

# OMNI

3000



## OPERATOR'S MANUAL

**SCEPTOR**  
Industries, Inc.

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# SECTION 1: INTRODUCTION

The OMNI™ 3000 is a portable, high-efficiency, wet concentrating air sampler utilizing SpinCon® technology. This technology is ideally suited for the collection of liquid and solid aerosol particulates, including submicron-sized particles, airborne molecular contamination, biological particulates, low vapor pressure, and semi-volatile chemical compounds.

## 1.1 Operating Principle

The OMNI 3000 draws air through a removable contactor, where the air and any suspended material contacts the sampling fluid which then strips out the particulate including biological matter. The sampling fluid remains in the contactor until the end of the sampling cycle allowing the contactor to operate for extended periods. This also allows more of the captured matter to be retained and concentrates particles and biological matter in the sample fluid. (The length of the cycle determines the final sample concentration of the target matter). By concentrating the target matter, sensitivity limitations of current analytical methods are overcome. Therefore, concentrations of airborne target matter, which would be undetectable using a conventional air sampler, are now easily detected. The OMNI is capable of sampling air at a rate of 300 liters per minute and delivering a final sample approximately 10 milliliters of liquid per sample.

The OMNI will collect a sample for an operator-defined period. After the cycle is finished, the liquid in the contactor is automatically pumped into a sample cartridge. The sample fluid can then be analyzed for target contaminants using a variety of analytical methods. Compatible analysis methods include:

HAPSITE, Fourier Transform Infrared, Polymerase Chain Reaction (PCR), Immunoassay, Culturing, Direct Microscopy, Mass Spectroscopy, Gas Chromatography, Liquid Chromatography, and Flow Cytometry, Inductively Coupled Plasma (ICP), Fluoroassay, Raman Spectroscopy, ELISA, and Colorimetric Spectroscopy, among others.

## 1.2 Intended Application

The OMNI 3000 sampler's SpinCon technology collects bioaerosols, organic and inorganic particulates, and semi-volatile and low vapor pressure chemicals in the air. SpinCon technology has been shown to collect:

Biological Organisms	Particulates, Vapors & Other Aerosols
<ul style="list-style-type: none"><li>• Micro-Biological spores, hyphal fragments, and vegetative cells such as Anthrax spores, molds, pollen</li><li>• Viruses and Coliphage viral material such as Foot and Mouth Disease</li><li>• Bacteria and Coliform material</li></ul>	<ul style="list-style-type: none"><li>• Chemical Warfare Nerve Agents</li><li>• Chemical Warfare Blister Agents</li><li>• Psychotic Agents</li><li>• Explosives</li><li>• Pesticides</li><li>• Metal dusts &amp; Submicron particles</li></ul>

### 1.3 Description

The OMNI™ 3000 is 16 inches tall, with a 7.5 inch by 8.5 inch footprint. The OMNI components are shown in Figures 1-1 through 1-4.

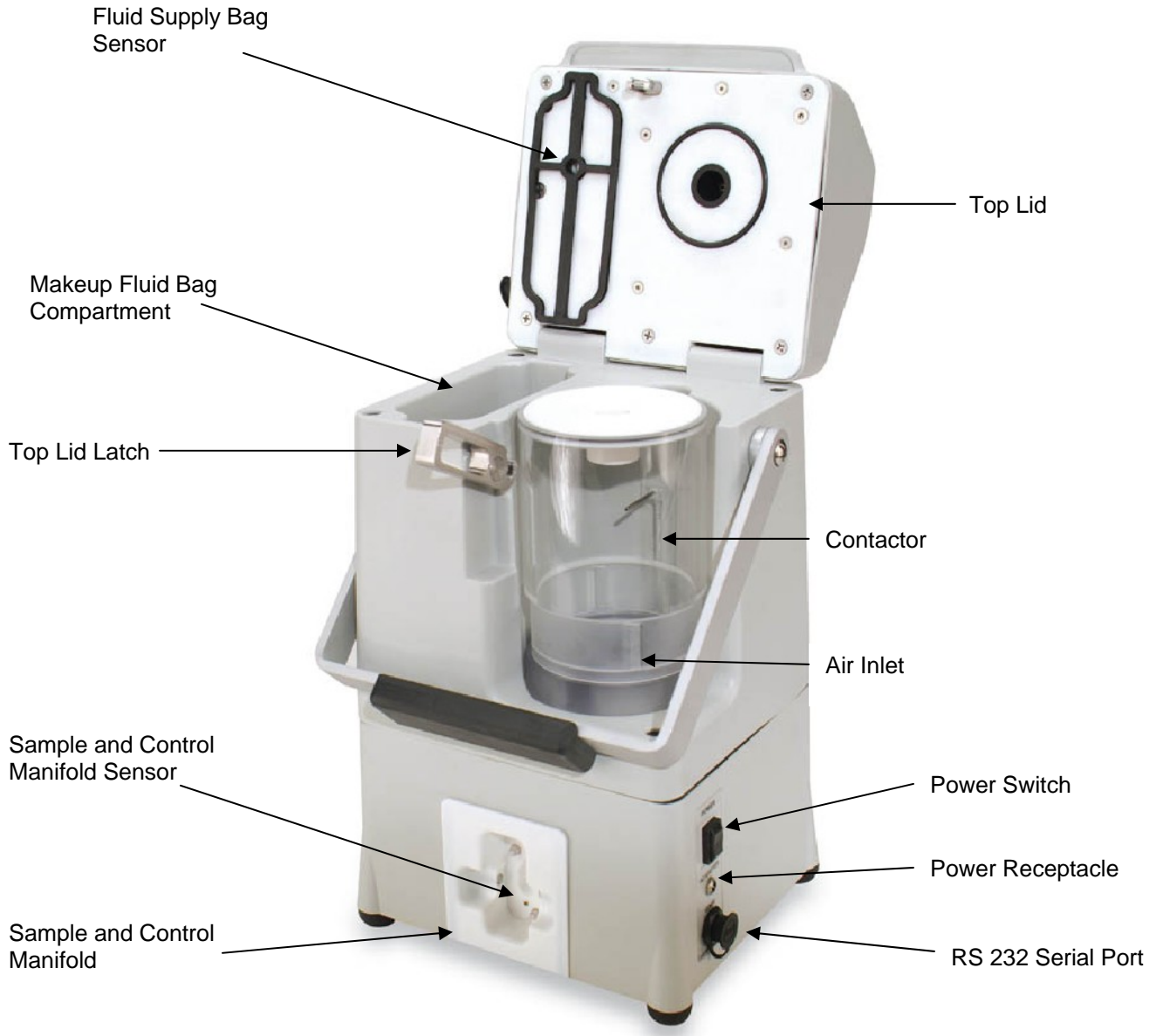


Figure 1-1: OMNI™ 3000

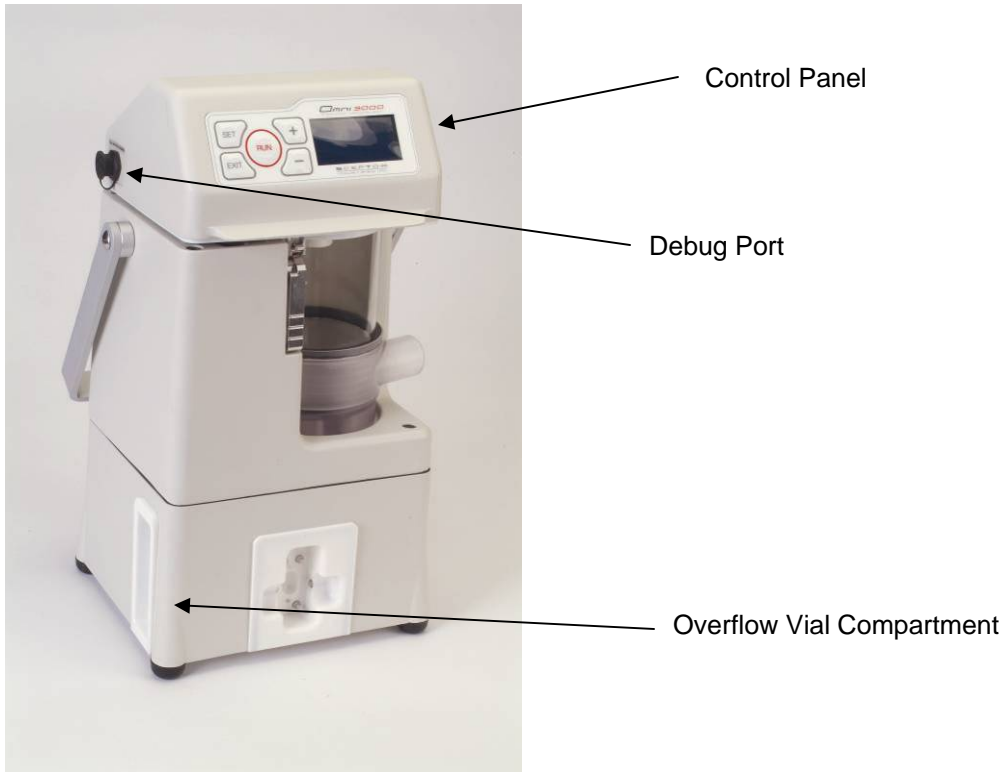


Figure 1-2: Front view of OMNI™ 3000

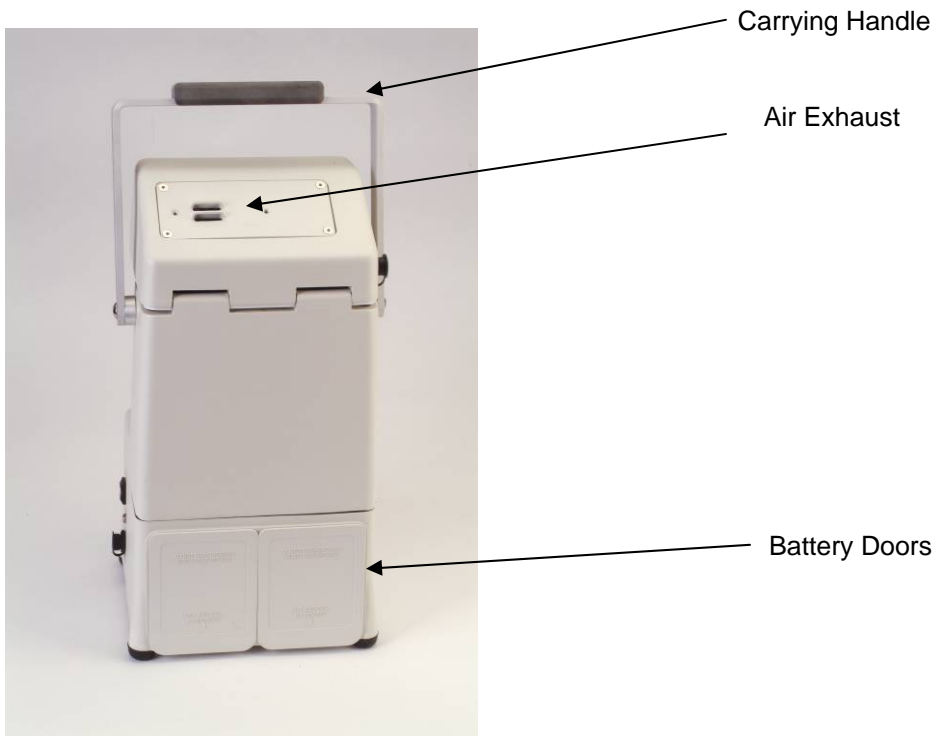


Figure 1-3: Back View of OMNI™ 3000

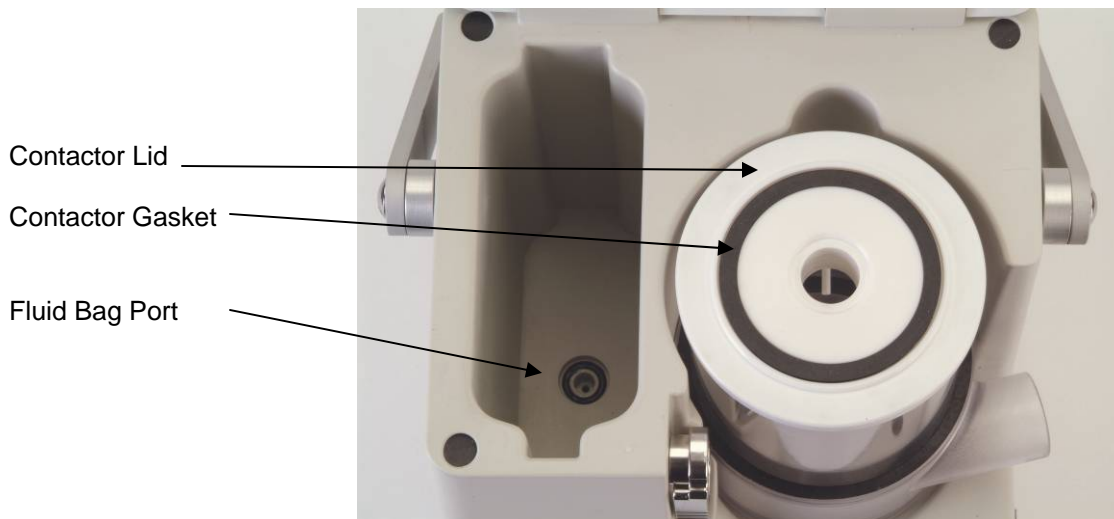


Figure 1-4: Top Inside View

### Debugging Port Connection

The debugging port connection is located on the left side of the top lid. It is used for debugging software and for Sceptor use only (Figure 1-2).

### Power Switch

The On/Off power switch is a toggle switch located on the lower right side of the instrument (Figure 1-5). The instrument can be powered by 90-264V, 47–63 Hz AC power, using the supplied converter and power cord (Figure 1-6), or by DC power using up to two 24 volt batteries (i.e. it can run on one battery) included in the optional battery kit (Figure 1-8). When both power supplies are attached, the instrument defaults to the AC power source. However, if both supplies are connected and AC power is lost, the instrument **does not switch to the DC power**; it will shut down until AC power is restored.

**Note:** System settings including sample duration are saved in memory when set and are not lost in the event of power failure.

### RS 232 Serial Port

The RS 232 serial port is a 115k baud rate, 8 bit, no parity communication interface for communication with the instrument. Contact the factory for more information about using the serial port to communicate with the system. (Figure 1-5)



Figure 1-5: Lower Right Side View

### Converter and Power Cord

The power cord for the AC supply is connected to a voltage converter, which converts the AC power into 24 Volt DC power (Figure 1-6). The 24 Volt DC converter plugs into the power receptacle on the lower right side of the instrument (Figure 1-5). The converter and cord are included in the purchase of the base instrument.

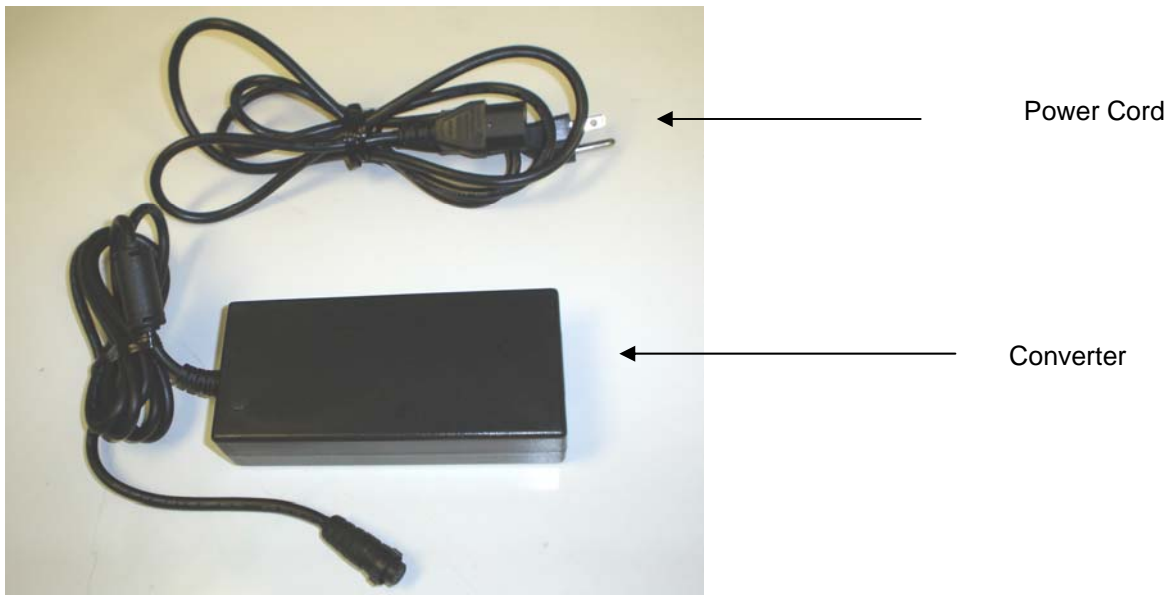


Figure 1-6: Converter and Power Cord

## Battery Doors and Compartment

Two battery compartments are located behind removable doors on the lower back section of the instrument (Figure 1-7). Each compartment holds one optional 24 Volt DC battery (Figure 1-8). Batteries are available for purchase as an option to the base unit.



Figure 1-7: Battery Doors and Compartment



Figure 1-8: Batteries, Battery Charger, and Automatic Refreshing Adapter

## Optional Batteries

DC power for the instrument can be supplied by up to two optional 24 Volt nickel metal hydride batteries (Figure 1-8). The instrument can operate on one battery for a short period of time in order to exchange low batteries with fully charged batteries (hot swappable). Replace batteries one at a time. If both batteries are removed at once and the AC supply is not connected, the instrument will shut down. Batteries can be recharged in approximately one hour using the battery charger in the optional battery kit. Two batteries will operate the OMNI™ 3000 in sampling mode for approximately 1.5 to 2 hours.

**Note:** During a sampling cycle, when the battery charge is too low to operate the instrument, it will automatically stop and extract the sample. “Low Bat” will be displayed on the control panel display.

## Optional High Capacity Battery Charger

The battery charger is used to charge the batteries (Figure 1-8). Batteries can be recharged in approximately one hour using the battery charger in the optional battery kit.

## Optional Automatic Refreshing Adapter

The refreshing adapter is used to extend the life of the batteries and to repair damaged battery cells (Figure 1-8). This adapter is not included in the battery kit.

## Control Panel

The OMNI™ 3000 is operated by using the sealed touch pad on the control panel located on the front of the top lid (Figure 1-9). The control panel has an LCD screen, which is easily viewable and operable while wearing personal protective equipment. The LCD displays the status of the instrument and enables the operator to set the desired sampling cycle.

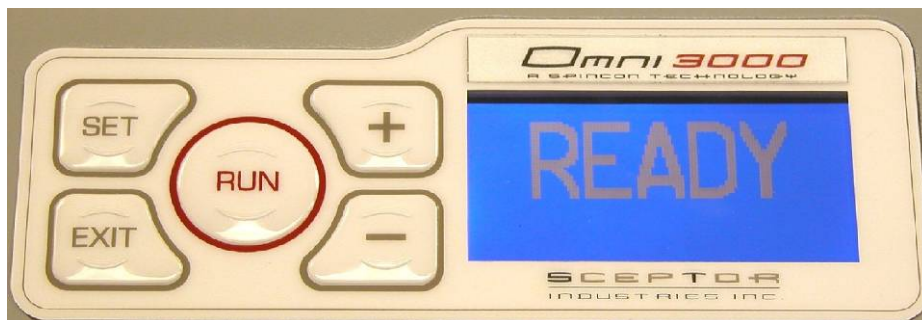


Figure 1-9: Control Panel

## Air Exhaust

The air that is drawn into the instrument through the contactor air inlet is exhausted through the air outlet on the back of the top lid (Figure 1-10). The exhaust is fitted with an internal baffle for noise suppression. (Please refer to Figure 1-14)

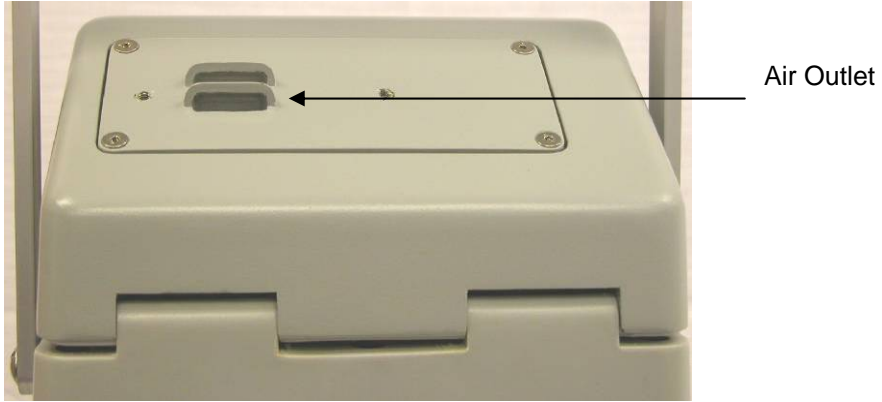


Figure 1-10: Air Outlet

**Optional Remote Exhaust Fitting and Hose**

The remote exhaust fitting (Figure 1-11) makes it possible to attach a hose (Figure 1-12) to the instrument and exhaust the air to a controlled location.

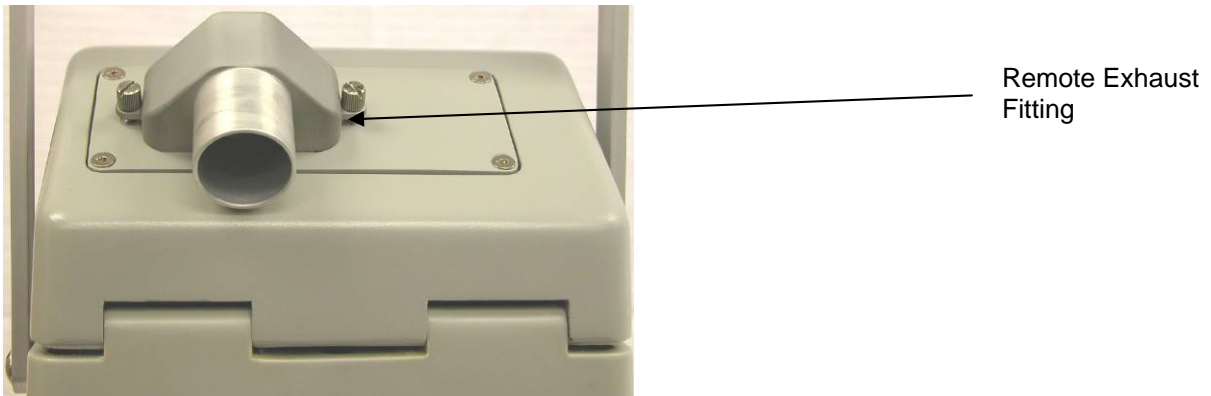


Figure 1-11: Air Outlet with Remote Exhaust Fitting

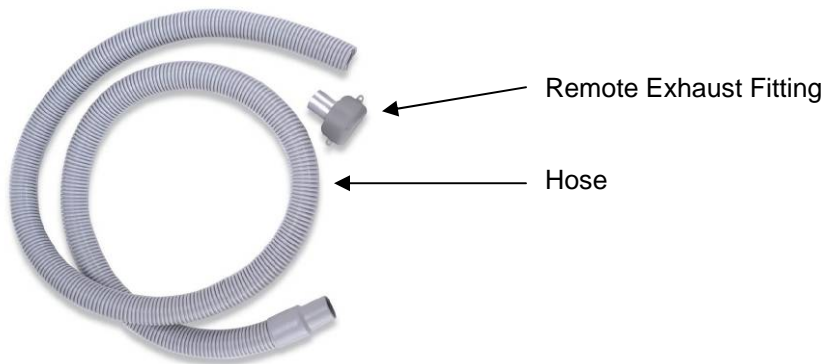


Figure 1-12: Exhaust Fitting

### **Optional Exhaust Filter Assembly with HEPA Filter**

Based on sample collection efficiency, it is possible some particles may be exhausted by the instrument. To capture any exhausted particulates, the exhaust filter assembly is comprised of a HEPA filter mounted onto the exhaust port (Figure 1-13).



Figure 1-13: HEPA Filter in Exhaust Filter Assembly

### **Acoustic Baffle**

The acoustic baffle (Figure 1-14) is located in the acoustic baffle compartment beneath the air outlet on the back of the top lid. The baffle reduces operation noise. This baffle must be changed periodically during routine maintenance. (See Section 6 of this document.)



Figure 1-14: Acoustic Baffle

### **Contactator**

The contactator (Figure 1-15) routes air through the instrument, where it mixes with the sample fluid and the target material is concentrated into a liquid sample. A vacuum at the top of the contactator draws air through the air inlets into the contactator. The spinning air forces airborne particulate material to be collected in the fluid. Throughout the sampling process, evaporated fluid is replaced by injecting makeup fluid from the water supply bag into the sample cartridge. Transferring this fluid from the sample cartridge to the contactator is determined by pressure variations in the contactator. No fluid exits the contactator until the end of the sampling cycle. In contrast, once the cycle has begun, air entering the contactator is continuously exhausted through the air outlet at the rear of the top lid (Figure 1-10).

At the end of the cycle, the liquid in the contactor is automatically drained as a discrete liquid sample into the sample cartridge (Figure 1-16). The cartridge can then be removed, sealed with a red tamper evident seal, and sent to a lab for analysis. If the sample is going to be analyzed on-site, a disposable syringe (Figure 1-20) can be used to remove the sample from the cartridge. The contactor has an integral plenum. This allows a hose to be connected to the unit, enabling use of sampling wand attachments, remote sample collection, or re-direction of the sampler inlet.

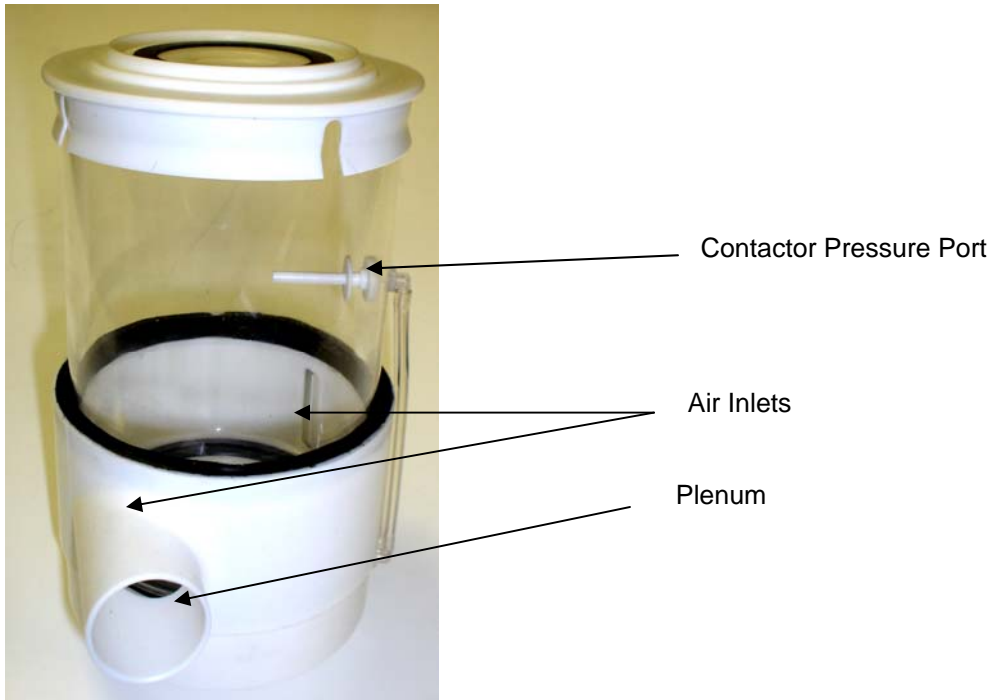


Figure 1-15: Plenum Contactor, Contactor Pressure Port, and Air Inlets



Figure 1-16: Sample Cartridge

### Sample and Control Manifold

The sample and control manifold (Figure 1-18) is located at the lower front of the instrument. It holds the sample cartridge in place during a sample cycle and controls the supply of fluid from the cartridge to the contactor. As fluid in the contactor evaporates and is drawn from the cartridge, the pumps on the control manifold supply additional fluid from the fluid supply bag into the sample cartridge. The fluid is then drawn into the contactor as needed.

After the cycle is completed the sample fluid with the collected material is automatically drawn back into the cartridge.

**Note:** If the cartridge remains in the instrument for an extended period after the cycle is finished, an extract cycle should be run prior to removing the cartridge to prevent fluid dripping from the manifold ports.

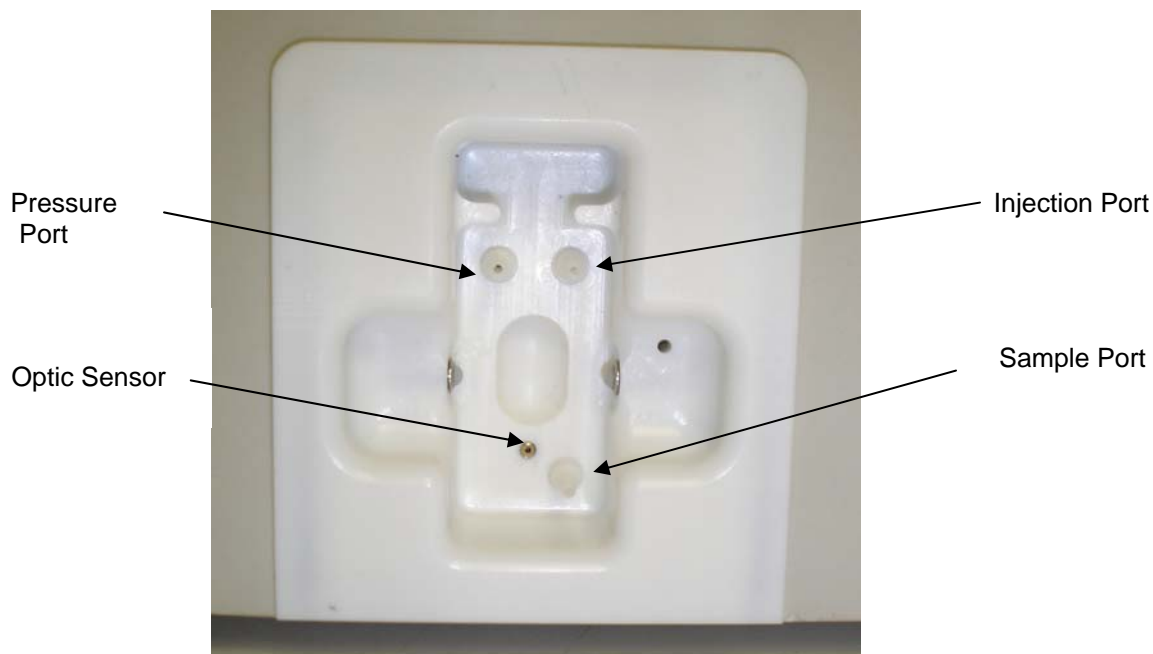


Figure 1-18: Sample and Control Manifold

## Sample Cartridge

Each sample cartridge (Figure 1-19) has a unique serial number identifier and comes enclosed in an easy-open small plastic bag. After removing the cartridge, dispose of the bag. The sample cartridge contains approximately 10 ml of fluid that is pumped into the contactor at the beginning of a sampling cycle. When the sampling cycle is completed, the sample fluid is pumped from the contactor back into the cartridge. The cartridge is then removed and the lid closed. A red tamper evident seal and a resealable plastic bag are provided with each cartridge for shipment to a lab. If the sample is going to be analyzed on-site, a disposable syringe (Figure 1-20) can be used to remove the sample from the cartridge.

**Caution:** After the “Run” button is pressed and the sampling cycle is running, DO NOT move or disturb the sample cartridge. This may cause the systems fluid control to fail.

**Note:** Do not reuse the sample cartridge. Sediment in the bottom of the cartridge left from a previous sample can cause clogging when the fluid from the cartridge is drawn back into the contactor.

Sample cartridges are available with sterile water or phosphate buffered solution. Contact Sceptor for custom sampling solutions.



Figure 1-19: Sample Cartridges

## Syringes

Disposable syringes (Figure 1-20) or syringes may be used to extract the sample fluid through the one-way rubber valves on the top of the cartridge for analysis. Additional syringes and cartridges may be purchased from Sceptor Industries.



Figure 1-20: Disposable Syringes

## Makeup Fluid Supply Port and Bag

The makeup fluid supply port is located inside the instrument to the left of the contactor (Figure 1-21).

Makeup Fluid Supply Port

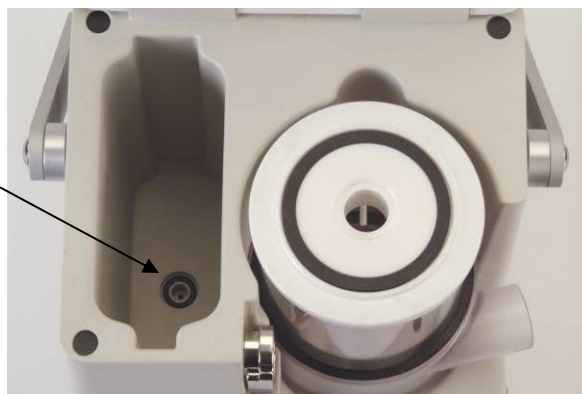


Figure 1-21: Makeup Fluid Supply Port

To access the makeup fluid supply port, push the carrying handle in front of or behind the instrument, pull the top lid latch forward, and raise the lid of the instrument to the up right position. To replenish the fluid, pull up on the frame of the fluid supply bag to remove it and drop in a new one. To insert, position the wider end of the frame toward the back of the instrument. Press down on the fluid supply bag frame to ensure that bag is properly seated in the fluid supply port. See Figure 1-22.



Fluid Supply Bag

Figure 1-22: Inserting Fluid Supply Bag

To minimize contaminating the system, do not refill fluid supply bags. Refilling of fluid supply bags can cause sample contamination.

Fluid from the supply bag is added to the sample as needed to compensate for evaporation. About 1 to 2 milliliters of fluid evaporates per minute--depending on environmental conditions: Expect 2ml of evaporation per minute at high ambient temperatures (>80°F) and low humidity (<15% RH); in contrast, expect approximately 1ml per minute of evaporation in low

temperatures (<60°F) and high humidity (>80% RH). Each bag contains approximately 4-8 hours of continuous sampling time.

Additional Fluid Supply Bags are available from Sceptor.

**Note:** The instrument is equipped with an internal water filter to prevent clogging in the fluid supply line. This filter is factory replaced as part of Sceptor's recommended annual maintenance program.

### Overflow Port and Vial

The overflow port (Figure 1-23) is located at the bottom left side of the instrument and holds the overflow vial (Figure 1-24).

Periodically this vial should be visually inspected to ensure it is empty. If for any reason the sample volume is too large to fit into the sample cartridge, the excess fluid will be diverted to the overflow vial. This normally only occurs if a sample cartridge is not properly sealed, if the contactor is damaged and air leaks into the fluid lines, or if the system has a worn or failed valve. In addition, the overflow valve is used during the full cleaning process.

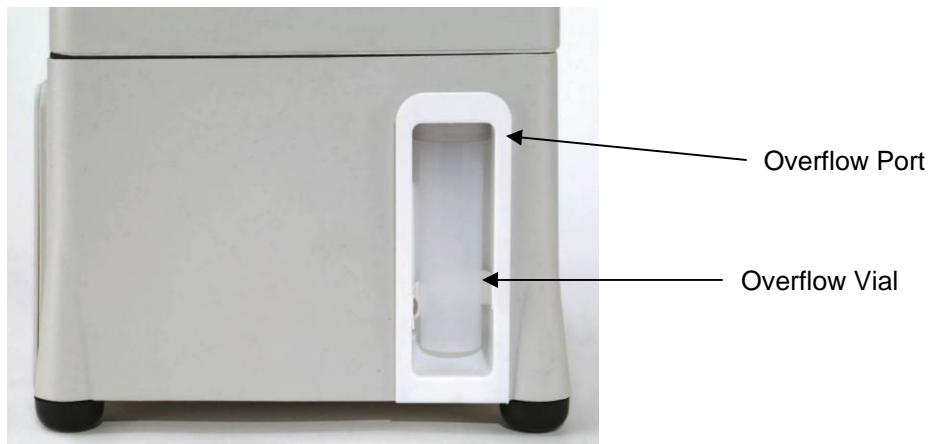


Figure 1-23: Overflow Port & Vial



Figure 1-24: Overflow Vials

## **SECTION 2: SAFETY PRECAUTIONS**

### **2.1 Warnings**

Use caution: Treat all collected samples as if they are hazardous.

The AC Power converter (Figure 1-6) must be electrically grounded.

Do not place or operate the instrument in standing water.

Do not operate the instrument with the covers removed, including the battery covers. Cover serial port with provided cap if not in use.

Do not restrict the air inlet or outlet during operation. This will reduce the performance and could cause the level control to fail.

If the flow rate drops below 260 LPM while operating on battery power, the sampling cycle will abort.

Remove and discard the desiccant packet from the sample cartridges bag. DO NOT EAT.

## SECTION 3: SETTING UP THE OMNI™ 3000

### 3.1 Unpacking the OMNI™ 3000

To unpack the OMNI™ 3000, open the protective carrying case and remove the instrument using the carrying handle.

Thoroughly read the instruction manual to learn about the instrument, the safety precautions, set up, operation, cleaning and maintenance before operating.

Save the Certificate of Conformance.

#### Base Instrument

The OMNI 3000 base instrument is shipped with an AC/DC converter, power cord, 20ml extraction syringe, protective carrying case and operator's manual. See Figure 3-1.



Figure 3-1: OMNI™ 3000 Base Instrument

## 3.2 Connecting the Fluids

### Sample and Control Manifold and Sample Cartridge

The sample and control manifold is located on the lower front of the instrument (Figure 3-2).

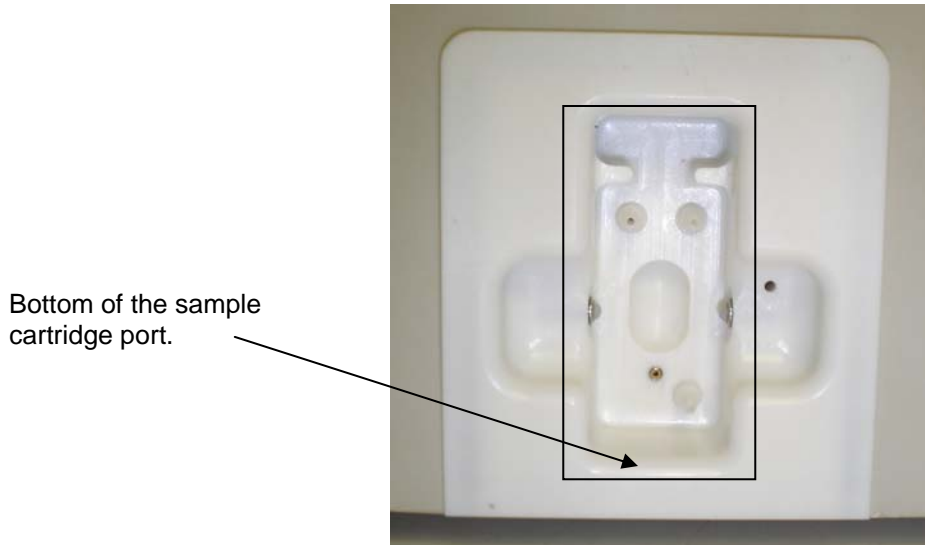


Figure 3-2: Sample and Control Manifold

To use the sample cartridge, remove the cartridge from the packaging by tearing the plastic from the pre-applied perforation and dispose of the enclosed desiccant pack. Open the cartridge lid and fold it back against the end of the cartridge. Using your thumb and forefinger, insert the cartridge into the sample and control manifold with the lid folded back as shown in Figure 3-3. Before inserting the sample cartridge, ensure that the bottom of the cartridge is touching the bottom of the sample and control manifold (Figure 3-3). (If the cartridge is off the bottom of the manifold, there is a risk that the cartridge valve could fold over and cause the cartridge to leak and the instrument to malfunction.) Make sure the three cartridge ports line up with the three manifold ports. Snap the sample cartridge into place so that the pins in the receptacle insert fully into the valves in the cartridge.

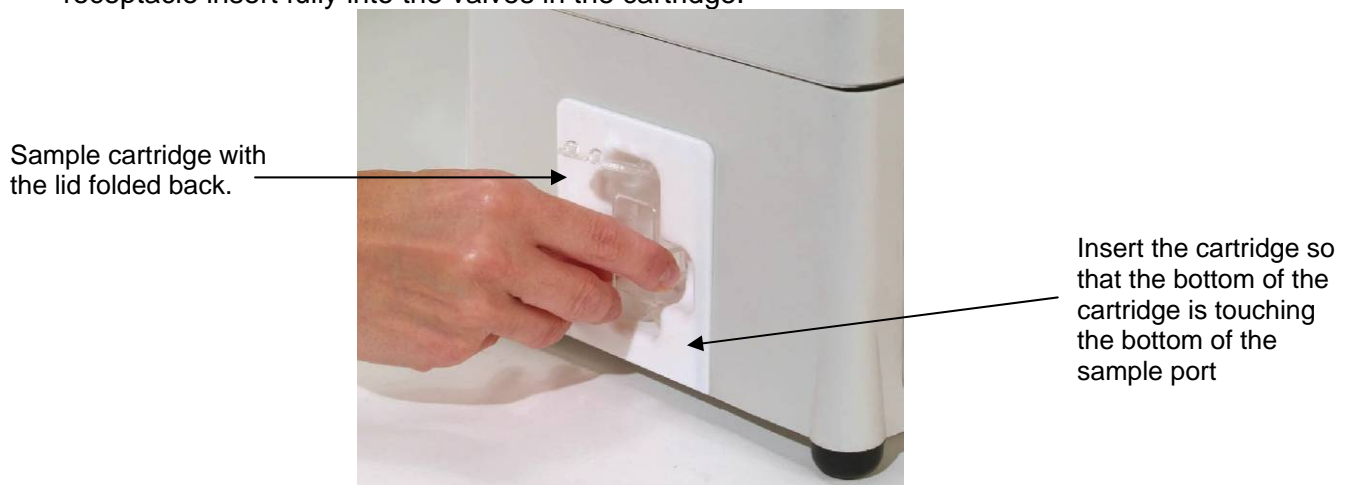


Figure 3-3: Inserting or Removing the Sample Cartridge

When the sampling cycle is complete, the instrument panel will read “READY”, and then it is safe to remove the sample cartridge from the sample and control manifold by smoothly pulling it straight out using your thumb and forefinger (Figure 3-3).

The sample can now be extracted using a syringe for on site analysis or sent to a lab for analysis. If the sample is to be sent to a lab for off-site analysis, wrap a red tamper proof seal around the cartridge and insert into a provided resealable plastic bag.

If desired, the appropriate Sample Line Cleaning can be performed after each sample cycle to reduce cross contamination between samples. See Section 5.2 “Internal Cleaning” for Sample Line Cleaning guidelines.

### Fluid Supply Port and Bag

The fluid supply port is located inside the instrument to the left of the contactor at the bottom of the fluid supply compartment (Figure 3-4).



Figure 3-4: Opening the Top Lid

Before inserting the fluid supply bag, open the top lid. Pull the carrying handle forward in front of the instrument or push behind the instrument to allow it to clear the lid, pull forward on the top release latch until the catch bar on the top is released then lift the lid of the instrument.

Remove the Fluid Supply Bag from the sealed bag by tearing the plastic bag open at the pre-applied perforation. Remove the protective orange cap. (The bag will not leak: The outlet fitting is spring loaded; therefore, fluid will not be released until it is inserted into the port.) Notice that the plastic frame supporting the bag is wider on one side than the other as shown in Figure 3-5. Insert the bag with the fitting down and the wider side of the frame in the back (Figure 3-6). Lightly press the frame down into the port until the outlet fitting slides in place. Close the top lid and close the release latch.



Note one end of the frame is wider than the other. The wider end must be placed at the back of the compartment.

Narrower end

Wider end

Figure 3-5: Fluid Supply Bag



Figure 3-6: Inserting the Fluid Supply Bag

**Note:** The instrument is equipped with an internal water filter to prevent clogging the fluid supply line. This filter is replaced during a yearly maintenance at Sceptor.

## Overflow Port and Vial

The overflow port is located at the bottom left side of the instrument (Figure 3-6). Although the instrument is shipped with the overflow vial in place, check to ensure that an overflow vial is securely installed in the overflow port before beginning a sampling cycle. Before each future sampling cycle, visually check to ensure that it is empty. If the instrument malfunctions and the collection sample volume is too large to fit into the sample cartridge then the excess sample will be diverted to the overflow vial.

To remove the vial, steady the instrument with one hand while pulling the plastic strip with the other (Figure 3-7).

**Warning: Treat any fluid in the vial as hazardous and properly dispose of it.**



Figure 3-7: Overflow Vial removal

To insert the vial, tip the top of the vial forward until it fits into the overflow port, place the plastic strap between the vial in the compartment, then push the bottom of the vial in place until it snaps. See Figure 3-8.

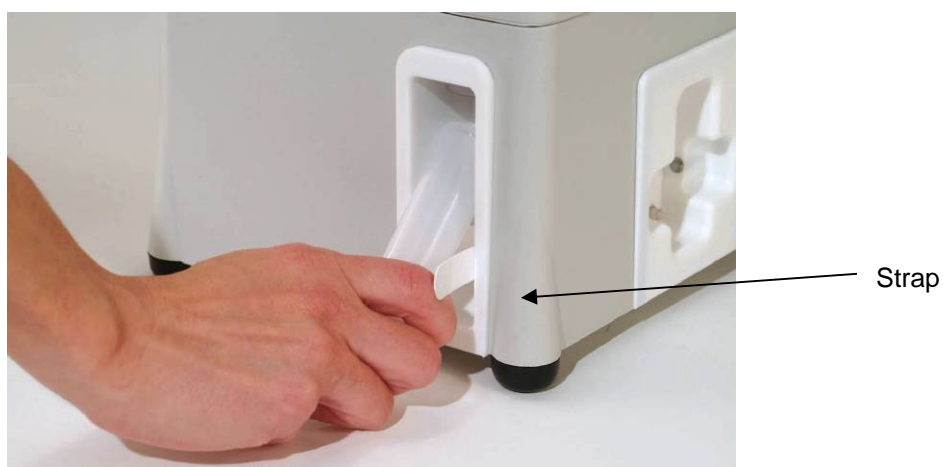


Figure 3-8: Overflow Vial installation

## 3.3 Power

### AC Power

Remove the converter and power cord from the protective case. Plug the 24 Volt DC power converter into the power receptacle on the lower right side of the instrument (Figure 3-9). Next plug the AC power cord into the voltage converter (which converts the AC power into 24 Volt DC power). Finally plug the power cord into a grounded outlet.

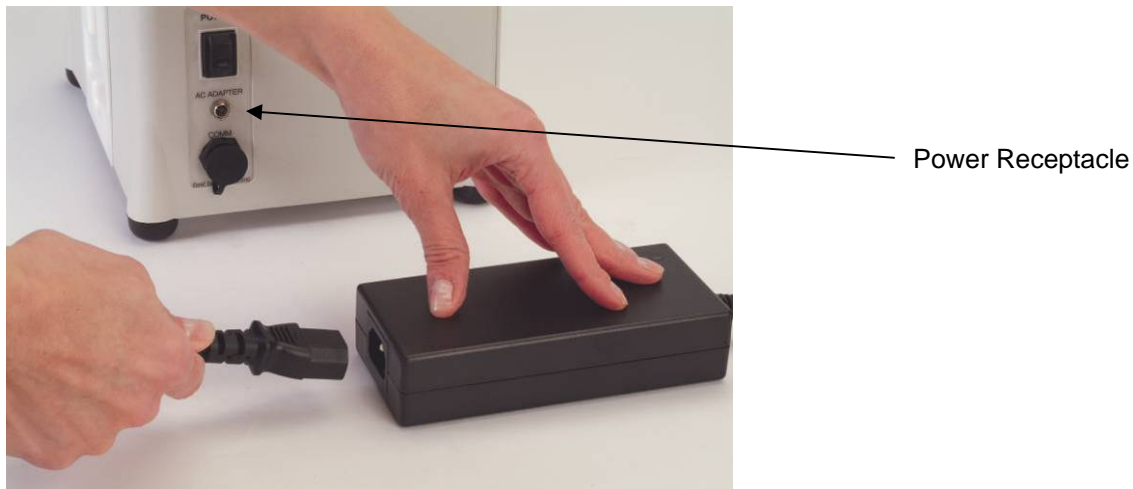


Figure 3-9: Plug power Cord into the Adapter.

### Optional Batteries

If an optional battery power kit was purchased, remove the batteries from the packaging. The batteries arrive fully charged.

#### Inserting Batteries

The battery compartments are located behind two doors in the lower back section of the instrument (Figure 3-10). Each compartment holds one 24 Volt DC battery. Remove the two battery doors at the lower back of the instrument. Removal of the doors may be accomplished by first steadying the unit with one hand and then using your other hand to pull upwards on the bottom of the door compressing the door gasket and therefore allowing the door clasp to clear the unit's frame. Once the gasket is compressed sufficiently, pull outwards to remove the door.

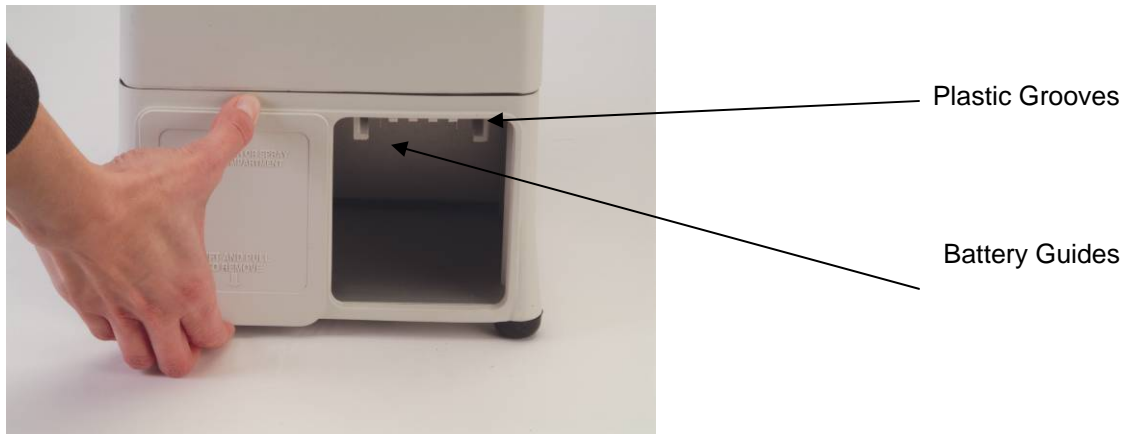


Figure 3-10 Battery Compartment and Doors

Notice the plastic U-shaped handle on one end of the battery, the battery latch, and the metal bar above it. See Figure 3-11. Line the battery up with the guides in the battery compartment; slide the battery in with the handle and the latch toward the outside. Push the battery into the compartment until the metal bar on top of the battery snaps into place behind the plastic grooves on the top front of the compartment (Figure 3-11).

**Caution:** Always replace the battery doors after inserting, removing, or exchanging batteries to avoid internal contamination of the unit.

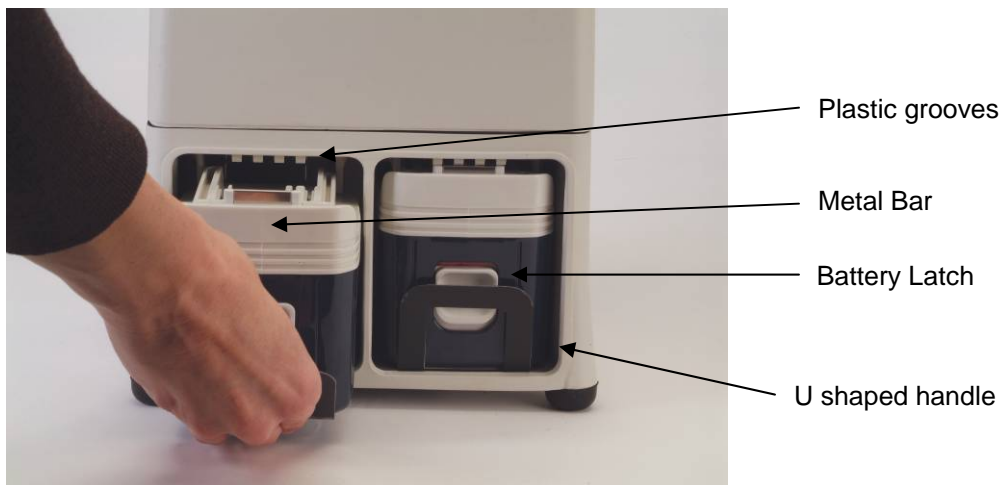


Figure 3-11: Installing Batteries

### **Battery removal**

To remove batteries, remove the battery doors; pull the battery handle while depressing the battery latch. Replace battery doors.

**Note:** The instrument can run on one battery for a short period of time in order to exchange low batteries with fully charged batteries (hot swappable). Replace batteries one at a time: if both batteries are removed at once the instrument will be without power and shut down.

**Caution:** Always replace the battery doors after inserting, removing, or exchanging batteries to avoid internal contamination of the unit.

## Battery Power Kit

The battery power kit comes with 2-24Vdc/3.3 Amp hour Nickel Metal Hydride rechargeable batteries and 1 CPU controlled battery charger with a built in cooling fan (Figure 3-12).



Figure 3-12: Battery Power Kit

### Safety Instructions and Warnings

- Read all the instructions before operating the charger.
- Do not expose batteries or charger to wet conditions.
- Only use Sceptor batteries, with a Sceptor charger. Other battery brands may burst, causing injuries and damage.
- Non-rechargeable batteries can not be recharged with the charger.
- Always use the plug and not the cord to unplug the charger.
- Never carry the charger by the cord.
- Do not operate the charger if the plug or cord is damaged. Replace it immediately.
- Do not use an extension cord with the charger unless necessary. Using an improper extension cord could result in electrical shock, fire, or damage. The following table lists the minimum recommended AWG size for extension cords.

Cord length	25 Feet	50 Feet	100 Feet	150 Feet
AWG cord size	18	18	18	16

- Do not use the charger if it has been damaged.
- Do not take apart the charger or adapter.
- Do not repair the charger yourself. Contact Sceptor for repairs.
- Always unplug the charger before performing any maintenance or cleaning.
- Make sure the charger vents are not covered or clogged when charging a battery.
- Do not charge batteries when the temperature is below 10°C (50°F) or above 40°C (104°).
- Do not charge batteries in direct sunlight.

- Do not charge batteries where flammables are located.
- Do not use a step-up transformer, an engine generator, or DC power receptacle to power charger.
- Use the power source specified on the nameplate of the charger.
- To prevent a short, do not touch the terminals with conductive materials, and do not store batteries with metal objects.
- Do not store batteries in temperatures over 50°C (122°F).
- Do not burn batteries to discard them. Doing so may cause an explosion.
- After charging the battery, unplug the charger from the power source.
- Keep charger away from children.

## Symbols

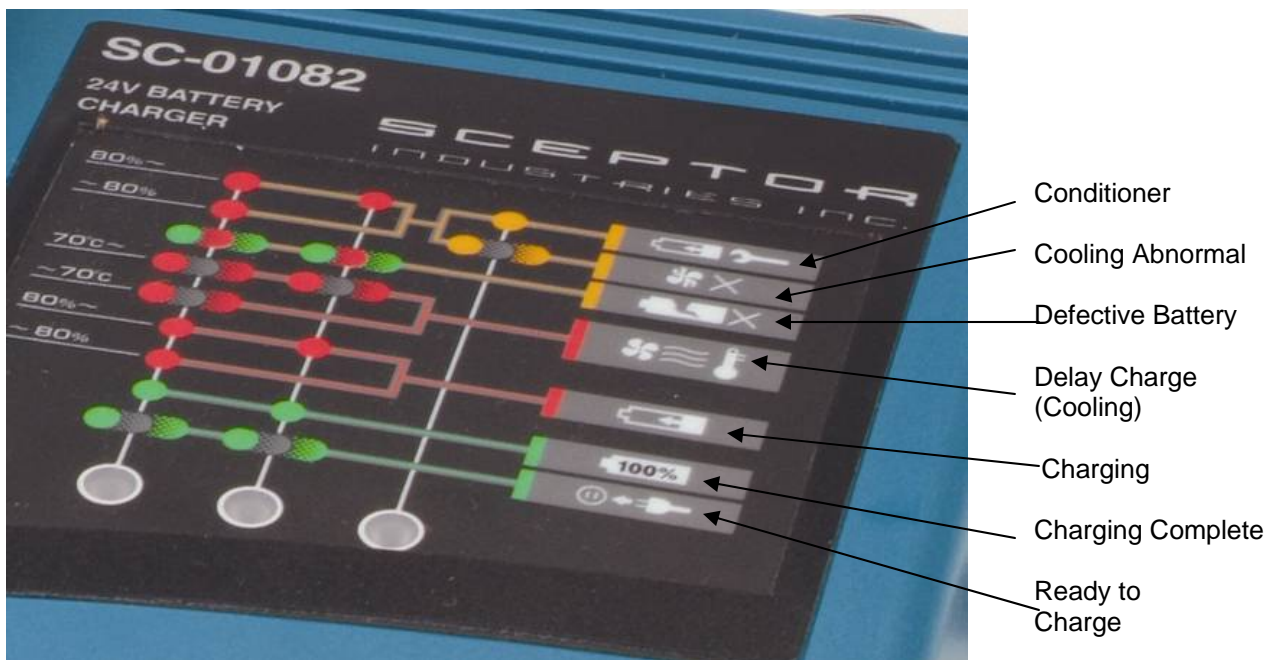


Figure 3-13: Symbols

### Charging the Batteries

1. Plug in the charger to the appropriate A/C power source. The two charging lights will flash green. See Figure 3-13.



Figure 3-14: Charger

2. Turn the battery upside down with the handle facing away from the charger.
3. Slide the battery into the charger from the top until it stops.

The terminal cover will open as the battery slides into place and close when the battery is removed (Figure 3-14).

When the battery is in place, the first charging light changes from green to red (the second light is off) and charging begins. See Figure 3-13. The red charging light will stay on indicating that the battery is between 0 and 80% charged. A second red light will appear when the battery is between 80 and 100% charged. When the battery is fully charged the two red charging lights will change to green.

4. To remove the battery, push up on the battery latch at the back of the battery. See Figure 3-15.

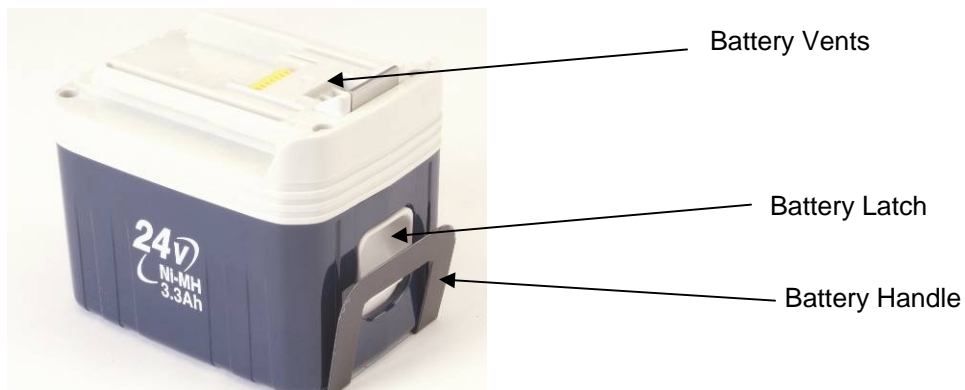


Figure 3-15: Battery

Charging the battery will take approximately 60 minutes.

If the battery is left on the charger after it is fully charged, the charger switches to a maintenance mode for 24 hours to maintain the charge.

5. Unplug the charger.

**Note:**

- When a new battery or a battery that has not been used for a long time is charged, it may not accept a full charge. This is normal. The battery can be fully charged after it is discharged and charged two times. The optional battery conditioner can be used to perform this function.
- If a battery is charged directly after use or left in the sun, the charging light may flash red. Two red lights will flash if the battery temperature is more than 70°C. One red light will flash if the battery is between 50° - 70°C. The charger fan will cool the battery and then begin charging.

**To Maintain Maximum Battery Life**

- Charge the battery before it is completely discharged.
- Never charge a fully charged battery. Over charging it will shorten its life.
- Charge the battery between 10°C - 40°C (50°F - 104°F).
- Never charge a hot battery. Allow a hot battery to cool before charging it.
- Do not repeatedly discharge a low battery.

Failure to follow these guidelines may cause the yellow defective battery light to flash (Figure 3-13).

**Charger Fan:**

- The charger has a fan to cool the battery while it is charging. A yellow warning light flashes when the cooling fan is malfunctioning or clogged and cannot cool the battery. (See Figure 3-13 for symbols.) The battery can be charged with the warning light on, but it will take longer than usual. Check the fan vents to ensure that they are not clogged. If the warning light flashes frequently contact Sceptor to repair the charger.
- Always keep fan and battery vents clean.
- If the charging lights alternate green and red, the battery cannot be charged because either the terminals on the charger or the battery are corroded, or the battery is worn out or damaged.

## Battery Conditioner

The optional battery charge/discharge conditioner (Figure 3-16) reconditions battery cells that have become inactive, improving capacity and battery life. It is only for use with Sceptor battery charger.



Figure 3-16: Battery Conditioner

### Safety Instructions and Warnings

- Read all the instructions before operating the conditioner.
- Do not expose batteries, charger, or conditioner to wet conditions.
- Only use Sceptor batteries, with a Sceptor charger and conditioner. Other battery brands may burst, causing injuries and damage.
- Non-rechargeable batteries cannot be recharged or reconditioned.
- Always use the plug and not the cord to unplug charger and conditioner.
- Never carry the charger and conditioner by the cord.
- Do not operate the charger if the plug or cord is damaged. Replace it immediately.
- Do not use an extension cord with the charger and conditioner unless necessary. Using an improper extension cord could result in electrical shock, fire, or damage. The following table list the minimum recommended AWG size for extension cords.

Cord length	25 Feet	50 Feet	100 Feet	150 Feet
AWG cord size	18	18	18	16

- Do not use the charger or conditioner if either has been damaged.
- Do not take apart the charger or conditioner.
- Do not repair the conditioner yourself. Contact Sceptor for repairs.
- When using the charger with or without the conditioner, make sure the charger vents are not covered or clogged.
- Do not condition batteries when the temperature is below 10°C (50°F) or above 40°C (104°).

- Do not condition batteries in direct sunlight.
- Do not condition batteries where flammables are located.
- Do not use a step-up transformer, an engine generator, or DC power receptacle to power charger and conditioner.
- Use the power source specified on the nameplate of the charger.
- To prevent a short, do not touch the terminals with conductive materials, and do not store batteries with metal objects.
- Do not store batteries in temperatures over 50°C (122°F).
- Do not burn batteries to discard them. Doing so can cause an explosion.
- Keep charger and conditioner away from children.
- After conditioning the battery, unplug the charger from the power source.

## SYMBOLS

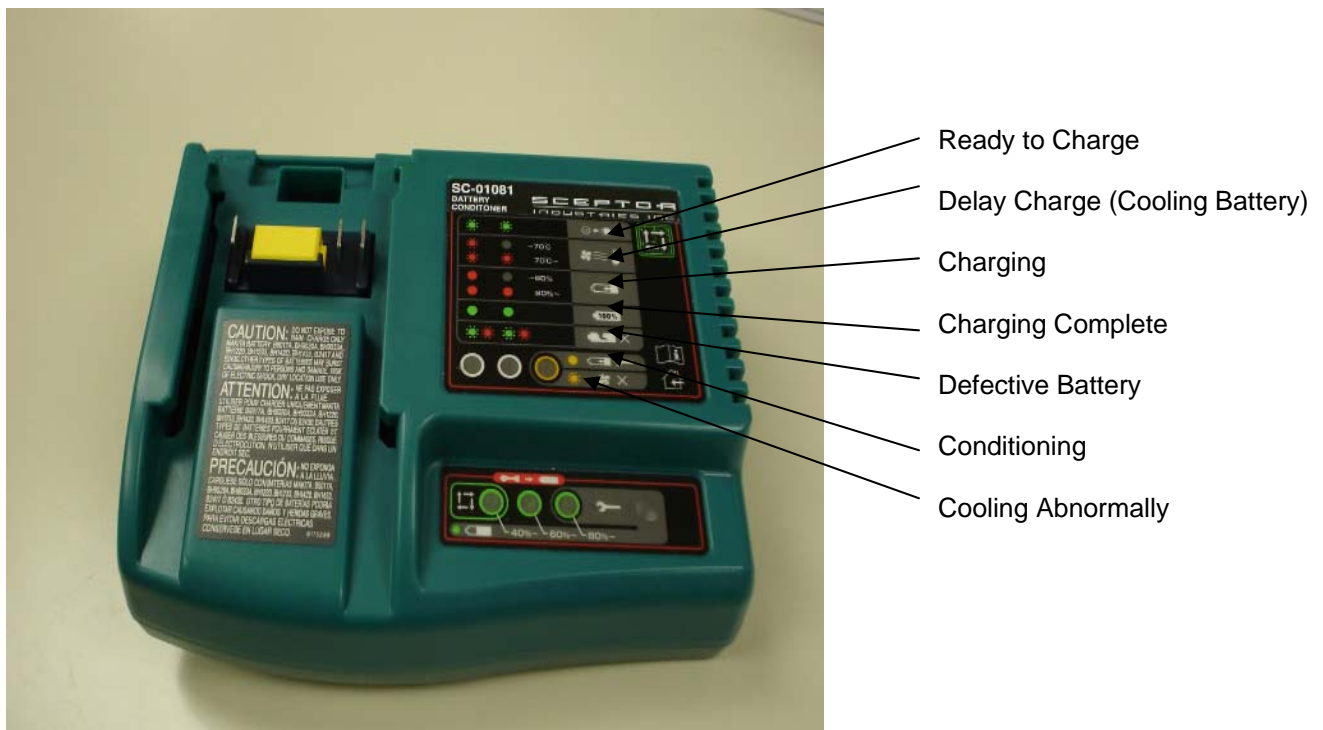


Figure 3-17: Enlargement of Conditioner Symbols

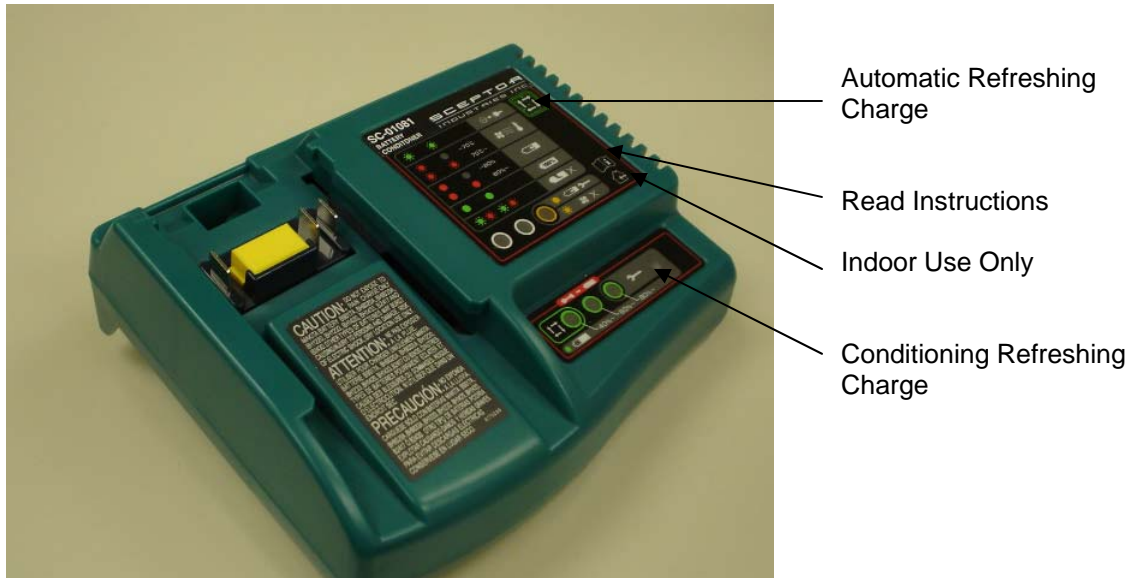


Figure 3-18: Enlargement of Symbols Instructions and Charging Symbols

### Using the Conditioner

The battery conditioner has either a conditioned refreshing charge or an automatic refreshing charge as show in Figure 3-18.

### Conditioned Refreshing Charge

The operator selects the conditioned refreshing charge if one of the following applies:

- The battery is new
- The battery has not been used for six months.
- The battery has not been conditioned for one week or more.
- The operator wants to check battery capacity.

The conditioning charge extends battery life by selecting the optimum battery charge condition for the battery.

### Automatic Refreshing Charge

If none of the above conditions applies, the conditioner selects automatic refreshing charge.

- The automatic refreshing charge keeps the battery in active condition by automatically selecting the quick refreshing charge and the optimal refreshing interval for the battery.
- Refreshing time depends on existing battery charge. The following table gives an approximate time for each charge.

Table 2: The Automatic Refreshing, Conditioned Refreshing and Normal Charging Times

Automatic Refreshing Charge	60 min. – 220 min.
Conditioned Refreshing Charge	Approx. 9 hours
Normal Charge	60 min.

## Instructions

1. Slide the conditioner onto the charger until it stops. See Figure 3-19. The terminal cover on the charger will open as the conditioner slides into place and close when the conditioner is removed (Figure 3-20).



Figure 3-19: Charger with Conditioner



Figure 3-20: Charger

2. Plug in the charger to the appropriate A/C power source. The two charging lights will flash green. See Figure 3-21.
3. Turn the battery upside down.
4. With the handle facing away from the charger, slide the battery into the conditioner until it stops. Either at this point the conditioner will select the automatic refreshing charge or the

operator can select the conditioned refreshing charge by pushing the conditioned refreshing button as shown in Figure 3-21.

If the refresher selects **automatic refreshing charge**, the first flashing green charging light changes to a solid red light (The second flashing green conditioning light turns off.) One refreshing light flashes green (Figure 3-21).

If the operator selects the **conditioned refreshing charge**, the first flashing green charging light changes to a solid red light. See Figure 3-21. (The second flashing green charging light turns off.) The third conditioned refreshing light begins flashing green. (The first and second lights are off.)

When the battery is conditioned the charging lights will change from red to green.



Figure 3-21: Enlarged Control Panel

The refreshing lights indicate the battery's charge. See Table 1 below.

**Table 1: Refreshing Lights** ● : ON    ◫ : Flashing    ○ : OFF

Refreshing Lights	Indication
◫ ○ ○	Automatic refreshing charge
○ ○ ◫	Conditioned refreshing charge
● ● ●	Capacity is 80% - 100%. (new battery)
● ● ○	Capacity is 60% - 80%. (wearing battery)
● ○ ○	Capacity is 40% - 60%. Indicates a short service life. (wearing battery)
○ ○ ○	Capacity is 0% - 40%. Charging lights flash alternately in green and red color. Indicates the battery is worn out.

- When battery is conditioned, remove the battery from the conditioner by pushing up the battery latch on the back of the battery and slide it back (Figure 3-22).

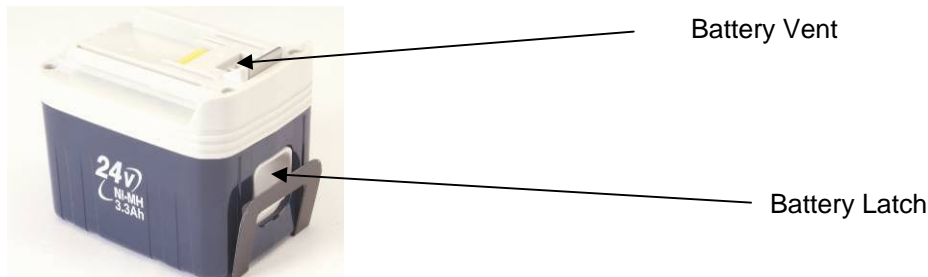


Figure 3-22: Battery

- To remove the battery conditioner, push up the latch on the back of the conditioner and slide it back.

### To Maintain Maximum Battery Life

- Charge the battery before it is completely discharged.
- Never charge a fully charged battery. Over charging it will shorten its life.
- Charge the battery between 10°C - 40°C (50°F - 104°F).
- Never charge a hot battery. Allow a hot battery to cool before charging it.
- Do not repeatedly discharge a low battery.

Failure to follow these guidelines may cause the yellow defective battery light to flash (Figure 3-17).

### Charger Fan:

- The charger has a fan to cool the battery while it is charging/ conditioning. A yellow warning light flashes when the cooling fan is malfunctioning or clogged and cannot cool the battery. (See Figure 3-17 for symbols.) The battery can be charged with the warning light on, but it will take longer than the usual and may damage the battery. Check the fan vents to ensure that they are not clogged. If the warning light flashes frequently, contact Sceptor to repair the charger.
- Always keep fan and battery vents clean.
- If the charging lights alternate green and red, the battery cannot be charged because either the terminals on the charger or the battery are clogged, or the battery is worn out or damaged.

### Optional Remote Exhaust Assembly

To attach the optional remote exhaust fitting, place the fitting over the air outlet on the top back of the instrument. Using a screwdriver, tighten the two screws on the fitting and slide the hose over the fitting (Figure 3-23).

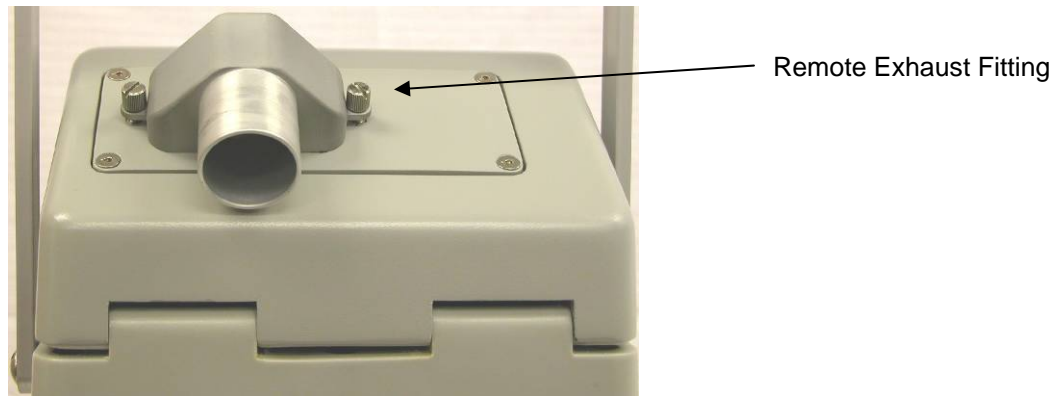


Figure 3-23: Optional Remote Exhaust Fitting

### Optional Exhaust Filter Assembly

Remove the top plate of the HEPA filter. Ensure that the exhaust filter assembly gasket is in place on the bottom side of the bottom plate. Place extensions (inside the filter) through the screw holes in the bottom filter plate over the exhaust air outlet so the extensions screw into the holes on either side of the outlet (Figure 3-24). Screw them in. Place the top on the filter lining up the screws on top of the filter with the extensions inside tighten the screws (Figure 3-25).



Figure 3-24: HEPA Filter



Figure 3-25: OMNI™ 3000 with Exhaust Filter Assembly

## SECTION 4: OPERATING THE OMNI™ 3000

After the fluids and the power cord have been connected or the batteries installed, push the power switch on. The LCD screen on the control panel will display READY (Figure 4-1).

### 4.1 Control Panel Button Functions



Figure 4-1: Control Panel

#### Run

When the control panel displays READY, press **Run** to start a sampling cycle.

Pressing **Run** during a sampling cycle will manually end the cycle and automatically pump the sample from the contactor into the sample cartridge.

**Warning: Pressing and holding Run will initiate an Extract cycle.**

Holding **Run** until “Extract” appears on the lower portion of the screen is a quick way to pump the fluid from the contactor into the sample cartridge when a cycle has been interrupted.

**Note:** Both **Run** and **Exit** functions stop a sampling cycle, but only **Run** automatically extracts the sample from the contactor and pumps the fluid into the cartridge. **Exit** only stops the cycle and leaves the fluid in the contactor. Removing the cartridge while fluid is in the contactor will cause the fluid to leak.

#### Set

When the screen displays READY, press **Set** to display the menu functions: *Extract, Data Log, Setup, Full Clean, Rinse,* and *Calibrate* (See Figure 4-2). When the menu is displayed, pressing **Set** will select the highlighted function.



Figure 4-2: Menu Functions

#### (-) (+)

Use **(+)** and **(-)** to scroll up or down the menu functions or to change the highlighted setting.

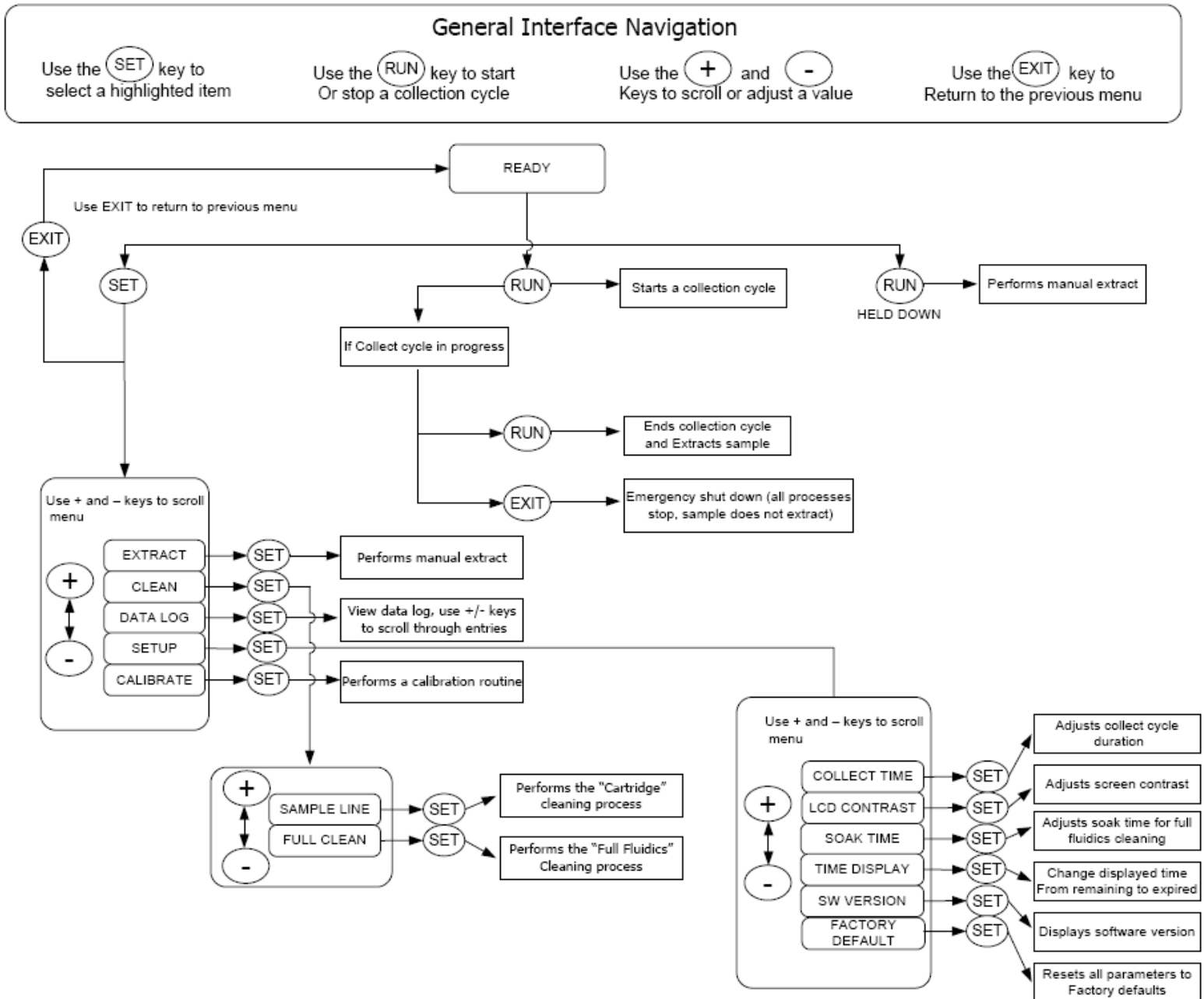
#### Exit

Press **Exit** to abort any cycle or to return to the previous menu after changing a setting.

**Warning:** If **Exit** is pressed to abort a cycle, the fluid in the contactor **will not** automatically be pumped into the cartridge. Select *Extract* from the menu functions to pump the sample from the contactor into the sample cartridge. Do not remove the cartridge or the contactor if the fluid has not been properly extracted: **the fluid will spill.**

## 4.2 Menu Navigation and Operation

To access Menu Functions press **Set** when the instrument displays READY. Use **(+)** and **(-)** to scroll up or down the menu. Press **Exit** to move back.



## Extract

Select *Extract* to manually pump the sample fluid from the contactor into the sample cartridge if the fluid from the contactor has not been not completely extracted, if the cycle has been interrupted, or if the cartridge has been in the instrument for an extended period to prevent fluid dripping from the manifold ports when the it is removed (Figure 4-3).

**Note:** A quick way to access *Extract* is to **hold** the Run button until *Extract* appears on the lower portion of the screen.



Figure 4-3: Extract Function

## Data Log

Select *Data Log* to display the most recent sampling cycle data (Figure 4-4).



Figure 4-4: Data Log Function

The data log stores the data for the last 15 sampling cycles. The run time displayed on the data log screen indicates the actual sampling time in minutes for each cycle. The data log also displays the AvFlw (average airflow) for each cycle in liters per minute. AvgInj (average injection) is the average number of injections per minute. PeakInj (peak injections) is the maximum number of injections per minute. Purges indicates the number of times a special software sub-routine was executed to manipulate the fluid level and dislodge a bubble from in front of the optic sensor in the sample and control manifold. Errs (errors) indicate errors that occurred during the cycles. See Figure 4-5. If a sampling cycle is manually stopped, then the data log will display "Aborted".

**Note:** Units with Serial Numbers below 00026 will not display time & date.



Figure 4-5: Data Log Information

## Setup

Select *Setup* (Figure 4-6) to change system settings.



Figure 4-6: Setup Function

## Sample Time

Sample time is how many minutes the sample collection lasts after run is pressed.

To set the sample collection time:

1. Press **Set** to select "Sample Time".
2. Press **(-)** or **(+)** buttons to increase or decrease the sample time. (Time is displayed in minutes.)
3. When the displayed sample time is correct, press **Exit** twice to return to Menu Functions or three times to return READY.

## Decon Time

Decon time is the length of time the full fluidics cleaning procedure soaks the wetted parts of the fluidic system.

To set "Clean Time":

1. Scroll down to "Clean Time"
2. Press **Set**.
3. Press **(-)** or **(+)** buttons to increase or decrease the cleaning time. (Time is displayed in minutes.)
4. Press **Exit** twice to return to Menu Functions or three times to return READY.

## Time Display

The time display selects whether the time remaining or elapsed in the sample cycle is displayed during the sampling cycle.

To set the time display to either minutes remaining or minutes elapsed in the sampling cycle:

1. Scroll down to "Time Display"
2. Press **Set**.
3. Press **(+)** or **(-)** to select "Remain" or "Elapsed".
4. Press **Exit** twice to return to Menu Functions or three times to return READY.

## LCD Contrast

The LCD contrast increases or decreases the screen contrast.

To change the screen contrast:

1. Scroll down to "LCD Contrast".
2. Press **Set**.
3. Press **(+)** or **(-)** to increase or decrease the contrast.
4. Press **Exit** twice to return to Menu Functions or three times to return READY.

## SW Version

SW version is the software version. This enables an operator to tell Sceptor which version of software the OMNI uses if there is a problem with the instrument.

## Factory Default (Dflt)

Factory default allows the instrument to be set to the built-in default settings. By changing the "Factory Default" to Yes, all the adjustable settings are returned to the as-built defaults (sample time, soak time, etc).

To change "Factory Default" to yes:

1. Scroll down to "Factory Default".
2. Press **Set**.



Figure 4-7: Setup Settings

## Clean

Select *Clean* (Figure 4-8) to access the Clean menu (Figure 4-9) where the operator can choose between choose from Sample Line Cleaning or Full Cleaning procedure. The Sample Line Cleaning is used typically in between sample collections to minimize sample carryover. The Full Cleaning procedure cleans **all** fluid lines in the instrument including those that carry the sterile supply fluid.



Figure 4-8: Clean Function



Figure 4-9: Clean Menu Selection: Sample Line or Full Clean

**Note:** The Sample Line Cleaning should be performed after each sampling cycle to prevent contaminating later sampling collections.

## Calibrate

Calibrate enables the operator to adjust the air flow rate to accommodate changes in pressure, for example, restrictions on the units flow path when a hose or HEPA filter is attached. The flow rate is displayed on the LCD and should be set to 300 liters per minute. The flow rate should be checked every time a hose, filter, or other attachment is connected or disconnected from the instrument.

## 4.3 Procedures

### Sample Collection

Either choose the previously programmed sample collection duration or change the sample collection time. To use the previous duration, press RUN. To change the cycle duration, first, press **Set** in the READY mode and use (-) to scroll down to *Setup*. Press SET again to select *Setup* (Figure 4-6). Next, select "Sample Time" (Figure 4-7). (The minutes are now highlighted.) Use the (-) or (+) buttons to increase or decrease the length of the cycle. When the displayed collection time is correct, press EXIT twice to return to Menu Functions or three times to return to READY, and then press RUN to begin the cycle. To stop a sampling cycle before the timer expires and auto extract, press RUN.

**Note:** If sample fluid forms a ring that continuously circulates above the contactor slits and no fluid is circulating at the bottom of the contactor, the instrument will normally recover after 30 seconds to 1 minute. If the problem continues for more than a few minutes, check to ensure no bubbles are forming in the cartridge at the bottom manifold port. If bubbles are forming, stop the collection cycle and replace the cartridge with a new one. Additionally use the extraction syringe to extract any fluid, which may be in the pressure lines through the Pressure port.

**Note:** It is a good practice to clear the pressure line of fluid before each sample during the sampling line cleaning procedure.

### Manual Extraction

Fluid can be manually extracted from the contactor if the sample fluid is not completely extracted, or if the cartridge remains in the instrument for an extended period after the cycle is finished to prevent fluid dripping from the manifold ports when the cartridge is removed.

To manually extract the fluid, press **Set** to display Menu Functions. Use the (-) button to scroll down to *Extract* (Figure 4-3). Press **Set** again. The fluid in the contactor will be pumped into the sample cartridge.

**Note:** Another way to perform a manual extract is to **hold** the Run button until *Extract* appears on the lower portion of the screen.

## Sample Cycle and Shutdown

The sampling cycle will automatically stop when the timer expires.

### Manual Sample Cycle Shutdown

To stop the sampling cycle before the timer expires, press either **Run** or **Exit**. Both **Run** and **Exit** stop a cycle, but only **Run** automatically pumps the sample from the contactor into the cartridge. **Exit** only stops the cycle.

### Unintended or Premature Shutdown

If power is lost or the instrument is shut down before it has completed a cycle, it may be necessary to run a *manual extract* to drain the contactor after power has been restored. System settings, including sample duration, are retained when the power is turned off or when the power fails. See “Manual Extraction” above.

### Removing the Sample Cartridge

After the sample has been extracted from the contactor and “ready” is displayed on the screen, the sample cartridge is ready to be removed. Place your thumb and forefinger on either side of the cartridge and pull it back. After removing it, close the lid to seal the cartridge. If the sample will be sent to a lab for analysis, place a red tamper evident seal over the cartridge and place it in a plastic resealable bag. If the sample is going to be analyzed on-site, a syringe (Figure 1-20) can be used to remove the sample from the cartridge.

### Syringe Extraction Procedure

Remove the Syringe from its packaging. Insert Syringe tip into Cartridge as shown. Syringe tip will slip between slit in valve as shown in Figure 4-10.



Figure 4-10: Inserting Syringe

Extract Fluid by pulling plunger of Syringe.

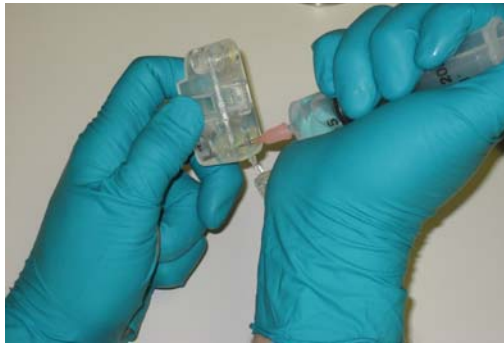


Figure 4-11: Extracting Fluid

Knock Cartridge repeatedly against hard surface to force droplets to bottom corner. Extract remaining fluid by pulling plunger as shown in Figure 4-12.

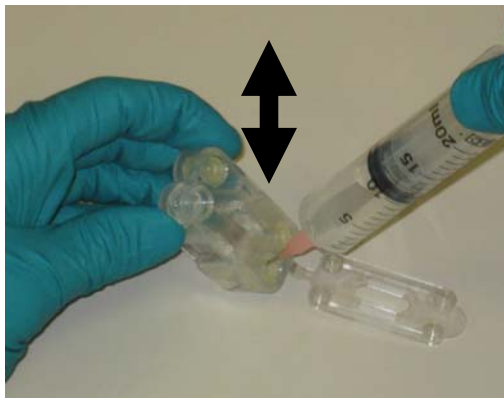


Figure 4-12: Removing Syringe

## Storage

Prior to long-term storage, it is recommended the user perform a full fluidics cleaning procedure.

To prepare the instrument for storage, open the top lid, remove the fluid supply bag from the fluid supply port, and close and latch the top lid. Remove any sample cartridge from the manifold. Visually check the overflow vial. If it is empty, leave it in its compartment. If it contains fluid, remove the vial and pour out the fluid. Rinse with clean water and then reinstall the vial. Make sure all fluid from the pressure and fluid lines on the Sample and Control Manifold is extracted.

## Purging Fluid from the Sample and Pressure Ports

To extract the fluid:

1. The contactor must be installed.
2. Locate the extraction syringe in the sample line cleaning kit.
3. Fully insert the plunger.

4. Connect the tubing fitting to the sample port as shown in Figure 4-14.

**Warning:** When connecting the extraction syringe to the fluid port, be sure to connect the extraction syringe tube fitting by pushing it straight onto the port. **Do not bend the sample port or pressure port side to side or up and down** doing so can damage the instrument.

5. Pull the plunger out, drawing air and fluid through the sample port.
6. Follow the same procedure for the pressure port.

**Warning: Do not purge the Injection port.**

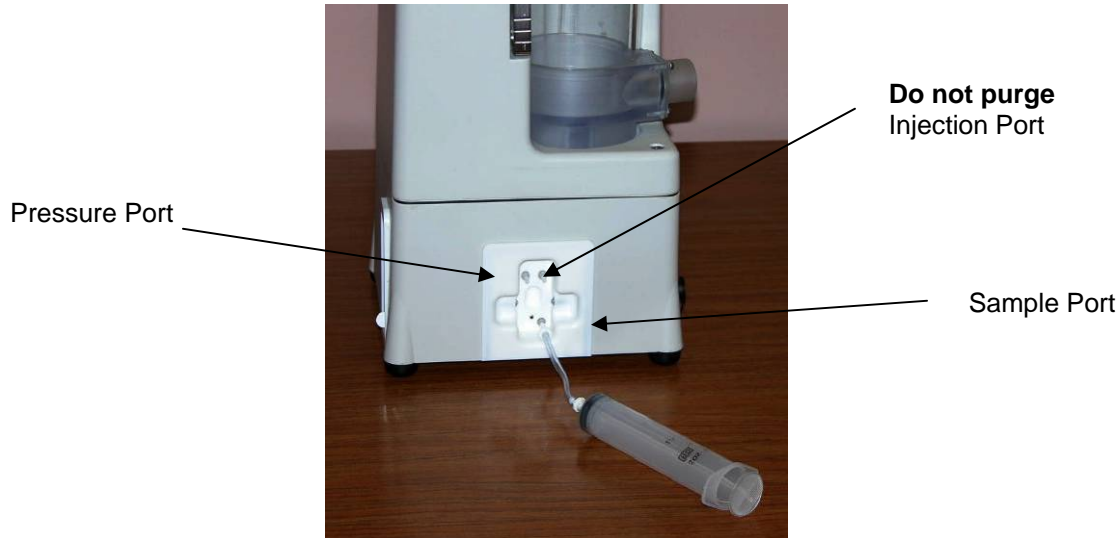


Figure 4-14: Extracting Fluid from the Fluid and Pressure lines

### Shutdown for Cleaning and Storage

Push the power switch off. Unplug the instrument from its power source or remove the batteries. System settings including sample duration are retained when the power is turned off. The instrument is now ready for external cleaning and routine maintenance as described in Sections 5 and 6.

## SECTION 5: CLEANING

***Note:** These cleaning procedures are only guidelines. The procedures may need to be validated and tailored for your specific application.*

### 5.1 Exterior Cleaning

Remove the sampler from the hot zone or contaminated area to an area where decontamination can be safely performed, if applicable, and disconnect AC power converter.

Install battery covers and plug covers on the AC adapter, the serial communication port, and the 5 pin debugging port.

**Warning:** If the AC adapter receptacle cover is **not** installed, **do not allow fluids to enter the receptacle**. Be sure to dry the inside of the adapter prior to re-connecting power, or equipment may be damaged.

Either wipe down the exterior of the instrument and any attachments, handle, or external hoses, or spray these components with bleach, hydrogen peroxide, or alcohol solutions.

Wash down with water.

**Note:** Follow any bleach wash-down with copious amounts of water to insure no bleach can contaminate subsequent samples or damage the surface of the instrument. A sodium thiosulfate rinse can be performed after bleaching and before water rinse to help neutralize the bleach and prevent sample contamination.

**Warning:** Never submerge the OMNI™ 3000 completely in liquid.

#### Contacting Cleaning

**Warning:** When cleaning the contactor, **do not disturb the positioning of the contactor pressure port**. The pressure port is the port extending into the interior of the contactor as shown in Figure 5-1. Disturbing this port can alter the sample volume produced by the instrument or cause the performance to be reduced if sample volume is significantly reduced.

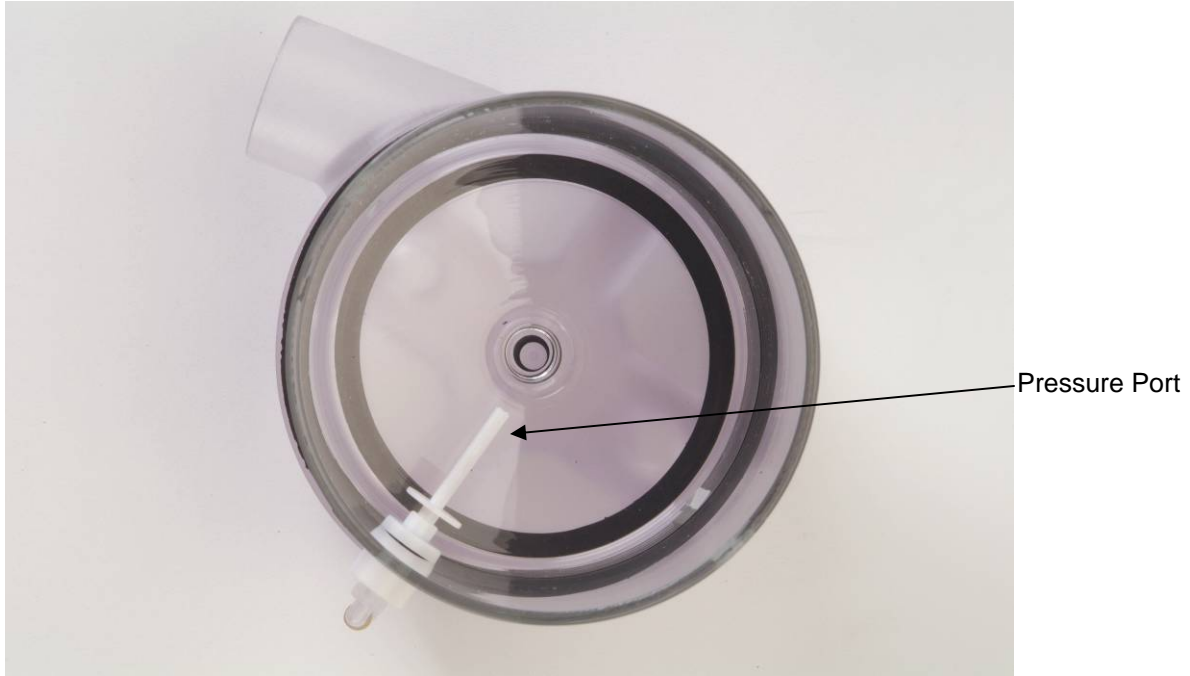


Figure 5-1: Contactor Top View

1. To remove the contactor, unlatch the top release latch, and raise the top lid. Remove the contactor by pulling it straight up out of the instrument. (Figure 5-2)

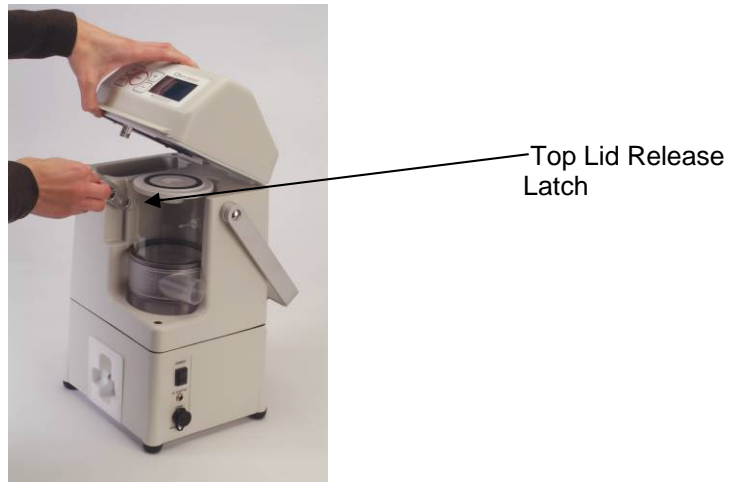


Figure 5-2: Opening the Top Lid to remove the Contactor

2. Carefully clean the exterior and the interior of the contactor with alcohol, hydrogen peroxide or a mild bleach solution.

**Warning: Do not use the following alone or in mixtures to clean the contactor:**

- Solvents containing aromatic hydrocarbons such as Toluene or Xylene
- Solvents containing Acetone or Ethyl Acetate
- Products containing Orange Oil

**Doing so will damage the contactor.**

The **contactor** may also be submerged in a solution of water and a non-abrasive detergent. To clean the air inlet slits in the contactor, use the provided contactor cleaning brush if necessary. After cleaning the contactor, apply a small amount of the o-ring lube (supplied in the Maintenance kit) to the contactor o-rings.

3. Inspect the O-rings on the base of the contactor for damage (Figure 5-3). If they are nicked or cut, they must be replaced before operating the instrument. Damaged O-rings will cause leakage in the pressure path, which will prevent the system from maintaining control of the sample volume, which can affect collection performance.



Figure 5-3: Contactor O-rings

O-rings

4. Insure that both gaskets in the contactor lid are intact. See Figure 5-4 and 5-5.

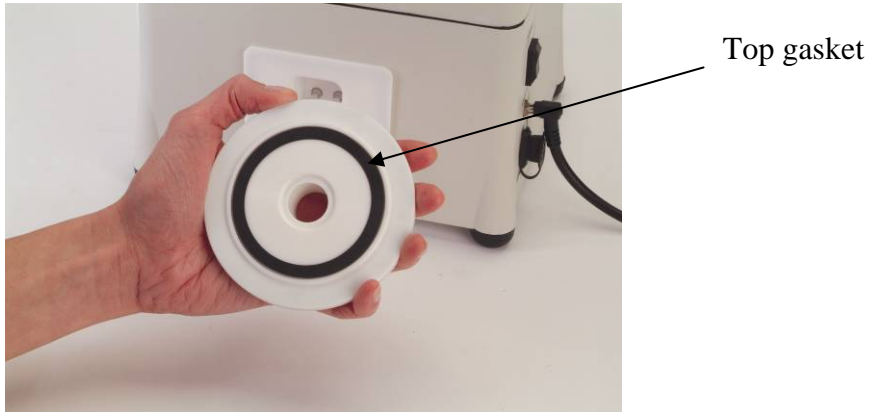


Figure 5-4: Top of Contactor Lid

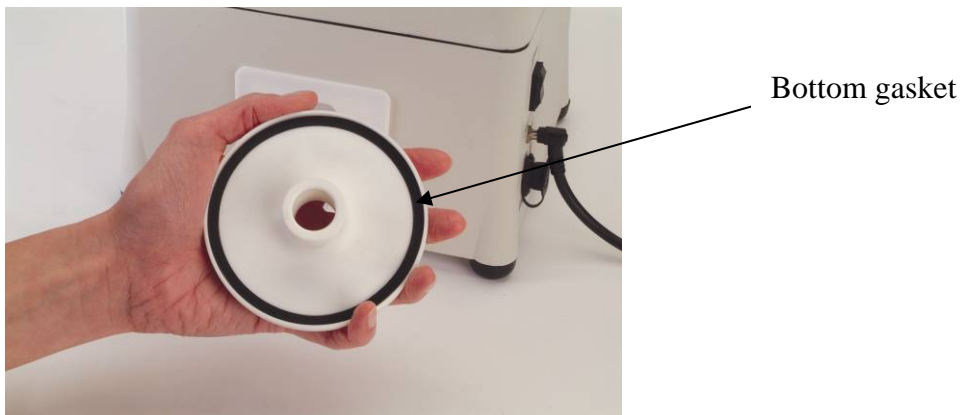


Figure 5-5: Bottom of Contactor Lid

5. Replace the contactor, close the top lid, and secure the latch.

**Warning:** When installing the contactor, **do not force the contactor down.** Forcing the contactor in place can damage the O-rings (Figure 5-3). Instead, set the contactor into place and gently apply pressure on the top with light back and forth twisting motion to ease the contactor pins into their receptacles. If needed, apply a small amount of the provided O-ring grease to the O-rings.

## 5.2 Internal Cleaning

There are two available internal cleaning procedures for the OMNI™ 3000. The first two procedures are for sample line cleaning and full fluidics cleaning respectively. The Sample Line cleaning procedures are generally for cleaning between samples and clean the fluid lines that contact the sample. **The Sample Line Cleaning procedure should be used after each sampling cycle to reduce cross contamination of samples.**

The full fluidics cleaning procedure not only cleans the lines that contact the sample but also the sterile fluid supply lines. These procedures should be used when the instrument is placed in or removed from storage and for periodic removal of contamination, which could occur in the lines. The procedures are listed below.

1. Sample Line
2. Full Fluidics

**Caution:** The cleaning procedures should be performed using Sceptor Cleaning Kits to ensure proper cleaning and prevent damaging the instrument.

### Sample Line Decontamination Procedure

The Sample Line Decontamination Procedure is for sample to sample cleaning (Figure 5-6). The purpose of the Sample Line Cleaning Procedure is to clean the system components, which routinely contact the collected sample. **NOTE: The Decontamination fluid used, Hydrogen Peroxide, loses effectiveness when exposed to sources of heat or light. Place the Hydrogen Peroxide Bag in its box whenever not in use. Always store it in a cool, dark place.**



Figure 5-6: Hydrogen Peroxide Cleaning Kit

Contains: 500 mL hydrogen peroxide bag, 50 cartridges, 3' of hose with screw-on adaptors, HEPA filter assembly with hose adaptor. 25 cleanings per kit.

To perform the procedure:

1. Place hose on filter assembly and on contactor plenum. (Figure 5-7)
2. Press **Set** on the control panel.
3. Select *Clean* from the menu functions and press **Set**.
4. Select *Sample Line* from the menu functions and press **Set**.
5. Follow the on-screen direction by unlatching the top release latch and raise the top lid. (The top lid may be raised while the instrument is on.)
6. Insert Hydrogen Peroxide Bag into the fluid supply-port. Close and re-latch lid. Press **Run** to continue.
7. Follow the on-screen directions by placing an empty cartridge into the Cartridge Port. Press **Run** to continue.
8. Allow the Sample Line Decontamination program to run. Follow the on-screen direction by replacing the full cartridge with an empty one. Press **Run** to continue.
9. When OMNI™ 3000 panel reads *Ready* remove full cartridge.
10. Unlatch the top release latch and raise the top lid.
11. Replace the Hydrogen Peroxide Bag with the Sterile Water Bag in the fluid supply-port. Press **Run** to continue.
12. Close and re-latch lid.
13. Wipe away any fluid near ports with a dry towel/cloth.

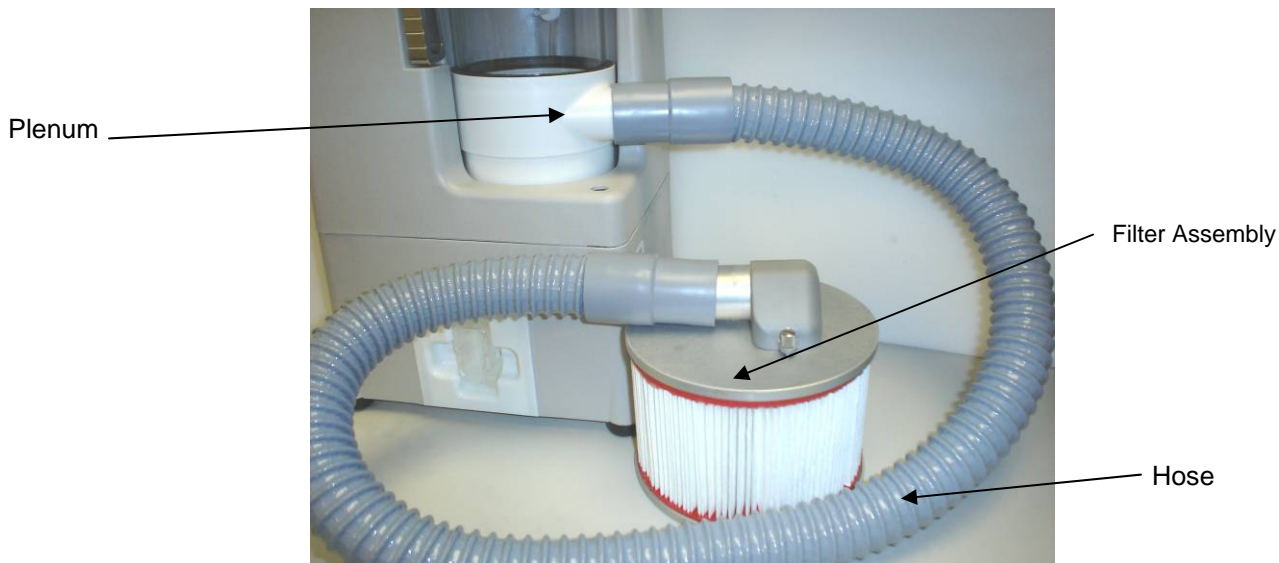


Figure 5-7: Sample Line Cleaning Connection

## Full Fluidics Cleaning Procedure

The full Fluidics Cleaning Procedure is recommended before a sampling cycle if the instrument has been in storage, before the instrument is placed in storage or when it is necessary to ensure that there is no growth in the fluid supply lines. The Full Fluidics Cleaning Procedure **should not be used for sample to sample cleaning**--doing so can reduce the life of the instrument.

### Recommended soak time for hydrogen peroxide is 5 minutes.

To change soak time select *Setup* in Function Menu, next select "Soak Time" and press **Set**. Use the (+) or (-) to increase or decrease the number of minutes. This setting is the number of minutes the hydrogen peroxide will soak in the lines during the Full Clean procedure.

To perform the procedure:

1. Place hose on filter assembly and on contactor plenum. (Figure 5-7)
2. Press **Set** on the control panel
3. Select *Clean* in the Function Menu and press **Set**.
4. Select *Full Clean* in the Clean Menu and press **Set**.
5. Follow the on-screen direction and insert an empty cartridge into the cartridge port. Press **Run** to continue.
6. Follow the on-screen direction by unlatching the top release latch and raise the top lid. (The top lid may be raised while the instrument is on.)
7. Insert Hydrogen Peroxide Bag into the fluid supply-port.
8. Close and re-latch lid. Press **Run** to continue.
9. Allow the OMNI™ 3000 cleaning program to run.  
  
**NOTE: Do not press any additional buttons while the program is running. Doing so will abort the program and enter into an exit cleaning procedure.**
10. Follow on-screen direction by removing full cartridge.
11. Insert an empty cartridge into the cartridge port. Press **Run** to continue.
12. Follow the on-screen direction by unlatching the top release latch and raise the top lid. (The top lid may be raised while the instrument is on.)
13. Remove Hydrogen Peroxide Bag and insert Water Bag into the fluid supply-port.

14. Close and re-latch lid. Press **Run** to continue. Allow the OMNI™ 3000 cleaning program to run.
15. When OMNI™ 3000 panel reads *Ready* remove full cartridge.
16. Wipe away any fluid near ports with a dry towel/cloth.

## **Decontamination**

**Note:** Procedures to decontaminate the instrument may vary depending upon the specific situation in which samples are collected or the contaminant of interest.

The previous cleaning procedures are only guidelines. Any cleaning procedure used for your specific scenario should be validated to ensure decontamination.

**Warning:** For contagious pathogens and biohazards, the OMNI™ 3000 needs to be double-bagged and a more complete decontamination of the system should be performed in an approved facility. Please contact your state or local HAZMAT agency for information concerning collection and decontamination of a hazardous material.

## SECTION 6: MAINTENANCE

**WARNING:** Before any maintenance, disconnect the power cord from the instrument.

### 6.1 Routine Maintenance

Maintenance not only involves cleaning the instrument properly as previously explained in Section 5, but also visually inspecting the components. The following components need to be routinely inspected: The O-rings on the base of the contactor, contactor lid gaskets, the pins in the sample and control manifold, the overflow vial, and the seals on the battery doors. In addition, the overflow vial, the acoustic baffle, and exhaust door gasket should be inspected and replaced as necessary.

#### Contactor O-rings

To inspect the contactor O-rings, remove the contactor by pulling straight up and visually examine the O-rings on the base of the contactor for damage (Figure 6-1). Damaged O-rings will cause leakage in the pressure path that will cause the system to lose control of the sample volume, which can affect collection performance. If they are nicked or cut, they must be replaced before operating the instrument.

To remove the damaged o-ring, squeeze it between your thumb and fore finger, creating a bulge in the O-ring. Then lift the bulge up off the contactor pin.

To replace a new O-ring, roll it across the top of the pin and push it down being careful not to cut or nick it with your fingernails. Periodic application of a small amount of o-ring lube (supplied in the Maintenance kit) especially after cleaning the outside of the contactor with detergents, will help to extend o-ring life.

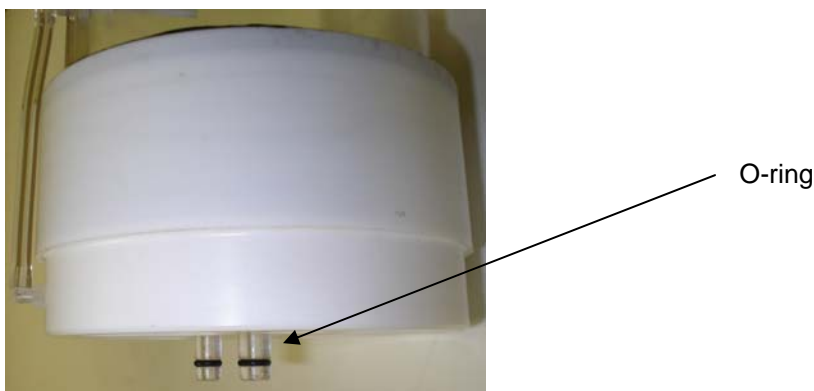
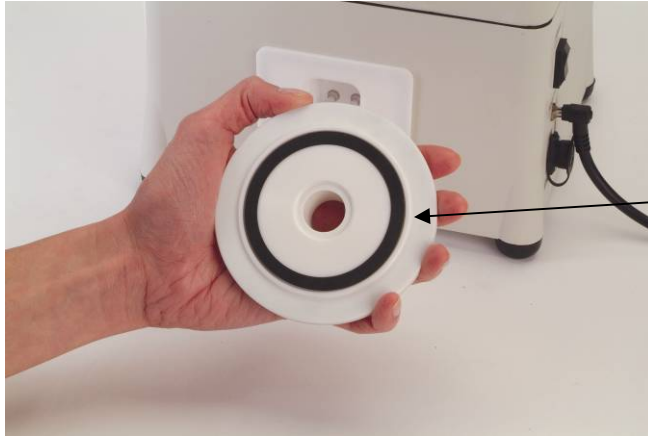


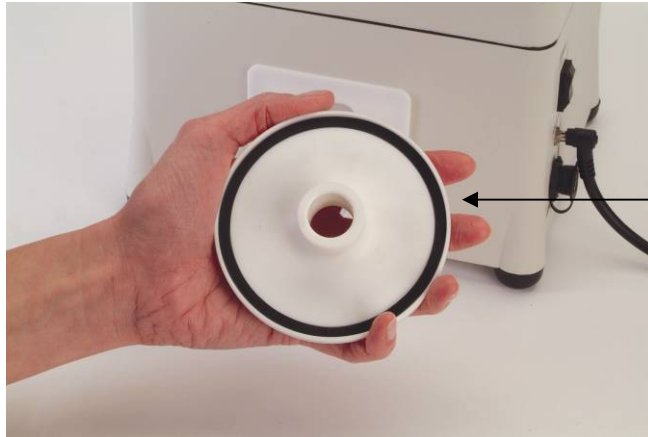
Figure 6-1: O-rings

## Contact Lid Gaskets

To inspect the contactor lid gaskets, remove the contactor lid. Examine both gaskets in the lid to make sure they are intact and that they are able to provide a good, clean sealing surface. See Figures 6-2 and 6-3.



Contact Top Lid Gasket



Contact Top Lid Gasket

Figures 6-2 and 6-3: Top Lid Gaskets

## Sample and Control Manifold Pins

To inspect the pins in the sample and control manifold, remove the sample cartridge if it is in place and examine the pins to see if there is any damage. (Nicked, cut, or bent pins can cause the instrument to malfunction). See Figure 6-4.

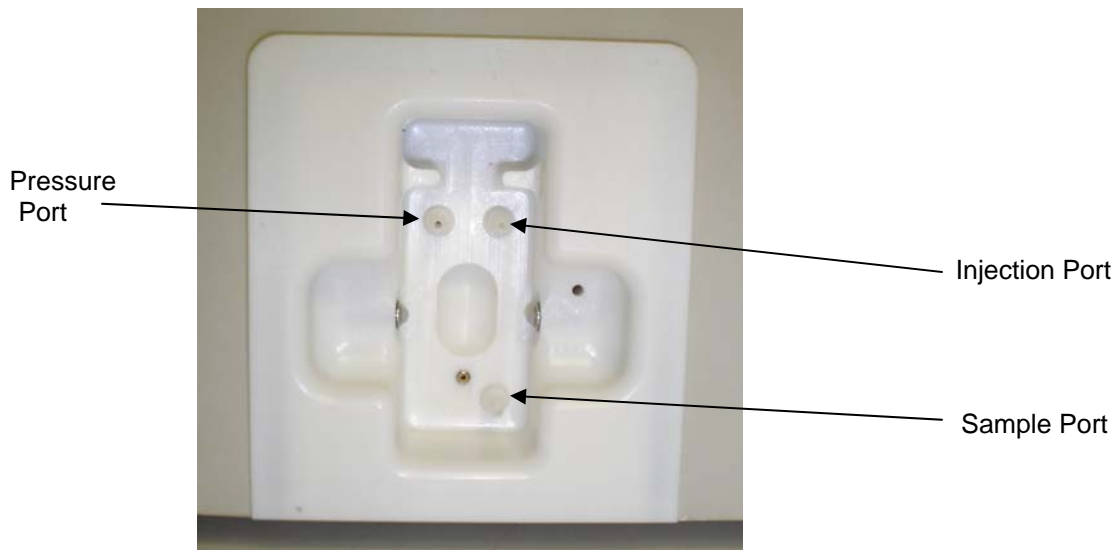


Figure 6-4: Sample and Control Manifold

### Battery Door Seals

To inspect seals on the battery doors (Figure 6-5), remove the doors and examine the seals to make sure they are not dirty or damaged.



Figure 6-5: Battery door seals

### Acoustic Baffle and Exhaust Cover Gasket

To replace the acoustic baffle, remove the air outlet cover on the back of the top lid by unscrewing the four screws that hold it in place (Figure 6-6). Lift out the baffle and install a new one (Figure 6-7). Properly dispose of it. Install a new cover gasket, then replace the cover and tighten the screws. The acoustic baffle should be replaced at least once per year.



Figure 6-6: Air Outlet Cover



Figure 6-7: Acoustic Baffle



Figure 6-8: Exhaust Cover Gasket

**Note:** The Exhaust Cover Gasket is single use and should be replaced whenever the exhaust cover is removed to ensure a proper seal.

### Overflow Vial

The overflow vial is located at the bottom left of the instrument and in the overflow port (Figure 1-23). If the vial is contaminated, damaged, or dirty, replace it.

## 6.2 Replacing and Repairing Parts

Discuss repairs and parts replacements with the Sceptor Customer Service or Technical Support team. Replacing major components, recalibration (other than airflow), and major repairs should be performed by Sceptor Industries to ensure the instrument remains in proper calibration. The last date of calibration will be indicated on a label on the bottom of the instrument.

## 6.3 Airflow Calibration

**Note:** Before calibrating the airflow, install a makeup fluid supply bag and a new sample cartridge. Connect all external attachments that will be in use.

The OMNI blower draws air through the system at the rate of 300 liters/minute (LPM). Optional attachments, such as the HEPA filter, remote sampling assembly, or exhaust hose, will cause a pressure drop in the system. Having an improperly calibrated flow rate can cause erroneous sample volumes and/or failed samples. The system airflow should be calibrated using the control panel to maintain a constant 300 (+/-10) liter/minute flow. To calibrate the airflow, press **Set** to display the function menu. Press the (-) button to scroll down to *Calibrate*. Press **Set** to select *Calibrate*. The calibration screen will appear. Press **Run** to start a calibration cycle. The calibration screen will display the airflow in liters/minute. Allow 1 minute for the system to start up. If airflow is not 300 LPM, gradually press the (+) or (-) buttons allowing 5 ~ 10 seconds between each change for the system to adjust speed. Press **Run** to stop the cycle and drain the contactor. The control panel will return to READY status. The airflow rate will be displayed on the control panel during a sampling cycle.

## 6.4 Yearly Preventive Maintenance

Sceptor recommends the instrument be sent to Sceptor annually for preventative maintenance and calibration. To check the last calibration date, see the calibration label on the bottom of the instrument. Sceptor offers an optional Preventive Maintenance Service Contract, which is highly recommended. Before sending in the instrument, clean the external components and internal lines with a full cleaning kit as described in Section 5.

If the instrument needs to be returned, contact Sceptor Customer Service at 888-450-4321 for a Return Materials Authorization (RMA), decontamination certificate, and shipping instructions.

**Warning: If the instrument has collected or has been suspected of collecting infectious material, you must notify Sceptor of this when requesting the RMA and you are responsible for having the instrument decontaminated by an authorized organization who can certify it is decontaminated before approval to return the system will be given.**

**Warning: If the instrument has collected hazardous material, refer to local HAZMAT guidelines regarding cleanup and decontamination of the instrument.**

## SECTION 7: ENVIRONMENTAL LIMITATIONS

Do not submerge the instrument.

The operating temperature range is 36° to 120°F (2° to 50°C). Below 36° the sample fluid begins to freeze due to the cooling effect caused by the high evaporation rate of the system.

The operating humidity range is 5 to 95% Relative Humidity (non-condensing).

## SECTION 8: TROUBLESHOOTING

Troubleshooting information for the OMNI™ 3000 aerosol sampler is listed below. When there is a problem with the instrument, reviewing the operating instructions will usually resolve it.

Symptom	Cause	Remedy
The instrument does not turn on when plugged in and on/off switch is pressed.	AC power cord may be unplugged, not fully seated or plugged into an outlet, which is not live.	Check to ensure AC power cord is plugged into a working AC outlet and insure the cord is fully inserted into the unit.
	DC converter w/power cord may be defective	Check to ensure green LED on power converter is lighted.
	Internal fuse is blown.	Contact Sceptor for repair.
	LCD Backlight may be damaged.	Contact Sceptor for repair.
Fluid does not extract after sampling is complete.	Clogged fluid extract line	Attach extraction syringe to sample port of sample, control manifold, and draw any fluid into syringe.
	Leakage in fluid or pressure path	Check fluid and pressure path for leaks
	Defective extraction pump or control valve	Contact Sceptor for repair
Cartridge empties completely and supply fluid does not inject into the sample cartridge	Fluid supply bag may not be connected properly or is empty	Ensure that the fluid supply bag is not empty and is properly connected
	Sample cartridge adjusted or reinserted during sampling cycle	Stop collection, reinsert sample cartridge & restart
	Dirty optics	Clean optical sensor on sample and control manifold
	Defective fluid injection pump or supply valve	Contact Sceptor for repair

Sample volumes too high	Sample cartridge leaking	Replace sample cartridge
	Damaged o-ring on contactor	Check contactor O-rings for damage. O-rings are provided in the OMNI™ Maintenance Kit
	Pressure port disturbed	Check pressure port inside contactor for proper position and alignment.
	Sample cartridge adjusted or reinserted during sampling cycle	Stop collection, reinsert sample cartridge & restart
	Sample fluid prone to bubbling	Do not use unapproved sample fluids in the system. Contact factory about use of alternate fluids.
	Pressure balance line leaking	Contact Sceptor for repair
Sample volumes too low or fluid does not draw into contactor	Clogged or leaking fluid lines	Inspect fluid lines for clogs and clear if necessary with extraction syringe.
	Sample cartridge leaking	Check for bubbling at bottom cartridge port to confirm then replace cartridge
	Top lid not latched, or contactor lid not installed or sealed properly	Check to make sure top lid is securely latched using the top release latch, and the contactor lid is properly installed
	Damaged o-ring on contactor	Inspect for damaged o-ring on contactor. O-rings are provided in the OMNI Maintenance Kit
Sample fluid does not stop injecting into cartridge	Sample cartridge moved during operation	Press "Run" to stop sampling cycle. Replace sample cartridge. Press "Run" again to restart sampling cycle.
	Optical sensor or amplifier failure	Contact Sceptor for repair
Fluid does not enter contactor, but is present in cartridge	Sample fluid line clogged	Check for clog in bottom of contactor. Use extraction syringe to unclog the line connected to the contactor sample drain (center) Draw a vacuum with the syringe. Never use pressure to remove a clog
	Pressure port disturbed	Check to ensure pressure port in contactor is in place and positioned correctly.
	Damaged O-rings	Check for damaged O-rings on the contactor. O-rings are provided in the OMNI™ Maintenance Kit
	Fluid in pressure line	Check pressure line for blockage by fluid or debris
	Top lid not latched	Check to ensure top lid is securely latched using the top release latch
Cannot reach required flow rate	Airflow path obstruction	Check for clog in contactor slits, wand and surface brush.

	Acoustic baffle installed improperly	Check that acoustic baffle is properly installed
	Upstream and/or downstream pressures too great for system to handle	Check for air blockage such as a clogged wand or surface brush. Check airflow calibration
Sample fluid forms a ring that circulates above the contactor slits and no fluid is circulating at the bottom of the contactor. See Also, Sample Volumes Too Low.	Fluid in the pressure line.	Connect the extraction syringe to the pressure port while the system is in Ready mode and draw any fluid, which may be in the pressure line into the syringe. See Figure 5-7.
	Pressure port disturbed	Check to ensure pressure port in contactor is in place and positioned correctly.
	Sample cartridge leaking	Check for bubbling at bottom cartridge port to confirm then replace cartridge

## Error Messages

Message	Cause	Remedy
Insert water bag and latch lid.	Makeup fluid bag not inserted into OMNI™.	Insert makeup fluid into fluid supply port.
Error, low battery cycle aborted, press EXIT to continue.	Low battery	Recharge battery on the battery charger per the instructions in the Sceptor user manual.
Error, injection count exceeded, press EXIT to continue.  Check water bag, press EXIT to continue.	Empty water bag  Leak in pressure line.  Bubbles keep forming in front of the optic sensor.  Bent manifold pins.	Check water bag  Check for damaged O-ring on bottom of contactor. Check pressure line on contactor. Sample cartridge may have a damaged valve. Replace sample cartridge.  Ensure manifold pins are straight and undamaged. Contact Sceptor if damaged
Error, check cartridge, press EXIT to continue.	Cartridge misaligned or optics may need cleaning.	Remove and then replace the sample cartridge. Wipe optics clean.

## SECTION 9: CONTACT INFORMATION

Sceptor Industries, Inc.  
8301 State Line Road, Suite 101  
Kansas City, Missouri 64114  
Phone: 816-360-3895

**Customer Service** For supplies and service  
Phone: 888-450-4321 or 816-360-3895  
Fax: 816-931-2451  
E-mail [contact@sceptorindustries.com](mailto:contact@sceptorindustries.com)

Please call the above number to obtain a Return Materials Authorization (RMA) if you need to send your instrument in for service. When returning an instrument for RMA repair, clearly indicate the RMA # on the shipping box label or packing slip to ensure timely repair. Instruments sent back without a RMA # may not be accepted for repair.

**Website** [www.sceptorindustries.com](http://www.sceptorindustries.com)

## SECTION 10: SPECIFICATONS

Power Requirements	Internal Battery or External 90-264V, 47 – 63 Hz AC power
Power Consumption	Approximately 70W while sampling (<2.5W Idle)
Optional Batteries	24VDC Hot Swappable Nickel Metal Hydride
Flow Rate	300 LPM w/ integral flow control
Size	7.5" x 8.5" x 16.5"
Weight	Approximately 13 lbs (21 lbs. with optional batteries)
Operating Temperature Range	2° - 50° C (36° - 120° F)
Sampling Time	Operator selectable up to 8 hours *
Sample Size	Approximately 10 milliliters
Sample Extraction	Automatic into sealed disposable sample cartridge
Sampling Solutions	Water or Phosphate Buffered Saline (PBS). Uses water for evaporative makeup. Consult factory before use of other sample fluids.
Portability	Easily transportable, carrying handle & standard foam padded shipping case with wheels.
Operator Interface	Sealed touch pad with LCD display easily usable and viewable while wearing personal protective equipment
Cleaning	Automated hydrogen peroxide rinsing. External surfaces can be sprayed and thoroughly rinsed; fluid lines can be easily flushed. Contactor can be removed for submersion cleaning or replacement.

- Appropriate sample cycle duration should be determined by the operator based on retention of the sample over time and minimizing loss of a target collected during a transient event. Significantly longer operation may be permitted if the target source is expected to be continuously present (non-transient). In general, if a transient event is expected, sample durations should be kept to 6 hours or less to minimize loss of material that may be collected early in the sample cycle.

## Understanding Sampler Performance Measures

In order to understand the level of performance of a concentrating air sampler, it is important to understand the differences between the various measures commonly used to describe the overall concentrating performance.

Normally the measures are based on ratios of the Sample Concentration,  $C_s$  at some time during the sampling period and the Ambient air particulate Concentration,  $C_a$ , and can be derived from the following equation. The formula below shows the relationship of sample concentration versus air concentration for a concentrating liquid based air sampler assuming no loss of material over time.

$$C_s = \frac{F \cdot n}{v} \cdot t \cdot C_a,$$

Where:

$C_s$ : is the Sample concentration at any given time

$F$ : is the flow rate of the sampler

$n$ : is the sampling efficiency of the sampler for a given particle size

$v$ : is the volume of the liquid sample produced by the system

$t$ : is the sampling duration

$C_a$ : is the ambient concentration

Note that this equation also applies to non-concentrating liquid based air samplers, however the sample volume will generally be time dependent for those systems and therefore the sampling duration will cancel the time factor in the equation and will provide a fixed sample concentration based only on the ambient concentration and sampler characteristics.

One traditional measure of sampler performance is the Concentration Factor  $C_f$ , which is a dimensionless number indicating that the sample concentration is some number of multiples of the air concentration. By rearranging the above formula as shown below, one can arrive at an equation for Concentration Factor,  $C_f$ .

$$C_f = \frac{C_s}{C_a} = \frac{F \cdot n}{v} \cdot t,$$

From this equation one can see that the concentration factor is time dependent, and therefore it will change based on sample duration. A concentration factor should normally be stated for a specific sampling duration; without this duration stated the performance of the sampler can be ambiguous.

Note that sometimes the Concentration Factor is stated in unequal units of Air volume per liquid volume, rather than being completely dimensionless. For instance it may be stated as X liters of air per mL of sample, or L/mL, which will show the factor as being 1000 times less than an equal

unit, dimensionless, Concentration Factor. Sceptor will always state Concentration Factor in equal dimensionless units, or in other words, Liters of Air per Liters of Sample (L/L), which is the same as mL of air per mL of sample (mL/mL).

In order to unambiguously define the performance of our samplers, Sceptor uses Concentration Rate,  $R_{conc}$ , as the measure of performance. The Concentration Rate is a function of only the key sampler characteristics and is based on multiples of air concentration per unit time or rather is the Concentration Factor per minute. Using this measure of performance, an operator can determine exactly what sample duration is required to provide a given sample concentration assuming a known ambient concentration. By yet again rearranging the above formula, one can arrive at an equation for Concentration Rate,  $R_{conc}$  that is dependent on only the sampler characteristics as shown below.

$$R_{conc} = \frac{C_f}{t} = \frac{F \cdot n}{v}$$

This measure may also be stated in unequal units of air volume per liquid volume, however as indicated above regarding Concentration Factor, Sceptor will always state this value in equal units of Air to Sample, (mL/mL/min).

An example calculation of Concentration Rate is as follows using characteristic values for the OMNI™ 3000 air sampler:

$$R_{conc} = \frac{F \cdot n}{v} = \frac{300L/\text{min} \cdot 0.75}{0.010L} = 22,500/\text{min} ,$$

This indicates that the number of particles in one unit of sample increases by approximately 22,500 multiples of the number of particles in the same unit of air in every minute of sampling.

# OMNI™ 3000 Quick Start Guide

1. Install water supply bag.....



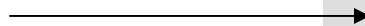
2. Install sample cartridge.....



3. Connect the instrument to an appropriate power source by connecting AC or installing batteries.



ON/OFF Power Button



4. Push the “ON/OFF” switch to “On”.....

- 5. Set the collection time, or use the previously programmed duration.**
- 6. Press the “Run” button to start a sampling cycle.**
- 7. To stop a sampling cycle before the timer expires, press the “Run” button.**
- 8. Remove the sample cartridge. Push the “ON/OFF” switch to “OFF”.**