintenance" and "Safety Stock." In the event of component failure, this safety stock can be drawn upon by USER or **Barnstead|Thermolyne** technicians, thereby, avoiding unnecessary delays in delivery of replacement parts.

SAFETY STOCK

Description	Cat. No.	Recommended Quantity	
		3-Module	4-Module
Resistivity Meter, 100 VAC	16499	1	1
Resistivity Meter, 115 VAC	16500	1	1
Resistivity Meter, 230 VAC	16501	1	1
Recirculation Pump & Motor	01443	1	1
Pump Only	PU494X1A	1	1
Cartridge Canister Head	16215	1	1
Cartridge Canister	30100	1	1
Pressure Regulator	02280	1	1
Resistivity Cell	D3788	1	1

TROUBLESHOOTING CHART

Symptom	Probable Cause	Test and Remedy
NANOpure II completely inactive (pump not operating, control panel pushbuttons not lit, etc.)	No electrical power to NANOpure II	Ensure that the NANOpure II power cord is connected to a live power source and completely plugged into the electrical outlet.
	Main fuse blown.	Replace the main fuse as indicated under Main Fuse Replacement in the Maintenance Section.
	Circuit board not inserted properly in connector.	Install resistivity meter correctly.
Pump does not run. Display lights.	Pump protector (on resevoir), feedwater line pressure switch, or jumper plug not connected to pump module.	Connect the pump protector or pressure switch cord to the receptacle on the left side of the pump housing. If a Barnstead pressure switch is installed in the feedwater line, the pump will not start until the line pressure rises to 0.35 kg/cm^2 (5 psi). Open the feedwater line shutoff valve or fill the feedwater reservoir. If no pump protector is used, make sure a jumper plug is installed.
Pump runs, but no display (no digital display and push buttons not lit)	Printed circuit fuse blown.	Replace the printed circuit fuse as indicated under Printed Circuit Fuse Replacement in the Maintenance Section.
Pump runs, display lights, but one or more indicator bulbs not lit. **NOTE:** Green temperature indicator lit only when depressed.	Burned out indicator bulb.	Replace the indicator bulb as indicated under Bulb Replacement for Temperature and Power Switches in the Maintenance Section.

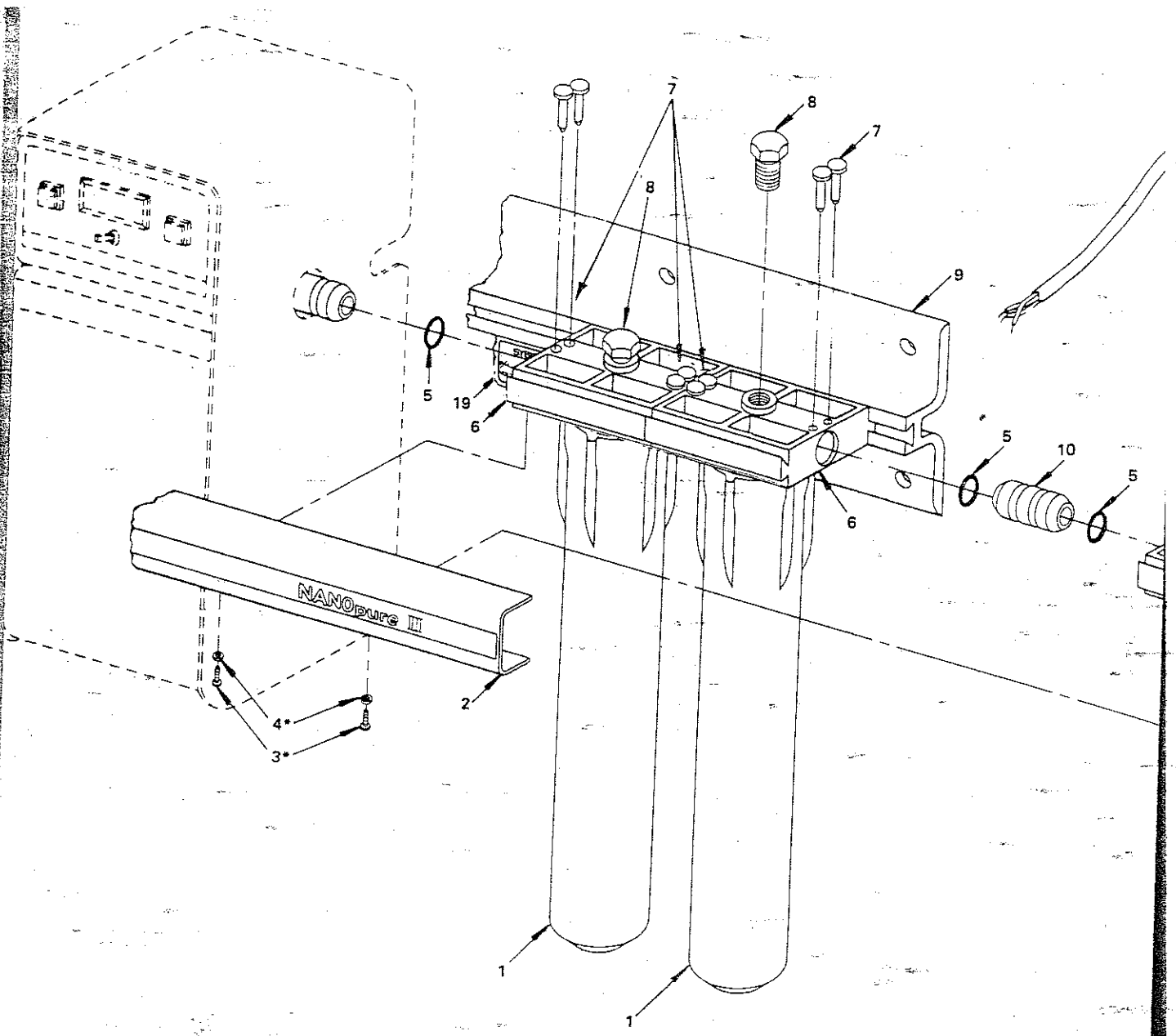
* remove cart before sanit:
cap fulls of Bleach in each holder - run 30 mins
* run 1st cart. by itself.

TROUBLESHOOTING CHART (Cont.)

Symptom	Probable Cause	Test and Remedy
Recirculated water will not rinse up to desired purity level.	Exhausted cartridges.	Replace all the cartridges as indicated under Cartridge Replacement in the Maintenance Section.
	Cartridges out of order	Install the cartridges in the proper order as indicated under Initial Operation.
	Cartridges upside down	Install the cartridges right side up as indicated under Initial Operation. (Check that a spring is installed in the bottom of each canister).
	Cartridge end caps not removed at installation.	Remove end caps.
	Feedwater bypassing cartridge(s)	Be sure that small O-ring inside head is not damaged and is properly installed.
Reduced or no product flow	Final filter clogged	Replace the final filter as indicated under NANOpure Final Filter Replacement.
	Air trapped in final filter.	Vent the final filter. This is accomplished by turning the vent fitting counterclockwise until water flows from the vent, and then turning the vent fitting fully clockwise.
	Cartridge end caps not removed at installation.	Remove end caps.
Leaking Canisters	Large O-ring around head is missing, damaged or not sealed properly.	Replace or position correctly.

TROUBLESHOOTING CHART (Cont.)

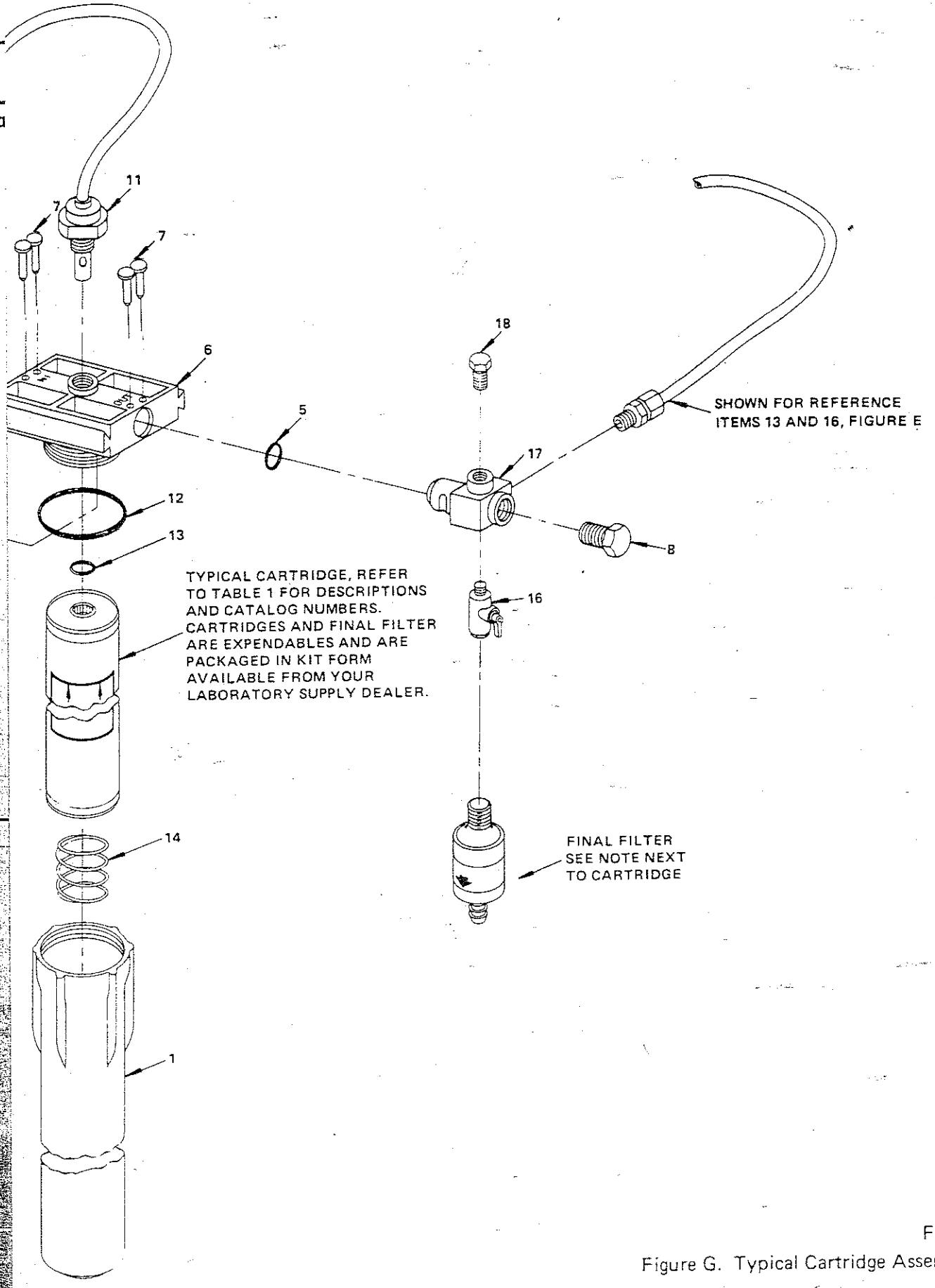
Symptom	Probable Cause	Test and Remedy
Short Cartridge Life	Cartridges being used are beyond expiration date.	Check the expiration date. Cartridges begin to lose capacity after being stored one year from the date of manufacture. Replace the cartridges with unexpired ones.
	Change in feedwater characteristics	If a Barnstead ROpure is the feedwater source, check that the membrane is functioning properly. If a Barnstead Still is the feedwater source, ensure that the distillate temperature to the NANOpure II does not exceed 49°C (120°F). If tap water is the feedwater source, check the quality of the water. In some cases the quality of the water will change with the seasons. Changing the source (city water to well water, or well water to city water) will result in a water quality change. If feedwater is from a central water purification system, verify water quality and proper functioning of the system.



ITEM NO.	DESCRIPTION	CATALOG NO.
1	CANISTER	30100
2	DRESS PLATE, 3-MODULE	06822
	DRESS PLATE, 4-MODULE	06824
* 3	SCREW, SELF TAPPING, NO. 4 x 3/8"	10273
* 4	WASHER, FLAT, NO. 4	10280
5	O-RING	06440
6	HEAD	16215
7	FASTNER PIN	FP550X1
8	PLUG, PVC, 1/2" NPT	15002
9	WALL BRACKET, 3-MODULE	16456
	WALL BRACKET, 4-MODULE	16457
10	CONNECTOR	15853
11	CELL, RESISTIVITY	D3788
12	O-RING	06808
13	O-RING	06411
14	SPRING, STAINLESS STEEL	06613
16	VALVE, BALL, 1/4" NPTF x 1/4" NPTM	02273
17	FAUCET BLOCK	16174
18	PLUG, PVC, 1/4" NPT	15784
19	DECAL, IDENTIFICATION	06838

*HARDWARE ITEM MAY BE OBTAINED LOCALLY

¥ Check Valve



F/O 11

Figure G. Typical Cartridge Assembly