OPERATING MANUAL

PAS-2000
PERSONAL AIR SAMPLER

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Redwood City, CA 94063 USA
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www.spectrex.com

Important

If you are going to use the
PAS-2000
for Asbestos Sampling

This PUMP has already been
Pre-Calibrated for you.

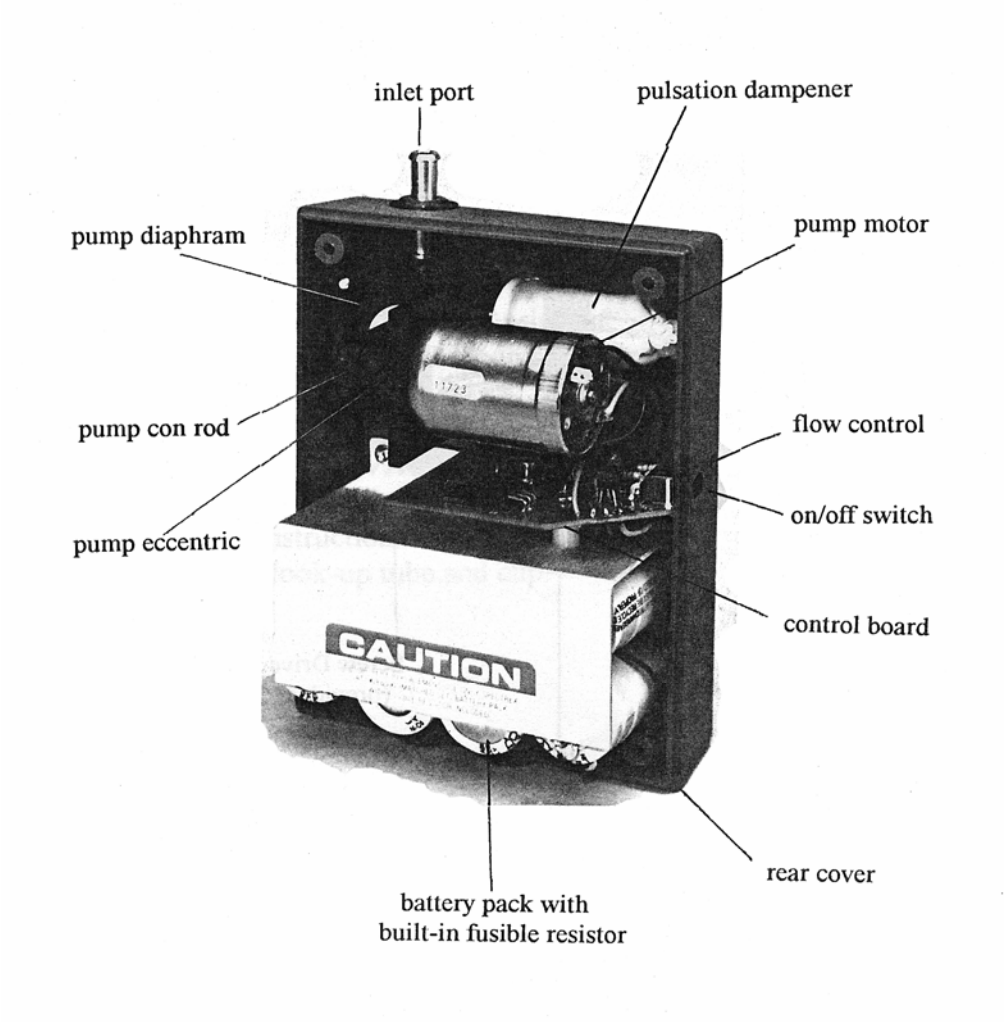
It has been set at:

2 liters per minute flow
while pulling through a
25 mm dia. 0.8 μm filter.

You do not have to adjust anything to start sampling.

As your PAS-2000 has a built-in rotometer, check to see that the floating ball lines up with the 2 LPM mark, with the 25 mm filter in place. If not, adjust the flow control potentiometer so that it does. However, from time to time, it is wise to check flow rate externally. Use the Spectrex BFM-2500 Electronic Bubble Flow Meters of the BFM-100 pocket size Bubble Flow Meter for this.

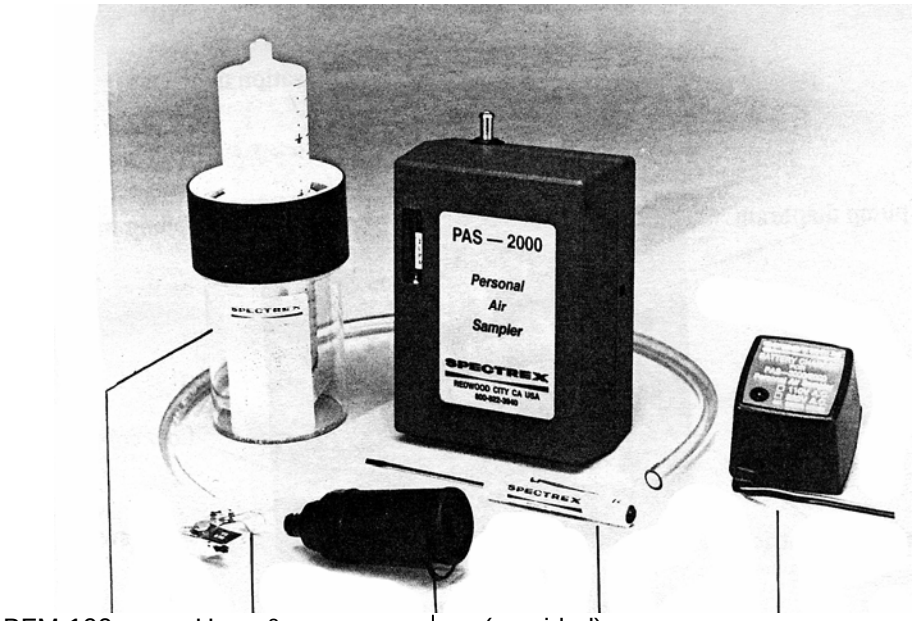
The PAS-2000 with cover removed



PURPOSE:

The PAS-2000 is a personal air sampler for moving air through an external collection device, such as a gravimetric filter.

Accessories for the PAS-2000



BFM-100 Pocket Bubble Flow Meter (optional)

Hose & Clip (provided)

25mm. dia. Filter Cassette (optional)

(provided) Screw Driver

Battery Charger (provided)

CONTENTS OF THE KIT:

The PAS-2000 sampling kit consists of

- Sampler, with built-in rechargeable battery pack
- 110 VAC. 60 Hz battery charger (220 VAC optional)
- Screw driver
- Instruction manual
- Hook-up tube and clip

STANDARD FEATURES:

1. Flow rates from 600 cc to 3 LPM set by potentiometer control.

2. Pulsation dampener.

3. 2 LPM flow for 10 hours across 0.8 μm filter.

4. Dependable 10,000 hours operating life.

5. External On/Off Switch and Flow Control potentiometer specially placed to avoid accidental operation.

6. Electronic voltage regulation for constant flow.

7. MSHA approval for intrinsic safety.

STEP-BY-STEP OPERATING INSTRUCTIONS:

1. Charge Batteries

Plug battery charger cord into receptacle on rear of pump and plug three-prong adapter into any standard 110VAC outlet. A full charge is obtained after 16 hours. The batteries cannot be overcharged.

2. Set Flow

The potentiometer is accessed on the side of the rear cover with use of the screwdriver provided. Turning the screwdriver clockwise increases flow. Note: The pump has already been set to 2 LPM across a 0.8 μm, 25 dia.filter.

SAMPLE COLLECTION

A. With sample collector attached, fit unit onto person to be monitored.

B. Record starting time and use the On/Off switch, located on the side of the rear cover, to turn pump on.

C. At the end of the sampling period, remove unit from wearer and record time.

MAINTENANCE:

The sampler is modular in construction and has an extremely rugged design. Maintenance is minimal and there is ease of access to all the components.

The pump can be removed from the case by loosening two screws accessible on the clip side of the case once the belt clip has been removed. It is easily disassembled and reassembled. All the standard controls are on one printed circuit board (the Control Board). This can easily be replaced by making appropriate connections from wired to (A) Pump Motor (2 wired); (B) Battery Pack (2 wired); to a new circuit board and sliding it into position.

Note: Battery recharge receptacle remains connected to board. This is removed from the case by loosening locking nut and pushing inward.

The battery pack can be replaced by removing battery cover and sliding the old pack out.

There is a fusible resistor in the center of the pack which will open if the batteries are shorted or overloaded. This is easily replaced with a soldering iron. A spare fusible resistor is included in the PAS-2000 kit.

WARRANTY:

The sampler is guaranteed for 90 days against any defects in parts or workmanship.

SERVICE:

For additional information or assistance call your local distributor or Spectrex Corporation.

For repairs, return the unit to your local distributor, or directly to:

Spectrex Corporation
3580 Haven Avenue
Redwood City, CA 94063 USA
800-822-3940
650-365-6567
Fax 650-365-5845
E-mail spectrex@spectrex.com
www.spectrex.com

Ship prepaid and enclose full information on your company. If the unit is out of warranty, there will be a reasonable service charge.

Appendix, Replacement Parts, Accessories and Modifications:

See Replacement Parts Price List for **PAS-2000/3000** on the rear page of price list.

Part Numbers are listed below:

Part Number	Description
4047100	Belt Clip
4081910	Rotometer
4101010	Rear Cover
4101110	Front Cover
4101120	Bracket to hold battery pack
4101712	Inlet port (stainless steel)
4102105	Control Board
4102300	Connecting rod, with bearings and connecting rod cap
4102710	Motor 12V
4102800	Pump (less motor)
4106000	Pulsation dampener
4106300	Finger cot (pulsation dampener)
4107100	Upper valve plate
4107200	Lower valve plate
4107300	Flapper valve
4107600	Diaphragm
4107700	Crankpin (fixed stroke)
6004000	Fusible resistor
6500000	Battery pack (including fusible resistor)

Accessories:

(Included with standard PAS-2000)

Part Number	Description
4082800	Screwdriver
4082901	Clip & tubing
6204300	Battery charger (110VAC) or
6204400	Battery charger (220VAC) if requested
6468400	Multi-pump battery charger (110VAC)

Accessories for Industrial Hygiene:

Part Number	Description
4089200	Filter cassette holder (includes tubing) with lapel sampler
4090000	Cyclone holder (includes tubing) with respirable dust lapel sampler
4091100	Loaded filter cassette (mixed cellulose esters 0.8 μm filter 37 mm diameter.)
4091300	100 filters (0.8 μm 37 mm dia. cellulose esters.)
6468830	BFM-100 pocket bubble flow meter 0-2 LPM
6468800	RM-2 Rotometer, precision 0.5-2.5 LPM
6468880	BFM-2500 Electronic Bubble Flow Meter

Battery Charging:

The battery charger supplied with the pump will supply about 140mA of current when it is being used. The charger limits the current to a safe value so the batteries can never be overcharged.

Under normal operation, charge the batteries for 14 to 16 hours to obtain a full charge.

Additional Information:

The battery cells in your pump are rated at 1.2 Ah. This means that if the eight-cell pack is drained at 1.2 Amps for one hour, the voltage would still be at or above 8 volts. Eights volts (or 1 volt per cell) is considered the end point and marks the point at which the “internal impedance” of the battery begins to increase greatly.

Ni-Cad (nickel-caldmium) batteries are NOT immortal. However, with reasonable care, they should provide a good service life for your pump. Any of the following three conditions may reduce the life of a Ni-Cad battery:

- Sustained overcharging heat
- Cell reversal
- Memory

Sustained overcharging heat is eliminated as long as you use one of the two battery chargers available for this pump. These chargers have been designed to revert over-charging of the battery cells.

Cell reversal takes place when one of the cells in the battery is completely discharged (zero volts). The remaining cells then force a current through the discharged cell; this causes the voltage across the cell to reverse and begins to

destroy the cell chemistry. To avoid this condition, a “watchdog” circuit was incorporated into the electronics in the pump (to keep the battery voltage from dropping below 8 volts.) If you feel a battery has gone bad, a simple voltmeter test, measuring the voltage across each cell, will usually detect the defective cell. It is usually best to run the pump for half an hour after a charge cycle and then examine each cell and replace the defective ones. Typical voltages with the pump running are:

1.38 volts maximum at full charge
1.25 volts typical during discharge
1.0 volts end point.

“Memory” is an apparent reduction of the battery capacity. If the battery pack is not fully discharged before recharging on a repeated basis, then the apparent capacity of the pack will decrease. This doesn’t necessarily cause a problem if the pack is used for the same length of time on each cycle. However, if the user tries to extend his or her normal running time with a pack in this condition, the pack will then not have the necessary capacity and the pump will stop before it is expected.

You can reverse memory with a series of full, charge/discharge cycles, and the battery pack will normally improve after each cycle. It may not be a bad idea after completing your sampling to run the battery pack down and then recharge fully each time before use.

Since the changing efficiency for a Ni-Cad cell is approximately 66%, and your charger will typically provide 140mA of current, it will take about 14 -16 hours to totally recharge a completely discharged battery pack.

While a Ni-Cad battery system is not ideal, it is the best system currently available for battery-powered equipment like your sampling pump. These battery cells can, and will, take a lot of abuse; and if you avoid over discharging and overcharging, they will give you many dependable recycles.

Note: When not in use, the battery pack will lose approximately 1% of its charge per day. Also, when not charged for 90 days, it will charge only to 80% of capacity on the first charge. It will, however, return to 100% after several charges and uses. Thus, the best way to insure top battery performance is frequent use.