

AirPro® Surveyor 2 Manual

AirPro® Surveyor Specifications

Size 3/8" x 7 1/2" x 4 3/8"

Weight 4.6 lbs. • 2094 g

Dynamic Range 1-1000 mL/min. total flow/constant flow

Flow Capacity (8 Hrs.) 1000 mL/min. total flow at up to 100 in./H₂O.

Battery System 12V, Rechargeable, sealed lead acid battery pack, (8-12 hours)

Lead-acid batteries do not have memory effect problems and with built-in smart charging circuitry the battery can be left charging indefinitely without causing damage.

AC Battery Charger Wall-mounted, single station charger, 120V, 60Hz, 9W, Output: 20V DC, 300 mA.

Electronics LCD time/function display, programmable timer functions; delayed start, preset sampling time, sampling time data retention. Charging and charged LED indicators and automatic battery charging circuitry tapering charge to trickle when battery approaches full charge.

Case Water-Resistant Case.

All specifications are subject to change. Please contact Bios or visit our web site at www.biosint.com for the most current information

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1.0 Unpacking Checklist

Your quality Bios product has been packaged with care and includes all components necessary for full operation. Please take a moment to check that you have received the following items. If you believe you have not received a full shipment or if you have any questions, please contact Bios immediately.

AirPro Surveyor 2 Air Sampler

- Single Station Battery Charger
- Instruction Manual, Warranty Card

2.0 General Description

The AirPro Surveyor 2 is a dual channel constant flow air sampler with a programmable electronic control system that provides integrated flow fault indication and shut off, delayed start, preset sampling time, sampling time data retention and automatic battery charging. Packaged in a waterproof case, it contains integral holders for 6mm and 0.25 inch tubes[•].

The Surveyor is an excellent tool for rapid field survey work and ambient air assessment. Its pump and flow control system is designed to handle extremely high back pressure loads for short sampling periods or for eight hour applications.

The flow control system for each channel consists of a throttling pressure regulator connected across an adjustable orifice. The regulator acts to keep the pressure between its output port and sensing port at a constant value. Since the two ports are connected across a fixed (albeit adjustable) restriction, the flow through the restriction is kept constant.

[•]Custom tube holders are available upon request. Contact Bios for additional information and pricing.

3.0 Charging the Battery System

Before using your sampler, be sure that the battery system has a full charge to ensure that it will perform to its specifications and maintain operation for the required sampling period. If "LO BAT" or "E02" is indicated on the display, recharging is necessary.

- 1 Connect the appropriate Surveyor charger into a standard wall outlet.
- 2 Insert the charger's barrel plug end into the two charging jacks located on the exterior of the carrying case on the right side just above the tube fittings. The red **Charging** LED on the faceplate will illuminate.
- 3 When the unit is fully charged the green **Charged** LED will illuminate.

4.0 Operating Instructions

In this section you will learn to operate the Surveyor 2 air sampler. The instructions are written for hands-on practice.

4.1 Turning the Power "On"

The sampler will automatically shut itself Off if it is left in the "Pause" state for two hours.

Activate the unit by pressing the **Power On** button located on the face of the sampler, at the top right-hand corner. The sampler is now on while in the "Pause" state.

The unit will alternately display the cumulated run time "00:00", (i.e.7:53) in hours and minutes, and the cumulated run time "00", (i.e.473) in total minutes.

4.2 Starting the Sampler

The sampler will run continuously if operated with its AC charging adapter. This is useful when 24 or 48 hour samples are necessary. If the sampler is operated continuously for extended periods, however, the warranty will be void. The pump motor specification rates the motor to run for approximately 1300-1500 hours.

If a delay start time has been programmed, the pump will start running when the delay time reaches (00). Also, the clock will count for a maximum of 99:59 and then roll over and begin counting at zero again.

To start the sampler, press the **Run** button. The pump will begin running. The **Run** button allows the user to toggle between the "Run" and "Pause" state.

4.3 Turning the Power "Off"

The sampler must be running or in the "Pause" state to manually turn the power off. It cannot be manually turned off while programming time.

To turn the power Off, press ▲ and ▼ buttons simultaneously.

4.4 Using the Integral Tube Holder System

The Surveyor 2 is equipped with a built-in adjustable tube holding system. Standard units will accommodate tube diameters of 6mm and 0.25 inches and tube lengths from 70-150 mm.

Inserting & Removing Sorbent Tubes

- 1 Slide a sorbent tube for each channel being used through the round opening in the white fittings located on the outside of the Surveyor case.
- 2 Gently twist the tube while pushing it into the internal fitting. Stop pushing when tube is snug and has bottomed out in the internal fitting.
- 3 To remove, gently twist the tube while pulling it from the opening.

Changing Holder for A Different Tube Length

- 1 Remove all tubes from the unit.
- 2 Turn the unit over and unscrew the two screws on the bottom of the black carrying case. The flat blade on the supplied screwdriver works best for this function.
- 3 Sit the unit on the left end of the carrying case and tip it over allowing the stainless steel system enclosure to fall out into your left hand.
- 4 Detach the charging adapter cable connector to free the enclosure from the carrying case.
- 5 Turning the system enclosure over with your left hand, locate the large screw in the center of the bottom of the stainless steel enclosure and unscrew it until the screw turns freely.
- 6 This will allow the tube retaining apparatus to slide. Reposition the tube holder to the new position and then tighten the screw from the bottom.
- 7 Before placing the stainless steel enclosure back into the carrying case, reconnect the charging jack cable and push it down and to the right so it does not restrict access to the tube holders.
- 8 Refasten the enclosure to the carrying case with the two screws on the back of the unit. Apply pressure from the faceplate while aligning the screws. Make sure that the o-rings are in place. This will ensure that the water-tight integrity of the case is retained. Remember the flat screwdriver blade works best for this process.

4.5 Setting & Calibrating the Flow Rate

The Surveyor 2 is a two-channel constant-flow sampler with independent flow adjustment for each channel. This procedure should be repeated for each channel being used.

Required Equipment

- Surveyor 2 Air Sampler
- Bios DryCal[®] Calibrator or other calibration device
- Tubing and sampling medium for each channel being used

- 1 Set up the “calibration train” with the sample medium or simulated sample medium in-line (inserted into the integral tube holder per Section 4.4). A length of tubing should then connect the sampler and the calibrator.
- 2 Confirm that the sampler and calibrator have been turned On.
- 3 Press the **Run** button to start the sampler.
- 4 Using the appropriate **Flow Adjust** screw, located on the left-hand side of the sampler, turn the **Flow Adjust** screw to set flow (counter clockwise to increase the flow rate or clockwise to decrease the flow rate). The flow rate is set and calibrated when the calibrator readings consistently match the desired flow rate.
- 5 Repeat this procedure for each flow channel being used.

4.6 Programming Time Functions

Surveyor 2 samplers offer auto-prompted, on-screen programmable timing functions for delayed start, preset sampling time and sample data retention.

Clearing “Accumulated Time” Function

The sample run time will automatically accumulate and be retained in memory until a sampling period is completed or until the sampler power is manually shut off.

The cumulated run time will remain in memory until the power is turned on and the **Run** button is pressed, indicating the start of a new sampling period. If necessary, make note of the previous sample run time prior to pressing the **Run** button.

Manually Clearing the Accumulated RunTime

With the power On, press the **Time** and **▲** buttons simultaneously. The cumulated run time will reset to “00”, “00:00”

Setting the “Run Time” Function

The sampler will retain all programmed “Run Time” information until the user resets this function to a different amount.

With the power on, press the **Time** button once, and the **Stop** LED will illuminate. The display will indicate either the default run time (:00) or the previously set run time.

Press the **▲** or **▼** buttons to increase or decrease the amount of time required. Time is indicated in hours and minutes. Pressing and holding the **▲** or **▼** buttons will accelerate the selection speed.

When the desired time is indicated, press the **Time** button once to set the delay start time, and the **Start** LED will illuminate. Or, press the **Time** button again to return to the “Pause” state.

Setting the “Delay Start Time” Function

The sampler will retain all programmed “Delay Start Time” information until the user resets this function to a different amount.

With the power On, press the **Time** button twice or until the red **Start** LED illuminates. The display will indicate a minus symbol before the delay start time data.

Press the ▲ or ▼ buttons to increase or decrease the amount of delay start time required. Time is indicated in hours and minutes.

When the desired delay start time is indicated, press the **Time** button once to return to the “Pause” state.

4.7 Display Messages, Errors & Faults

Should more than one error occur at the same time the error message numbers will be added together. (Example: E 02 and E 04 = E 06)

- E 01** E 01 indicates that the pump is drawing excessive current caused by extreme back pressures or a low battery. If the pressure is not reduced the unit will shut off in 20 seconds.
- E 02** Low Battery. The battery has discharged to a level that could damage the battery. The unit will shut off in 20 seconds.
- LO BAT** Low Battery Warning. Warning just prior to E 02 fault. Battery requires charging when LO BAT message is indicated.
- E 04** E 04 indicates that Channel 1 may have excessive back pressure or a blocked line. If the pressure is not reduced the unit will shut off in 20 seconds.
- E 08** E 08 indicates that Channel 2 may have excessive back pressure or a blocked line. If the pressure is not reduced the unit will shut off in 20 seconds.

5.0 Limited Warranty

The Bios AirPro Surveyor is warranted to the original end user to be free from defects in materials and workmanship under normal use (as defined under Section 2.0, General Description, and Section 4.2, Starting the Sampler) and service for a period of 90-days from the date of purchase as shown on the purchaser’s receipt. The Surveyor’s battery is warranted for 90-days from the original purchase date. If the unit was purchased from an authorized reseller a copy of an invoice or packing slip showing the date of purchase may be required to obtain warranty service.

The obligation of Bios International Corporation under this warranty shall be limited to repair or replacement (at our option), during the warranty period, of any part which proves defective in material or workmanship under normal use and service provided the product is returned to Bios International Corporation, transportation charges prepaid.

Notwithstanding the foregoing, Bios International Corporation shall have no liability to repair or replace any Bios International Corporation product:

- 1** Which has been damaged following sale, including but not limited to damage resulting from improper electrical voltages or currents, defacement, misuse, abuse, neglect, accident, fire, flood, act of God or use in violation of the instructions furnished by Bios International Corporation,
- 2** Where the serial number has been altered or removed or
- 3** Which has been repaired, altered or maintained by any person or party other than Bios International Corporation’s own service facility or a Bios-authorized service center.

This warranty is in lieu of all other warranties, and all other obligations or liabilities arising as a result of any defect or deficiency of the product, whether in contract or in tort or otherwise. All other warranties, expressed or implied, including any implied warranties of Merchantability and fitness for a particular purpose, are specifically excluded.

In no event shall we be liable for any special, incidental or consequential damages for breach of this or any other warranty, express or implied, whatsoever.

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