Operating and Maintenance manual

Milli-Q®

NOTICE

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Table of contents

Use of this manual

This manual describes how to install, use and maintain your Milli-Q water purification system. The use of this equipment is simple; however, it is strongly recommended that this manual be read before connecting the system to a source of water or to electrical power. A thorough knowledge of your water system not only helps to prevent damage to the system or personal injury, but it also helps you to become familiar with all its functions.

Distinguishing between text specific to one or more Milli-Q systems

The information presented in this manual uses the following notation:

The four types of Milli-Q systems and the A10 TOC option are described in this manual.
The guide shown on the edge of each page permits you to distinguish between information relevant to all models or to information relevant to a specific model of water system.

It is important to verify that the column on the edge of the page corresponding to your model is full before proceeding to study information pertaining to system characteristics, operations, ...

Example:

FOR COMMON TEXT : all the columns are full.

FOR TEXT SPECIFIC TO A MODEL **Gradient** : column 2 is full.

All reference figures are located at the back of this manual, in A3 foldout sheets.

Dotted portions of drawings represent components or items not delivered with the system.
Elements shown in light grey represent keypad buttons which are not being referred to in that section of text, or not referred to in examples of screen displays.

Warnings

Caution signs are shown throughout this manual to bring items to your attention which present risk or which require delicate manipulations.

 : **Caution.**

 : **Danger.**

General Information

The Milli-Q system is used as a final water purification stage. The feedwater to a Milli-Q can be produced by electrodeionisation (E.D.I.), Reverse Osmosis (RO), distillation or deionisation.
The Milli-Q system produces water of Type 1 quality. This is equal to or better than ASTM, CAP and NCCLS Type 1 water quality standards.

The principal components of the Milli-Q system, **Figure 1**, are:

(A) ..... Control Panel
(B) ..... Q-Gard pack adapter
(C) ..... Q-Gard purification pack
(D) ..... Door for locking Quantum purification cartridge
(E) ..... Liquid Crystal Display (LCD)
(F) ..... LED Indicator
(G) ..... Keypad
(H) ..... ON / OFF Power Switch
(I) ..... Power cord socket
(J) ..... Fuse Holder
(K) ..... Fittings / inserts for water connection
(L) ..... Sanitisation port plug for cleaning the UF module see figure 1, rear view
(M) ..... Point of Use Gun with support arm
(N) ..... Sticker with catalogue number, lot number and system type
(O) ..... Locking clip screws
(P) ..... Locking clips

How the system works

Pre-treated water (from E.D.I., Reverse Osmosis, distillation or deionisation) enters the system and is pumped through the Q-Gard cartridge for an initial purification step.

The water is then exposed to UV light at both 185 and 254 nm wavelengths. This oxidises organic compounds and kills bacteria.

The function of the Quantum cartridge is to remove trace ions and oxidation by-products produced by the action of the UV light.

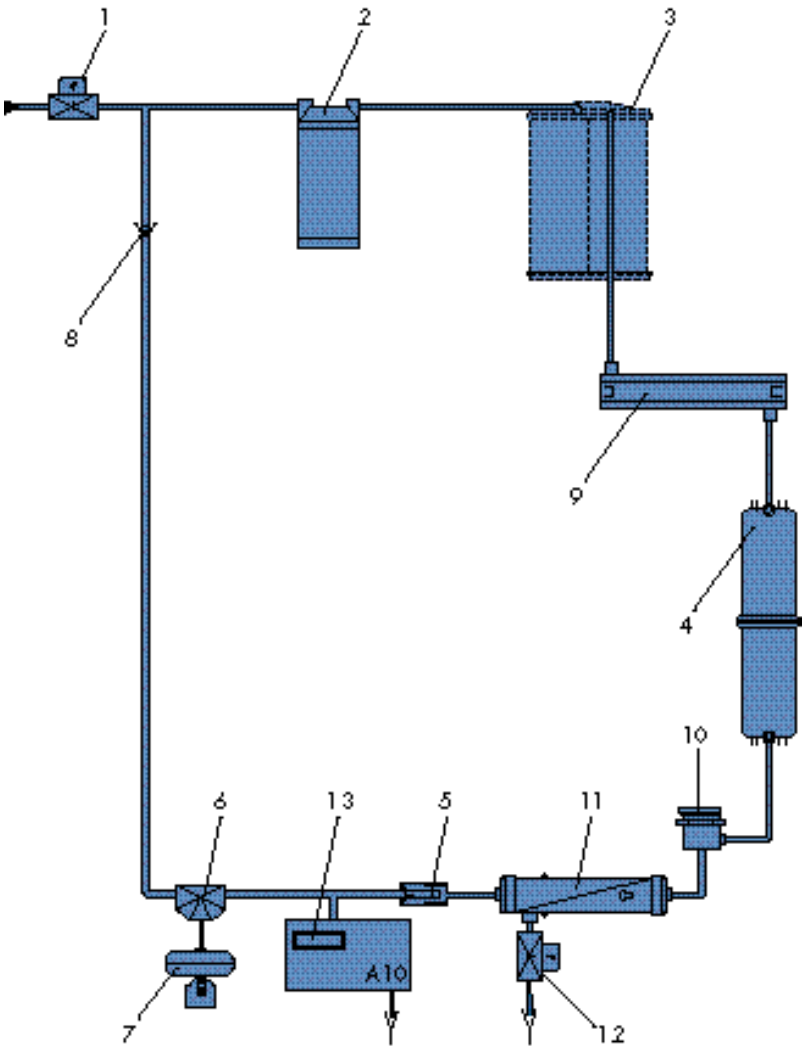
Purified water then passes through an Ultrafiltration (UF) module. The UF module acts as a barrier to colloids, particles and organic molecules with a molecular weight greater than 5000 Daltons. The contaminants retained by the UF are periodically flushed out of the system via tubing to a drain.

A manual 3 way valve located in the point of use (POU) allows you to direct ultrapure water through a final filter made up of a 0.22 µm membrane (MilliPak-40). The final filter removes particles and bacteria greater than 0.22 µm in size and prevents recontamination of the system from the point of use.

The A10 TOC monitor takes samples of ultrapure water to determine trace organic levels. Samples are taken periodically in PRODUCT mode.

System Schematic

The water flow schematic of a Milli-Q system is shown below. Only the main components are shown.



Inlet solenoid valve 1
Pump 2
Q-Gard Pack (selected based upon the type of feedwater) 3
Quantum ultrapure cartridge 4
Resistivity cell 5
Point of use with dispensing valve 6
MILLIPAK 40 final filter 7
Check valve 8
UV lamp 9
Sanitisation port used to introduce chemical sanitants to UF module 10
Ultrafiltration cartridge 11
UF cartridge reject solenoid valve 12
A10 TOC monitor 13

Composition of materials in contact with water

Part	Material	Part	Material
Pack Adapter	ABS	MILLIPAK 40	Polycarbonate, PVDF
Q-Gard Pack	PP, PE	Fittings	PE, PA, PVDF
Inlet solenoid valve	Stainless steel	Resistivity cell	Stainless steel 316 L
Quantum cartridge	PP	Manifold	POM
Pump head	NSF* listed and FDA* approved materials	Tubing	PE
		Three way valve	Copolymer of butadiene and styrene, Viton®, PTFE
		O-rings	EPDM
UV lamp and housing	Ultrapure Quartz, Stainless steel		
UF housing	ABS		
UF sanitisation port	ABS		
Reject solenoid valve	Stainless steel		

* NSF = American National Sanitation Foundation
FDA = American Food and Drug Administration

Electrical specifications

Voltage /	Electrical consumption	Frequency	Main power fuse	RS 232 Output
230 Volts 120 Volts	60 VA 60 VA	50 Hz 60 Hz	1.0 A Slo-Blo™ 2.0 A Slo-Blo	
230 Volts 120 Volts	100 VA 100 VA	50 Hz 60 Hz	1.0 A Slo-Blo 2.0 A Slo-Blo	
				RS 232 type RJ 11 connector

Hydraulic specifications

Feedwater tubing	8 mm outer diameter (OD) length : 3 meters maximum
Reject tubing	8 mm and 6 mm OD length : 2.5 meters maximum
Inlet feedwater pressure	Minimum : 0.1 bar (1.5 psi) Maximum : 0.3 bar (4.5 psi)
Feedwater flowrate	≥ 1.5 litre / minute (LPM)
Feedwater temperature	5 °C to 35 °C

Feedwater quality

Millipore recommends using water treated by ELIX (Electrodeionisation, E.D.I.) or Reverse Osmosis (RiOs).

Environmental Conditions

Ambient storage temperature	5 °C < T < 40 °C
Ambient operating temperature	5 °C < T < 25 °C
Humidity	20 % - 80 % without condensation

System performance

Purified water quality	
Resistivity	18.2 MΩ•cm at 25 °C
Pyrogens	0.02 EU/ml
TOC*	5 - 10 ppb
	1 - 5 ppb
	2 - 5 ppb
Micro-organisms	≤ 1 cfu/ml
Particles (0.22 µm)	< 1/ml
Flowrates	
Product water flowrate	Up to1.5 litre/minute
	Up to1.0 litre/minute
Noise level in dB A at 1 metre	42 dB A

* Test conditions: Milli-Q system was equipped with a Q-Gard purification pack and a Quantum EX ultrapure cartridge. The feedwater to the Milli-Q came from a RiOs Reverse Osmosis system. TOC levels in the feedwater were < 50 ppb. The quality of the Milli-Q product water can vary as a function of the quality of the feedwater.

Dimensions and operating weight (with Q-Gard and Quantum)

Height	455 mm
Length	255 mm
Depth	355 mm (includes the wall mounting points on rear)
Weight(s)	16.0 kg
	16.8 kg
	16.3 kg
	17.1 kg
	+ 0.6 kg with A10 TOC module

Unpacking

The different components supplied with the system are shown in figure 2 and are listed below.

		Present? Yes	No
(A)	Milli-Q water purification system		
(B)	Electrical power cord		
(C)	Folder with documents to insert		
(D)	Tubing 8 mm OD, 5 meters length for:		
	- inlet water connection		
	- reject stream for ultrafiltration module		
(E)	Tubing (6 mm OD), 2.5 meters length for A10 waste stream		
(F)	Tubing used when UF module is sanitised and cartridges are purged		
(G)	Fitting 1/4" MNPT - hose barb (MNPT = male national pipe thread)		
(H)	Fitting 1/2" FNPT - 8 mm OD tubing with screen filter inside		
(I)	Fitting 1/4" MNPT - 8 mm tubing		
(J)	Teflon™ tape		
(K)	Plastic bag containing elbow fittings		
(L)	Six sided key used to loosen / tighten point of use arm		

Items ordered separately

(M) Q-Gard purification pack
(N) Quantum ultrapure cartridge
(O) MILLIPAK 40 final filter (0.22 µm) for point of use gun

Checked by _____ Name _____ Signature _____ Date

Verified by _____ Name _____ Signature _____ Date

Installation of the system

The system can either be placed on a bench or wall mounted.
If the system is to be wall mounted, then it is necessary to first verify that the wall can support the weight of the system.
Contact Millipore Technical Service for further instructions on wall mounting the system.

Some versions of the Milli-Q systems require a drain nearby. When a reservoir is used as a feedwater supply, locate the system and reservoir close together whenever possible.
Figure 5 shows the different connections to be made to the system.

Note: The feedwater supply valve, pressure regulator with gauge are not supplied with the Milli-Q and must be ordered separately. **Contact Millipore Technical Service for more information.**

Connection of feed water to the system (Figure 3)

System fed from a reservoir

1. Cut the feed water tubing, 8 mm OD (figure 2, D) to the desired length (< 3 meters).
2. Remove the protective plug (B) from the "FEED 1" connection (H) by pressing on collar (A) and pulling on the plug.
3. For wall mounting the system, install elbow connectors (figure 2, K).
4. Connect the feed water tubing (C) (8 mm OD) to inlet "FEED 1" (H) by inserting it firmly in the fitting.
   Verify that the connection is secure by pulling several times on the tubing once it is inserted.
5. Connect the other end of this tubing to the reservoir. The fitting (figure 2, I) can be used on the reservoir. It is recommended to use the Teflon™ tape (figure 2, J) on the reservoir to avoid leaks.

System fed from a pressurised source

1. Cut the feed water tubing, 8 mm OD (figure 2, D) to the desired length (< 3 meters).
2. Remove the protective plug (B) from the "FEED 1" connection (H) by pressing on collar (A) and pulling on the plug.
3. The feed water valve or the fitting (D) should terminate in a 1/2" MNPT fitting.
   The 1/2" FNPT fitting (E) is screwed on to the fitting (D). Use the Teflon tape (figure 2, J), to ensure a good seal against leaks.
4. Connect the tubing (C) to the fitting (F). Pull on the tubing afterwards to insure it is secure.
5. Pressurised feedwater entering the Milli-Q system must be regulated between 0.1 Bar (1.5 psi) and 0.3 Bar (4.5 psi). **Installation of a pressure regulator is necessary if the feedwater pressure is over 0.3 Bar (4.5 psi). The regulator should be adjusted while water is dispensed from the system.**

Connection of the reject tubing(s) (Figure 3)

Any Milli-Q system with the A10 TOC or UF option(s) has to have reject tubing on the system. The procedure to connect the reject tubing is the same as that used for the feed water tubing.

1. Connect the Ultrafiltration cartridge reject tubing (8 mm OD) < 2.5 meters (figure 2, D), to the "DRAIN 3" (I) outlet.
2. Connect the A10 waste stream tubing (6 mm OD) < 2.5 meters (figure 2, E), to the "OUT 5" (J) outlet.

Note: If the Milli-Q System is fed by a reservoir, then the A10 reject water can be recycled to the reservoir. See APPENDIX 1, page 30.

When starting up the system, place the ends of all reject tubing(s) to the drain.

Installation of the Q-Gard purification pack (Figure 4)

(The Q-Gard is only used on Milli-Q systems equipped with a pack adapter (A))

1. Raise the pack adapter (A) to its highest position. Remove the two protective plastic inserts (B) on the pack adapter.

2. Remove the two protective inserts on the Q-Gard pack (C). Wet the two O-rings on the Q-Gard with pure water.

3. Push the Q-Gard so that the pack adapter metal rod (D) goes through the hole at the top of the Q-Gard.
   - Lift the Q-Gard slightly and push the bottom of it into the small opening (E) on the system.
   - Push the top of the Q-Gard until it is secure.

4. Lock the Q-Gard in place with the metal locking clip (F) on the end of the metal guide pin (D).

5. Bring the adapter cap down to its lowest position (G) so that it covers the top of the Q-Gard.

Electrical connection of system

1. Connect the power cord (figure 2, B) to the Milli-Q (figure 3, L). Connect the other end of the power cord to an earth grounded power source.

2. Check that the point of use Milli-Q gun trigger is in the upright position.

3. Turn on the system electrical switch (figure 1, H) by putting it to position **I**.

4. The serial number is displayed for 10 seconds. Please record the type of system and serial number below.

Example:

```
GRADIENT    VI.03
SR.N°  F8 KM35924
```

SR. N° _____

Note: Contact Millipore Technical Service when connecting a low level tank sensor to the Milli-Q system. As an option, it is possible to get a "NO FEED WATER" message when there is no water in the reservoir.

Installation of the Quantum Ultrapure Cartridge (Figure 4)

Note: It is important to have the system electrical power switched on before installing the Quantum Ultrapure Cartridge.

1. Open the blue door on the front of the Milli-Q by pressing the 2 latches (H) on the right side of the door to open it.

2. Remove the two protective inserts from the Quantum cartridge. Wet the two rubber O-rings on the Quantum cartridge with pure water.

3. Install the Quantum cartridge and push it in as far as it will go.

4. Close the door. It is necessary to fully snap the latches (H) shut to hold the Quantum cartridge inside.

Starting the Milli-Q after installation of Q-Gard and Quantum cartridge

A 5 minute rinsing cycle "AIR PURGE" occurs automatically whenever new cartridges are installed in the Milli-Q system. It is necessary to have the power on during the cartridge installation. Do not install the Millipak 40 yet.

1. Open the feedwater inlet valve if there is one.

2. Press OPERATE/STANDBY to go from STANDBY to PRE-OPERATE. The system will be waiting to begin the AIR PURGE cycle.

```
PRE OPERATE
AIR PURGE
```

3. Start the AIR PURGE by moving the point of use gun trigger forward. Direct all water from the point of use to a drain.

```
PRODUCT
AIR PURGE  : 5 mn
```

4. At the end of 5 minutes the system will go into STANDBY mode. Move the trigger back to close the point of use valve (upright position).

```
STANDBY
CLOSE THE VALVE
```

5. If possible, leave the system in PRE-OPERATE mode overnight. This helps to hydrate the ion exchange resin inside the cartridges.

```
PRE OPERATE
```

6. In PRE-OPERATE mode, purge the Quantum cartridge of any trapped air by pushing the end of a small screwdriver into the small hole located on the blue door (figure 4, K).
Push the small screwdriver gently into the hole to purge out the trapped air. Open the POU valve for a few seconds. Repeat the previous action until all trapped air has been purged.

Cleaning the A10 measurement cell

Whenever a Milli-Q system is configured as an A10 model, the system starts up by an automatic cleaning of the A10 analysis cell after the 5-minute AIR PURGE cycle. This cleaning lasts for 1 hour.

Connection of a printer with the system's RS 232 interface

The Milli-Q system offers the possibility of sending information to a printer.
For further information, **contact Millipore Technical Service.**

Modes of operation

Your Milli-Q system has a number of operating modes which can be activated via the keypad. Other modes are automatically activated by the microprocessor.

These different modes are displayed on the screen, and are described below:

Standard displays

Operating mode	Action	Status of system
STANDBY	Press the OPERATE/STANDBY button while the system is in PRE OPERATE mode.	The system is in a STANDBY mode. While in this mode, system operation is not possible. Automatic recirculation does not occur in this mode.
PRE OPERATE	Press the OPERATE/STANDBY button while the system is in STANDBY mode.	In this mode the system will recirculate water for 5 minutes each hour.
18.2 MΩ•cm	Automatically occurs from PRE OPERATE mode when point of use trigger is moved forward. This is referred as PRODUCT mode.	During PRODUCT mode, the system displays the product water resistivity compensated to 25 °C.
25.5 MΩ•cm 18.6 °C	Automatically occurs from PRE OPERATE mode when point of use trigger is moved forward. See “Use of the Keypad”, page 20.	During PRODUCT mode, the system can display the product water resistivity non temperature compensated as well as the water temperature.
TEMP: 18.6 °C TOC: 4 ppb	Press the MEASURE keypad button when the system is in PRE-OPERATE or PRODUCT mode.	The product water temperature is displayed. For systems with the A10 option, the product water TOC is also displayed.
PROD. TIME SETUP COUNTER: 9mn	In PRE OPERATE mode, press the MENU button for 2 seconds to view the counter. See “Use of the Keypad”, page 17.	The counter can be used to dispense water from the system for a specific amount of time. This time can be selected and changed with the keypad. After the counter finishes, the system automatically goes into STANDBY mode.
FAST FLUSH	Automatic with Biocel and Synthesis Milli-Q systems.	This is a rinsing of the ultrafiltration module and lasts 30 seconds. It does not effect normal use of the system.
TOC: 3 ppb	Occurs automatically.	Display of the last TOC measure or oxidation in process.

Additional displays

System maintenance messages

Display message	System status	Action
EXCH. CARTRIDGES	**SERVICE LED blinking** The operational lifetime of the purification /polisher cartridges has expired.	Occurs automatically. **See MAINTENANCE chapter, page 21 for further information**
START SANIT.	**SERVICE LED blinking** A cleaning of the ultrafiltration module is necessary.	Occurs automatically. **See MAINTENANCE chapter, page 22 for further information**
AIR PURGE	A 5 minutes air purge of the cartridge(s) is in progress.	Automatic after installation of new cartridges.
EXCHANGE UV LAMP	**SERVICE LED blinking** The operational lifetime of the UV lamp of the Milli-Q has expired.	Occurs automatically. **Call Millipore Technical Service**
EXCHANGE A10 UV	**SERVICE LED blinking** The operational lifetime of the UV lamp inside the A10 has expired.	Occurs automatically. **Call Millipore Technical Service**
A10 CLEANING 59	**SERVICE LED blinking** A cleaning cycle of the A10 is in progress. Duration is 60 minutes.	Occurs automatically after installing new purification / polisher pack(s). **See the MAINTENANCE chapter, page 24 for further information.**

Alarm displays

Displays	Status of the system
CARTRIDGE OUT	The Milli-Q has stopped operating because either the Quantum or Q-Gard purification pack is loose. **See the Quantum and Q-Gard installation section** , page 12 for more information.
NO FEED WATER	The Milli-Q system is connected to a reservoir level sensor and has detected that the reservoir is empty. **Wait until there is water in the reservoir.**
SYSTEM ERROR #	Indication of a specific fault or malfunction with an internal component of the system. **See the TROUBLESHOOTING chapter**, page 27 for more information.
RS 232 ERROR	There is a problem with the RS 232 output. **See the TROUBLESHOOTING chapter**, page 25 for more information.
A10 ERROR #	Service or maintenance needed for the A10 TOC accessory. **See the TROUBLESHOOTING chapter**, page 28 for more information.

Note: The ALARM LED will blink while the above ALARM messages are displayed on the LCD.

Use of the Keypad

The keypad allows the user to activate the different operating modes or to review information about system performance.

KEYPAD	ACTION	DISPLAY

STANDBY and PRE-OPERATE

Press the **OPERATE/STANDBY** keypad button for at least 2 seconds to switch between these two operating modes.

: STANDBY — STANDBY

: PRE-OPERATE — PRE OPERATE
TOC

Measure

In PRODUCT or PRE-OPERATE mode

Press **MEASURE** to display temperature and last TOC value.

TEMP: 22.6°C
TOC : 3ppb

Cleaning

The CLEANING function is described in the ROUTINE MAINTENANCE chapter. This is for cleaning and sanitising the ultrafiltration module.

Menu function

Programming a dispensing time period

In PRE-OPERATE mode only,
Press **MENU** for at least 2 seconds.

↓

Select or change the counter time by pressing the arrow keys ∨ ∨ or ∧ ∧

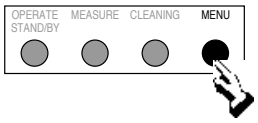
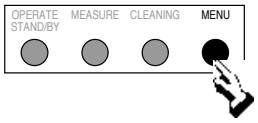
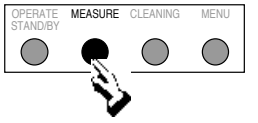
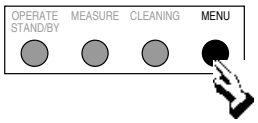
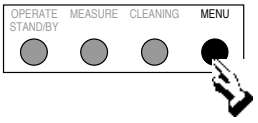
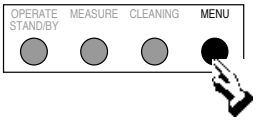
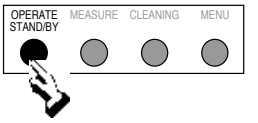
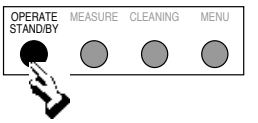
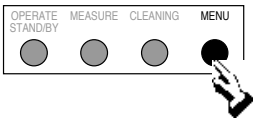
PROD.TIME SETUP
COUNTER: 13mn

OPERATE STAND/BY MEASURE CLEANING MENU

Press **OPERATE/STANDBY** for at least 2 seconds to accept the COUNTER time.

PRE OPERATE

Note: Moving the point of use trigger forward will initiate the COUNTER and start to dispense water. The system will dispense water from the point of use gun for the amount of time that the COUNTER is set to. When the dispensing time is finished (COUNT = 0), the system will automatically go to STANDBY mode. Move the trigger back to the vertical position to go to PRE OPERATE mode.

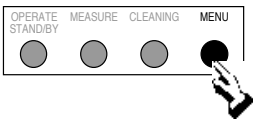
KEYPAD	ACTION	DISPLAY
Printer		
	In PRODUCT mode Press **MENU** for at least 2 seconds ↓	PROD. TIME SETUP COUNTER: 0mn
	Press **MENU** ↓	SERVICE: PRINTER PRESS “MEASURE”
	One press on the **MEASURE** button starts printing ↓	
	Press **MENU** for at least 2 seconds, display returns back to initial operating mode.	18.2 MΩcm TOC: 3ppb
Display the age of the UV lamp(s) and purification cartridges		
	In either PRE-OPERATE or PRODUCT Press **MENU** for at least 2 seconds ↓	PROD. TIME SETUP COUNTER: 0mn
	Press **OPERATE/STANDBY**, the age of the cartridge (s) is shown ↓	SERVIC E: AGE CARTR.: 1 18 DAYS
	Press **MENU** twice, the age of the UV lamp is shown ↓	SERVIC E: AGE UV LAMP 68 DAYS
	Press **OPERATE/STANDBY** once, the age of the UV lamp in the A10 TOC module is shown ↓	SERVIC E: AGE UV A10 68 DAYS
	Press **MENU** for at least 2 seconds, display returns back to initial operating mode.	18.2 MΩcm TOC: 3ppb

Cleaning the A10 module (Duration 1 hour)

The A10 CLEANING mode is used to clean the oxidation chamber of the A10 and is described in detail in the ROUTINE MAINTENANCE section, page 24.

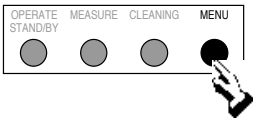
KEYPAD	ACTION	DISPLAY

Choosing the display language



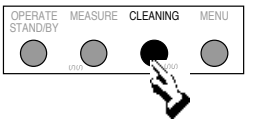
In either PRE OPERATE or PRODUCT mode
Press **MENU** for 2 seconds
↓

```
PROD. TIME SETUP
COUNTER:     0mn
```

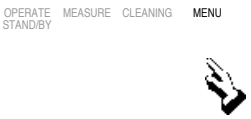


Press **MENU** four times

```
SERVICE:  OPTIONS
LANGUAGE: ENGLISH
```



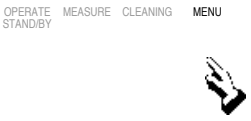
Press the arrow keys to change between different languages.
↓



Press **MENU** again to return to either PRE OPERATE or PRODUCT mode.

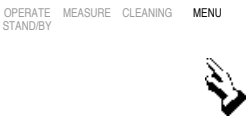
```
18.2 MΩcm
TOC:        3ppb
```

Choosing the unit of measurement



In either PRE OPERATE or PRODUCT mode
Press **MENU** for 2 seconds
↓

```
PROD. TIME SETUP
COUNTER:     0mn
```



Press **MENU** four times
↓

```
SERVICE: OPTIONS
LANGUAGE ENGLISH
```

Press on **OPERATE/STANDBY**

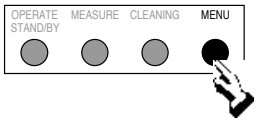
```
SERVICE:  OPTIONS
PROD.UNIT :  MΩcm
```

The arrow keys allow the choice of MΩ•cm or µSiemens•cm^{-1} as units
↓

Press **MENU** again for 2 seconds to return to the initial operating mode.

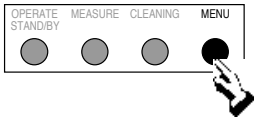
KEYPAD	ACTION	DISPLAY

Non temperature compensated resistivity display



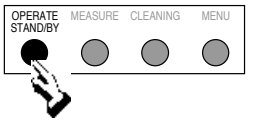
In either PRE OPERATE or PRODUCT mode
Press **MENU** for 2 seconds
↓

```
PROD. TIME SETUP
COUNTER:     0mn
```



Press **MENU** four times
↓

```
SERVICE: OPTIONS
LANGUAGE ENGLISH
```



Press twice on **OPERATE/STANDBY**

```
SERVICE:  OPTIONS
T°CORRECT ION:ON
```

The arrow keys allow the choice of a compensated or a non temperature compensated resistivity display.
↓

```
SERVICE:  OPTIONS
T°CORRECT ION:OFF
```

Press **MENU** again for 2 seconds to return to the initial operating mode.

```
19.4MΩcm  23.4°C
TOC:        3ppb
```

Purging the air out of the Ultrafiltration Cartridge

See Appendix 1, page 29, Purging the air from the UF cartridge.

Startup of the Milli-Q

The intermittent recirculation of water inside the Milli-Q has allowed the cartridge(s) to become fully hydrated. Before installing the point of use filter (MILLIPAK 40), dispense about 2-3 litres of water from the system.

Installing the MILLIPAK 40 final filter (Figure 6 and 7)

1. Remove the venting cap (A) from the MILLIPAK 40.

Note: Do not use Teflon Tape on the threads of the Millipak unit **because it could damage the Point-of-use valve** . An O-ring is located on the thread portion of the point-of-use. The O-ring is used instead of Teflon tape to insure a watertight connection.

2. Screw the MILLIPAK 40 onto the point of use (B). Teflon™ tape is not needed. Turn it a maximum of 2-3 times.
3. Replace the venting cap but do not tighten it onto the MILLIPAK 40.
4. Start to purge the MILLIPAK 40 by bringing the point of use gun trigger forward (C) in PRE-OPERATE mode.
5. When all of the air is purged from the MILLIPAK 40 by allowing water to run out of the vent, tighten the venting cap (A).
6. Close the point of use gun trigger (C) by moving it to the vertical position. The system should be left in PRE-OPERATE mode.

Purpose of the LED on the point of use gun

When the point of use trigger is brought slightly forward, the Milli-Q system goes into a RECIRCULATION mode. The green LED will flash when the water quality is not optimal. Once the green LED is lit steadily, the trigger can be brought forward to dispense water from the point of use gun.
If the resistivity is below a predetermined setpoint, the green LED will blink continuously.

Timetable for routine maintenance

Annual (once a year)	**Following a message on the LCD**
If installed, clean the screen filter in the feedwater line. See ROUTINE MAINTENANCE, page 24.	**Display:** EXCH. CARTRIDGES. Replace the expendable cartridges. See ROUTINE MAINTENANCE, page 21. **Display:** START SANIT. Clean the Ultrafiltration module. See ROUTINE MAINTENANCE, page 22. **Display:** EXCHANGE UV LAMP Replace the UV lamp. See TROUBLESHOOTING, page 26. **Display:** EXCHANGE A10 UV Replace the UV A10 lamp See TROUBLESHOOTING, page 26.

Note: When the product water flowrate becomes low (< 0.5 l/min.), change the MILLIPAK 40 final filter. If the MILLIPAK 40 has only been in place a short time and becomes clogged, then check the quality of the feedwater.

Routine maintenance

Replacing the Q-Gard Purification Pack, figure 4. (Only for systems equipped with the Q-Gard pack adaptor)

1. Put the Milli-Q system into STANDBY mode by pressing OPERATE / STANDBY for 2 seconds. **Do not turn off the electrical power to the system** .
2. Remove the old Millipak filter from the Point of Use valve
3. Open the Point of Use valve for a few secondes to depressurise the system.
4. Bring the pack adapter (A) to its highest position.
   - Remove the metal retaining clip (F)
   - Remove the Q-Gard pack from the system.
5. Install a new Q-Gard. See “INSTALLATION and START-UP” chapter, page 12 and 13.

Replacing the Quantum Ultrapure Cartridge

Note: The Quantum cartridge and the Millipak final filter must be replaced at the same time as the Q-gard pack.

1. Put the Milli-Q system into STANDBY mode by pressing the OPERATE/STANDBY button for 2 seconds. **Do not turn off the electrical power.**
2. Remove the old Millipak filter from the Point of Use valve
3. Open the Point of Use valve for a few seconds to depressurise the system.
4. Open the front blue door by pulling the 2 latches open (figure 4, H).
5. Pull out the Quantum cartridge.
6. Install the new Quantum cartridge by following the instructions in the “INSTALLATION AND STARTUP” chapter, page 12 and 13.

Note: After replacing the Quantum cartridge, put the system into PRE-OPERATE mode. Bring the Point of Use trigger forward and the system will begin a 5-minute AIR PURGE cycle.

Replacing the MILLIPAK 40 (Figure 7)

The MILLIPAK 40 final filter should be changed whenever the product flowrate becomes too low (< 0.5 LPM) or whenever the Quantum and Q-Gard cartridges are replaced. The lifetime of the MILLIPAK 40 is dependent upon the quality of the feedwater and dependent upon the amount of water dispensed through the Milli-Q.

To change the MILLIPAK 40

1. Make sure that the point of use trigger (C) is in the closed (upright) position.
2. Remove the venting cap (A) from the MILLIPAK 40.
3. Unscrew the MILLIPAK 40 from the female thread (B) on the point of use gun. Turn it counterclockwise to unscrew it.
4. Install the MILLIPAK 40 as described page 20.

Sanitisation of the Ultrafiltration module

A regular sanitisation of the UF cartridge is necessary to obtain the best water quality and to have the maximum life of the UF module. The Milli-Q system will periodically display every two weeks the message "START SANIT." to inform you that a sanitisation is necessary.

There are two choices of sanitisation cycles in the software.

Cycle 1: (7 hours)

This is the typical sanitization cycle and will be used most of the time. This allows the UF module to be sanitised **at the start of an evening and throughout that night** .

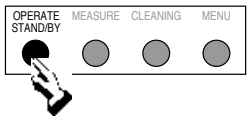
With Cycle 1, it will be necessary to close the Point of Use trigger after 21 minutes. After this, the system can be left alone until the next morning.

Cycle 2: (8 hours)

This cycle contains a longer soak time and should be used whenever the UF module exhibits reduced flowrate or is known to be fouled. **This program should be started on the morning** .

With Cycle 2, it will be necessary to close the Point of Use trigger after 71 minutes. After this, the system can be left alone.

Before starting a sanitisation, it is necessary to have more than 25 litres of feedwater available.

KEYPAD	ACTION	DISPLAY
	Put the Milli-Q into STANDBY mode by pressing OPERATE / STANDBY for 2 seconds ↓	STA NDB Y
	Remove the MILLIPAK 40 from the point of use (figures 6 and 7) ↓	
	Screw the adapter fitting (figure 2, G) onto the point of use. ↓	
	Fit the 12 mm OD tubing (figure 2, F) onto the end of the barb fitting. Place the other end of this tubing into a drain or sink. ↓	
	Remove the sanitisation port plug from the system. Keep it near the system. (figure 1, L) ↓	
	Introduce **3 grams** of sodium hydroxide (NaOH) into the sanitisation port. ↓	
	Screw the sanitisation port plug back onto the system. Check that it is secure to avoid leaks. ↓	
OPERATE STAND/BY MEASURE CLEANING MENU	Press **CLEANING** for 2 seconds (Pressing **CLEANING** again allows the choice of the longer sanitisation cycle). ↓	CLEANING: 1
	Wait 10 seconds to validate the selection. ↓	CLEANING: 1 OPEN THE VALVE
	Bring the point of use trigger forward to begin the sanitisation cycle. ↓	CLEANING: 421mn
	When 400 minutes are shown, put the trigger back to its upright position. ↓	CLEANING: 400mn CLOSE THE VALVE
	Note: If the valve is not closed, then the Sanitisation time will not count down any further.	
	At the end of the sanitisation cycle, the system will automatically go into PRE-OPERATE mode. ↓	PRE OP ERATE

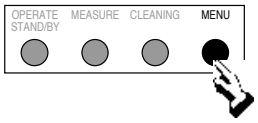
Remove the tubing from the point of use. Remove the adapter fitting. Reinstall the MILLIPAK 40.
The Milli-Q system is now ready for normal use.

Cleaning the screen filter in the feedwater line (Figure 3)

1. Close the valve on the feedwater line.
2. Remove the feedwater tubing (C) from the fitting (F).
3. Unscrew the fitting (E) from the feedwater pipe (D) and the other fitting (F).
4. Clean the screen filter (G).
5. Proceed in reverse order to reinstall the screen filter.

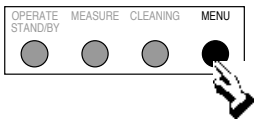
Cleaning the A10

Periodically, the detection cell in the A10 needs to be cleaned of any built-up residual organic matter. If this build-up happens, then the displayed TOC values could be erratic or higher then previously seen.
To fix this, an autocleaning cycle is needed to oxidise any organic contaminants present in the A10 detection cell.
To perform a cleaning cycle of the A10, follow these instructions:



In PRE OPERATE mode
Press **MENU** for 2 seconds
↓

```
PROD. TIM E SETUP
COUNTER:      0mn
```

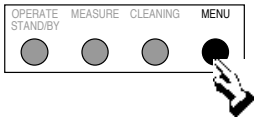


Press **MENU** 3 times
↓

```
SERVIC E: A10
A10 CLEAN ING  60
```

Wait 5 seconds to start the A10 cycle.
After 60 mins. the system will automatically return to its initial operating mode.

(To interrupt the cleaning cycle)
↓



Press **MENU** for 2 seconds to return to the initial operating mode.

```
18.2  MΩcm
TOC:          3ppb
```

Note: It is possible to get water from the point of use valve during the A10 CLEANING mode, but the flowrate is lower.

Troubleshooting messages

Whenever the SERVICE LED is blinking, a message is displayed on the screen which indicates the nature of the service needed.

STATUS/PROBLEM	CAUSE	REMEDY
There is no electrical power to the system.	- No electrical power. - The power cord is not plugged into the wall. - The system power fuse is defective or blown.	Check the source of power. Check the power cord. Change the main power fuse. See APPENDIX 1
The Milli-Q system is in PRODUCT mode but does not produce any or very little water.	- The tank is empty - The feedwater valve is closed. - The pump does not work. - Inlet solenoid valve not opening. - Feedwater pressure is too low. - Air is trapped in the final filter. Clogged final filter. Air is trapped in the UF module.	Fill the tank. Open the feedwater valve. **Contact Millipore Technical Service** **Contact Millipore Technical Service** Verify that the feedwater pressure is at least 0.1 Bar. Purge air from the final filter. See MAINTENANCE section. Replacing the MILLIPAK filter, page 22. See MAINTENANCE section. Replacing the MILLIPAK filter, page 22. Purge the UF cartridge. See Appendix 1, Purging the UF cartridge, page 29.
EXCH. CARTRIDGES	The Cartridge(s) are at the end of their useful life.	Change the cartridge(s) See the ROUTINE MAINTENANCE chapter page 21.
CARTRIDGE OUT	The cartridge(s) are not installed properly or have been removed.	Put the cartridge(s) back in place. See the ROUTINE MAINTENANCE chapter page 21.
AIR PURGE	The cartridges were just replaced.	Wait for the 5 minute AIR PURGE to finish before using water.
SYSTEM ERROR #	The error number corresponds to a particular equipment error.	These error code numbers are listed on page 27.
RS 232 ERROR	The Milli-Q is connected to a printer. A transmission error has occurred between the Milli-Q and the printer.	Press the OPERATE/STANDBY button to reinitialise the system. If the error persists, **contact Millipore technical service**.
NO FEED WATER	The Milli-Q is connected to a level sensor in the feed reservoir.	Fill the reservoir with water before using the Milli-Q again.
OPEN THE VALVE, FAST FLUSH, SAN. CYCLE or CLOSE THE VALVE	The Milli-Q is operating in a preprogrammed software cycle.	Follow the displayed instructions and wait for the program to end.

Troubleshooting messages (continued)

STATUS/PROBLEM	CAUSE	REMEDY
EXCHANGE UV LAMP	The limit of the UV lamp life has been reached.	Replace the UV lamp. **Call Millipore Technical Service.**
START SANIT.	A cleaning cycle of the UF cartridge needs to be started.	Start a cleaning procedure. See the MAINTENANCE chapter.
A10 ERROR #	An error has occurred with the A10 TOC module.	Press OPERATE/STANDBY to reinitialise the Milli-Q. If the error persists, then **contact Millipore Technical Service** .
EXCHANGE A10 UV	The limit of the UV lamp life has been reached.	Replace the UV lamp in the A10. **Contact Millipore technical Service** .
A10 CLEANING	The Milli-Q has the A10 inside. The cartridges were just replaced or an A10 cleaning was started from the SERVICE MENU.	Let the Milli-Q finish the 60 minute A10 cleaning cycle. The Milli-Q can dispense water during this mode.

List of ALARM codes

When the ALARM LED is flashing, an error code number will be displayed which indicates the nature of the problem inside the Milli-Q.

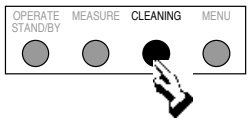
System Error #	DESCRIPTION	REMEDY
1	The motor voltage is above its recommended operating value.	**Contact Millipore Technical Service.**
2	Temperature < minimum.	The measured temperature needs a short period of time to stabilise. If the message persists, **Contact Millipore Technical Service**.
3	Temperature > maximum.	The measured temperature needs a short period of time to stabilise. If the message persists, **Contact Millipore Technical Service**.
4	Resistivity < minimum (off-scale).	Resistivity of product water is off-scale. Let the Milli-Q operate for a few minutes to force any air out of the resistivity cell. If the message persists, **Contact Millipore Technical Service**.
5	Resistivity > maximum (measurement is not representative).	Resistivity of water is off-scale. Let the Milli-Q operate for a few minutes to force any air out of the resistivity cell. If the message persists, **Contact Millipore Technical Service**.
6	Motor voltage error.	**Contact Millipore Technical Service.**
7	UV lamp voltage error.	**Contact Millipore Technical Service.**
8	Defective UV lamp.	**Contact Millipore Technical Service.**
9	Error with the electronics reference signal.	**Contact Millipore Technical Service.**
10	Error in EEPROM storage.	**Contact Millipore Technical Service.**
11	Communication error with the A10	Press OPERATE/STANDBY to reinitialise the Milli-Q. If the problem persists, then **contact Millipore Technical Service**.

A10 ERROR	DESCRIPTION	REMEDY
0	EEPROM saving error	If the error persists, then **contact Millipore Technical Service**.
1	Error in analogue to digital conversion	If the error persists, then **contact Millipore Technical Service**.
2	Temperature range error.	The temperature exceeded acceptable limits during analysis. If the error persists, then **contact Millipore Technical Service**.
3	The resistivity of the water in the A10 is not accepted at the current temperature.	The correlation between these two measurements has passed the allowed limits during the TOC measurement. If the error persists, then **contact Millipore Technical Service**.
4	Temperature too low.	The water temperature is below 5 °C. It is necessary that the temperature be above this value.
5	Temperature too high.	The water temperature is above 41 °C. It is necessary that the water temperature is below this value.
6	Conductivity too high	Conductivity of the sample water exceeded during sampling.
7	Overheating	The temperature exceeded 60 °C during oxidation. If the error persists, then **contact Millipore Technical Service**.
8	Incomplete oxidation	The sample oxidation was not completed in the allotted time. If the error persists, then **contact Millipore Technical Service**.
9	Low oxidation rate	The sample oxidation rate was abnormally low. If the error persists, **contact Millipore Technical Service**.

Interrupting the sanitisation cycle of a UF cartridge

If a sanitant chemical has been introduced into the Milli-Q, it is absolutely necessary to let the sanitisation cycle finish in order to completely rinse the sanitant from the system.
If no sanitant has been introduced, then the sanitisation cycle can be cancelled by following these instructions.

```
SAN.CYCLE   420mn
```



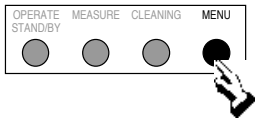
Press **CLEANING** for 10 seconds
↓

```
STANDBY
```

At the end of the sanitisation cycle, the Milli-Q will go back to its initial mode of operation.

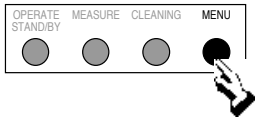
Purging trapped air from the UF cartridge

In either PRE OPERATE or PRODUCT



Press **MENU** for 2 seconds
↓

```
PROD. TIME SETUP
COUNTER:      0mn
```



Press **MENU** 4 times

```
SERVICE: UF
AIR PURGE
```

Open the point of use valve to begin the AIR PURGE cycle.
Dispense product water from the system to the drain.

```
PRE OPERATE
AIR PURGE     5mn
```

At the end of the air purge, the system will go back into STANDBY mode.
Close the point of use valve to place the system in PRE OPERATE mode.

```
STANDBY
CLOSE THE  VALVE
```

Interrupting the A10 cleaning cycle

If an A10 cleaning cycle has been started from the MENU service mode, then it can be cancelled at any time by pressing on the **MENU** button.

APPENDIX 1

Replacing the main electrical power fuse

1. Put the system into STANDBY mode by pressing OPERATE/STANDBY for 2 seconds.
2. Turn off the power switch (figure 1, H) by putting it into the **O** position.
3. Unplug the electrical power cord from the wall and from the system.
4. Remove the fuse holder (figure 1, J).
5. Remove the blown fuse and replace it with the spare fuse.

   Note: Put a new spare fuse into the holder for future use.
6. Replace the fuse holder and plug the power cord back in to the system and to the wall.

Regulating the mobility of the point of use arm

The point of use arm can be adjusted in 2 locations. This adjustment is done by tightening the arm screw(s) with the 6 sided key.

Do not overtighten the arm screws. This may block movement of the arm or can damage the arm itself.

Recycling the reject water from the A10 TOC

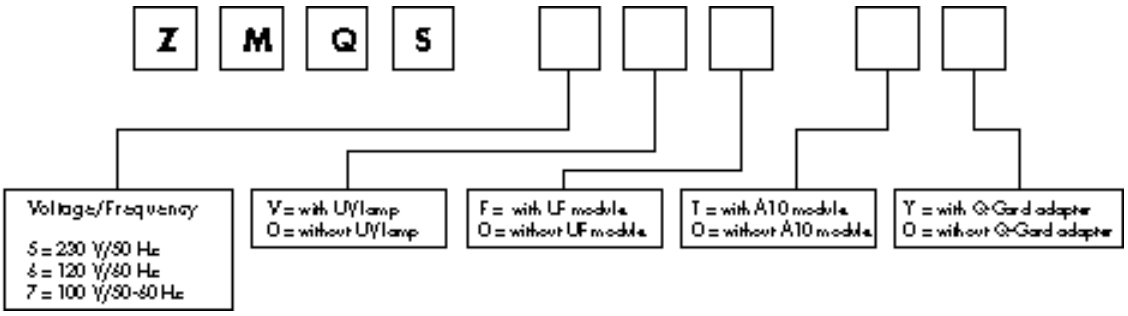
The reject water from the use of the A10 can be recycled to a feed reservoir. **Contact Millipore Technical Service for more details.**

System is not operated for a long time

Keep the Milli-Q in PRE OPERATE mode when water is not needed. In this mode, the Milli-Q will operate all cycles to keep the water quality optimum.
If the Milli-Q is to be shut down for a long time, **contact Millipore Technical Service for further information** .

Systems

Catalogue numbers



Expendables

Description	Reference
Q-Gard purification pack	
Q-Gard 1 purification pack, (1/pack)	QGAR D00 R1
Q-Gard 2 purification pack, (1/pack)	QGAR D00 D2
Quantum cartridge (without MILLIPAK)	
Quantum IX (Ionex), (1/pack)	QTUM 000 IX
Quantum EX (Organex), (1/pack)	QTUM 000 EX
Quantum VX (Volatile Organic Carbon Removal), (1/pack)	QTUM 000 VX
Quantum cartridge (with non sterile MILLIPAK)	
Quantum IX (Ionex), (1/pack)	QTUM MPK IX
Quantum EX (Organex), (1/pack)	QTUM MPK EX
Final Filter	
MILLIPAK 40 final filter, sterile, (2/pack)	MPGL 04S K2
MILLIPAK 40 final filter, non-sterile, (1/pack)	MPGL 040 01
Biocel, Synthesis and A10 models	
UV lamp, 18 W	QUVL QSL 01
UV lamp, Anatel	ZFA1 0UV 01
UF cartridge, 5 K	CDUF HF0 5K

Accessories

Description	Reference
Pressure regulator *	ZFMQ 000 PR
Printer cable	PRNT CBL 01
Wall mounting bracket	SYST FIX 01

* Necessary if feed pressure > 0.3 bar (4.5 psi).

WARRANTY

Millipore Corporation ("Millipore") warrants the products manufactured by it against defects in materials and workmanship when used in accordance with the applicable instructions for a period of one year from the date of shipment of the products. MILLIPORE MAKES NO OTHER WARRANTY, EXPRESSED OR IMPLIED. THERE IS NO WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

The warranty provided herein and the data, specification and descriptions of Millipore products appearing in Millipore's published catalogues and product literature may not be altered except by express written agreement signed by an officer of Millipore. Representations, oral or written, which are inconsistent with this warranty or such publications are not authorized and if given, should not be relied upon.

In the event of a breach of the foregoing warranty, Millipore's sole obligation shall be to repair or replace, at its option, any product or part thereof that proves defective in materials or workmanship within the warranty period, provided the customer notifies Millipore promptly of any such defect. The exclusive remedy provided herein shall not be deemed to have failed of its essential purpose so long as Millipore is willing to repair or replace any nonconforming Millipore product or part. Millipore shall not be liable for consequential damages resulting from economic loss or property damages sustained by a customer from the use of its products.

However, in some states the purchaser may have rights under state law in addition to those provided by this warranty.

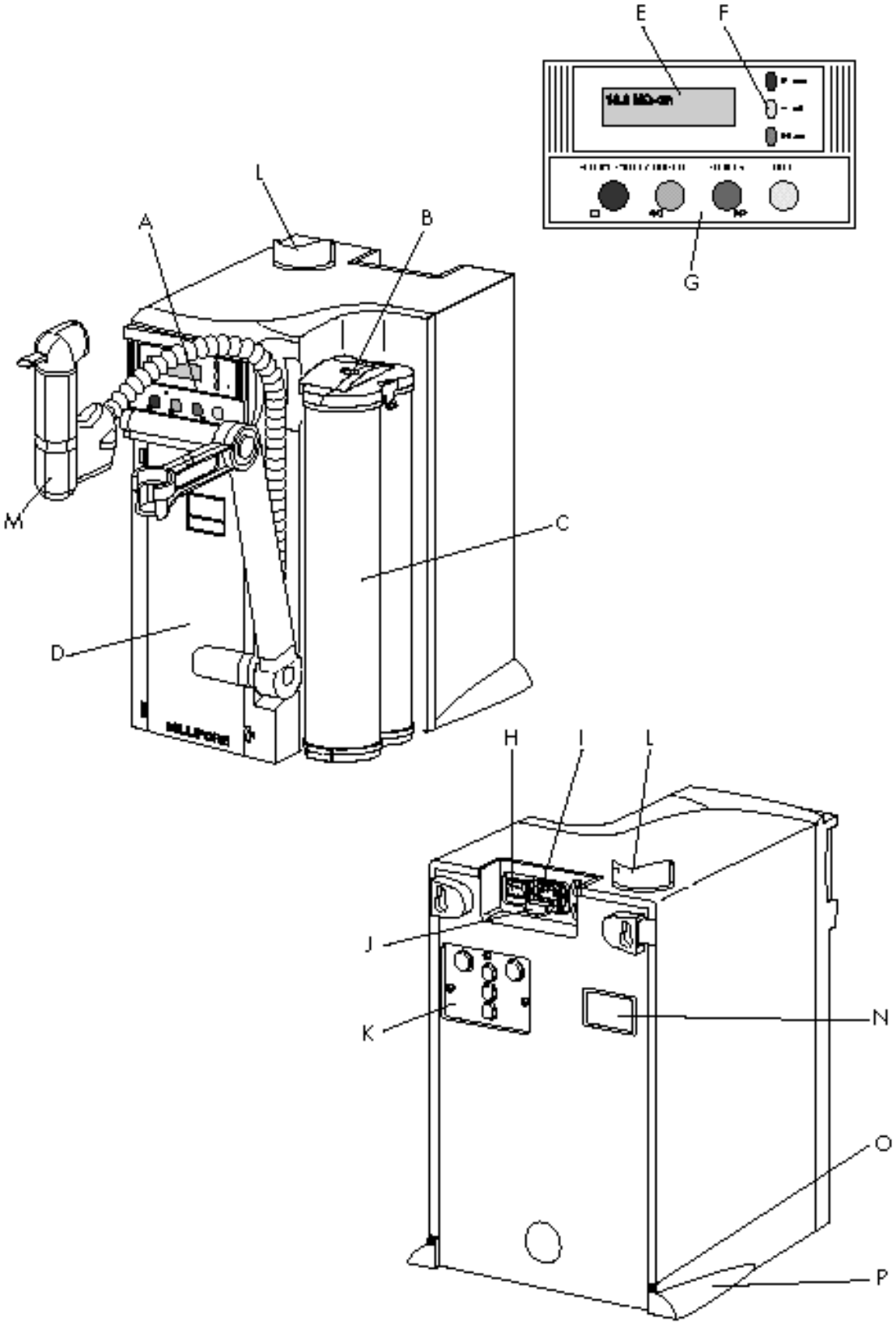


Figure 1

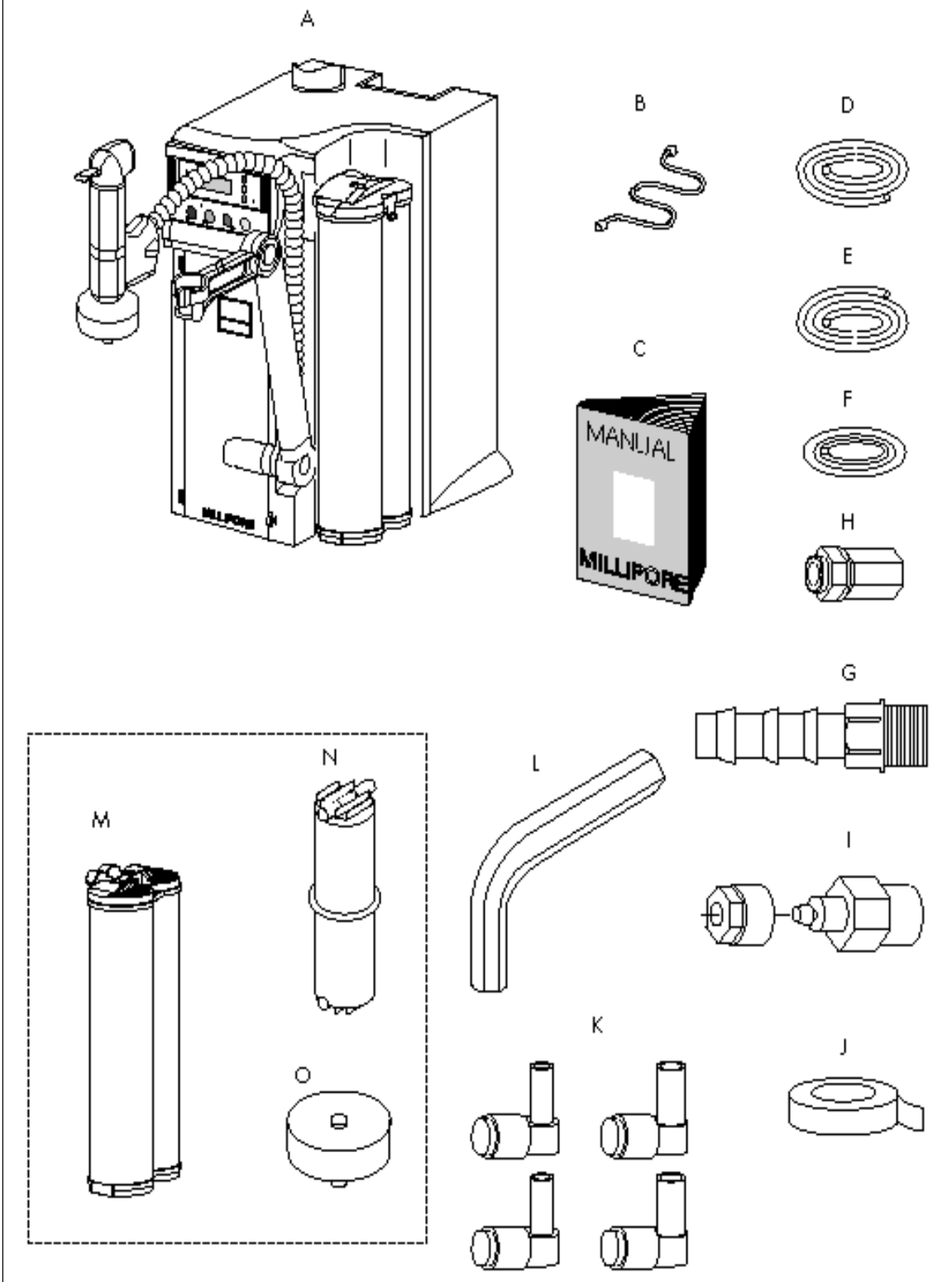


Figure 2

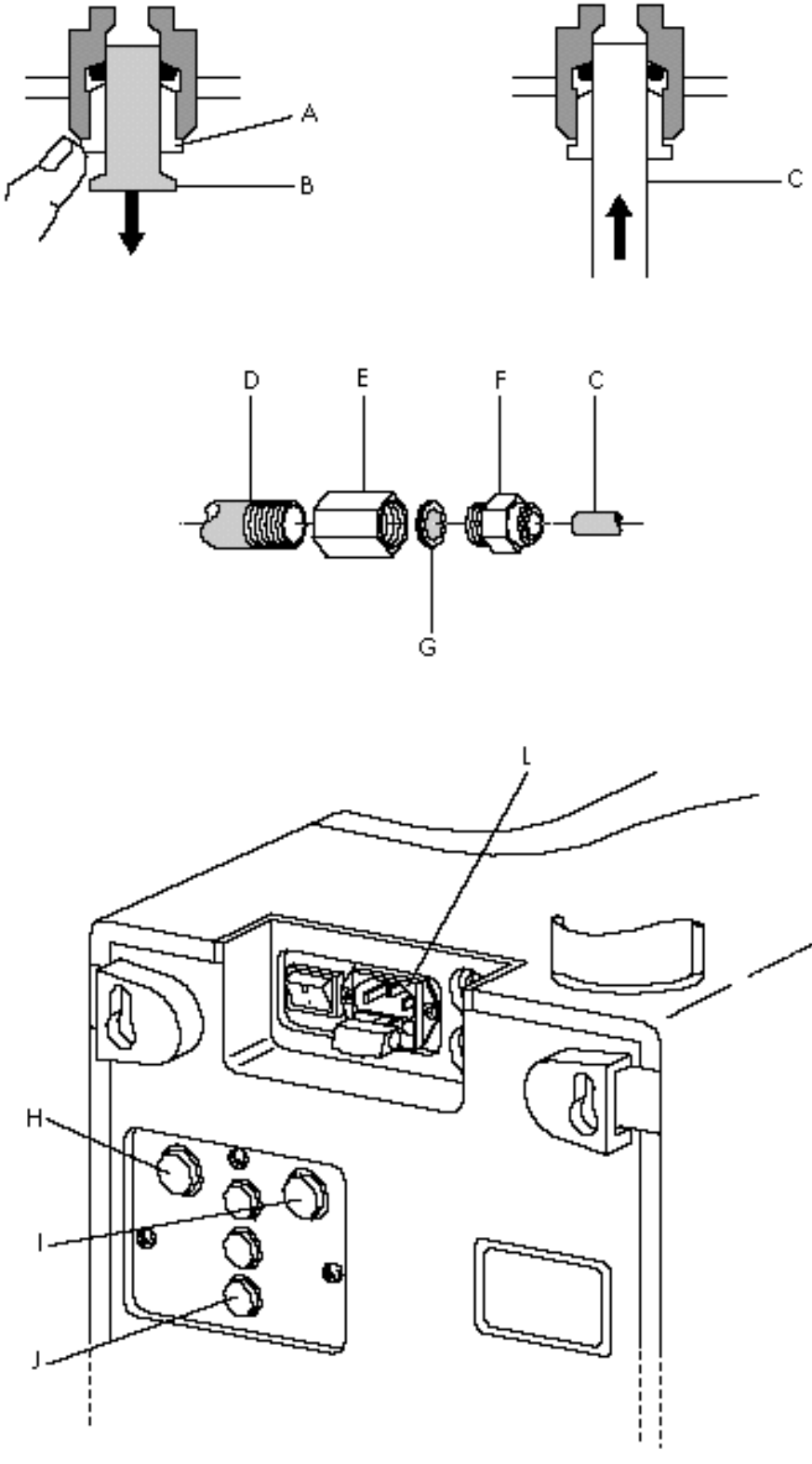
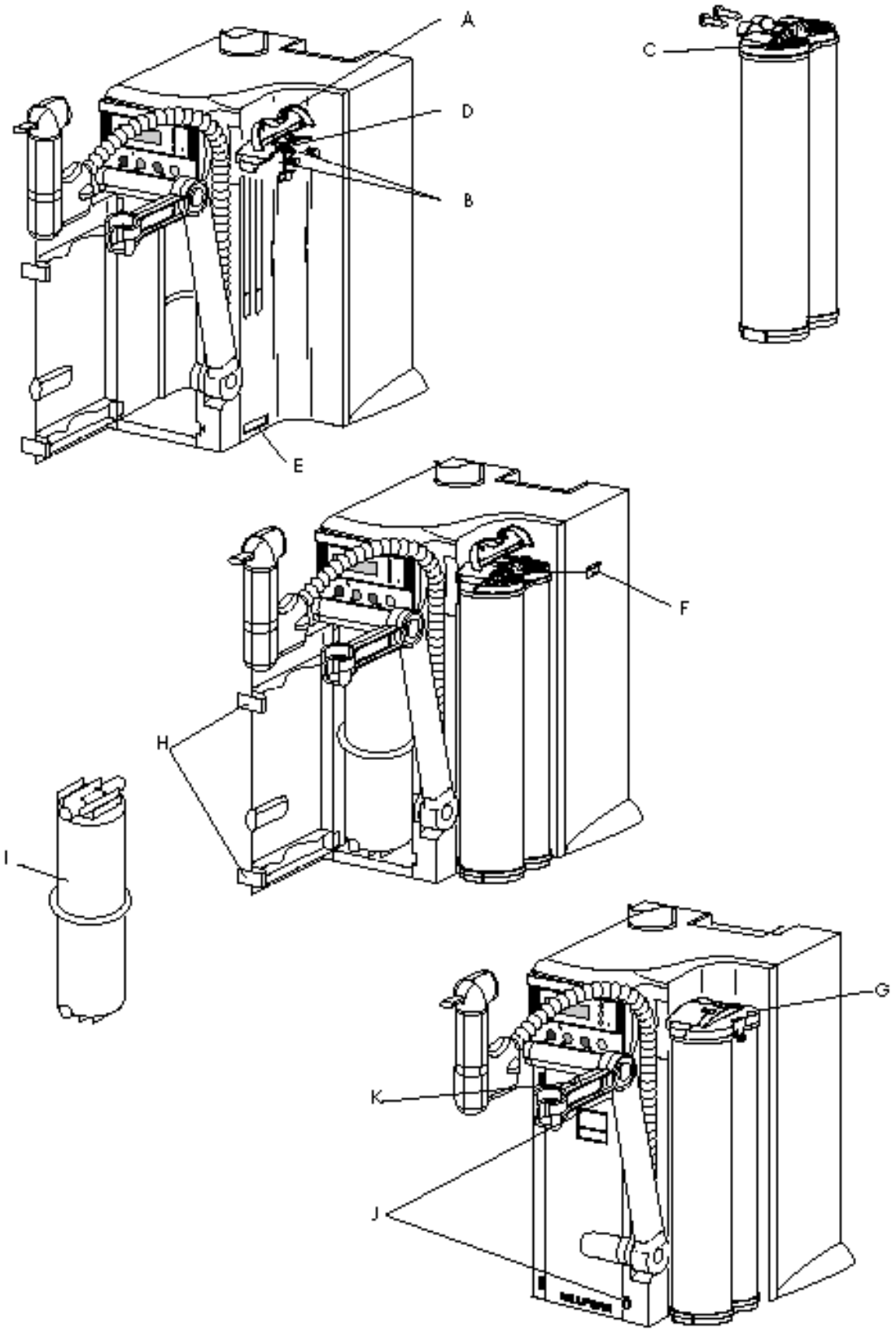


Figure 3



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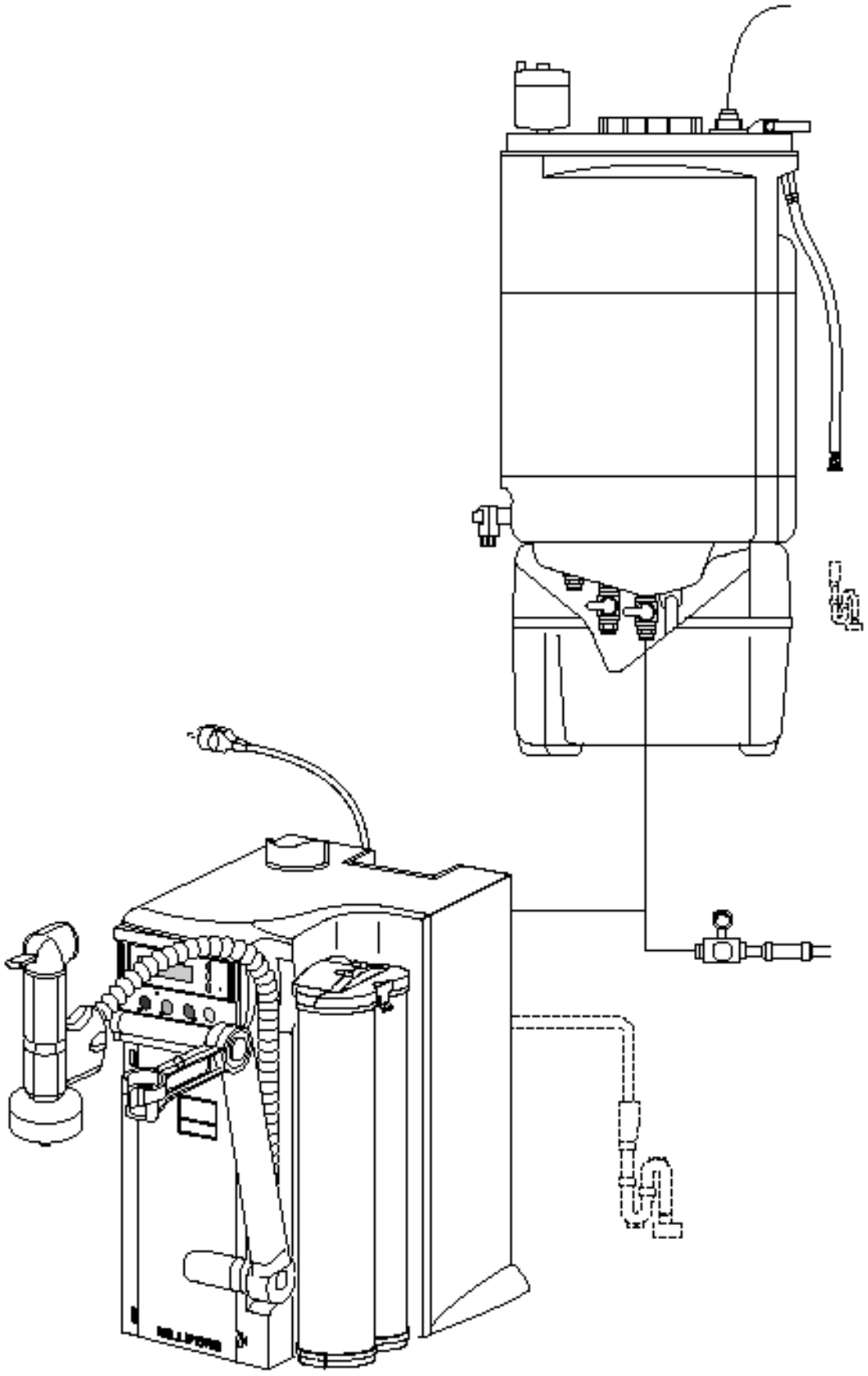

Figure 5

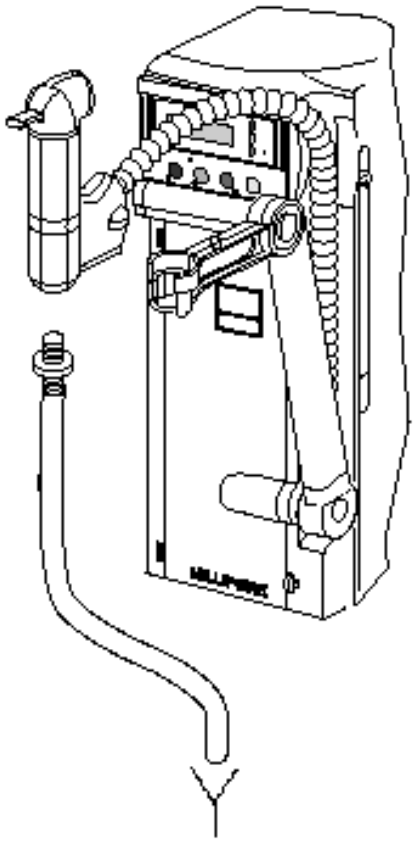

Figure 6

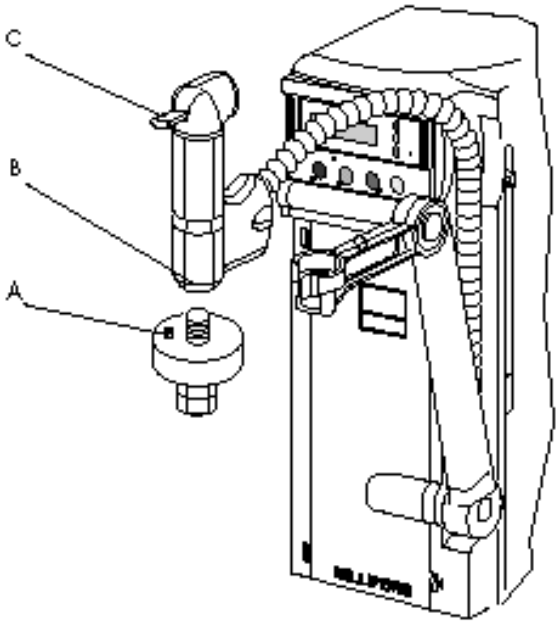

Figure 7