



BUCK-*Libra Plus*™ MODEL LP-5

INSTRUCTION MANUAL



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MAN-LIBRA PLUS
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Table of Contents

Section	Description	Page
1	Quick Start Tutorial.....	5
2	Design and Basic Features.....	6
3	Pump Specification.....	7-8
4	Operational and Menu Displays.....	9-11
5	Filter Cassette Sampling.....	12
6	Bubble and Impingers Sampling.....	13
7	Low Flow Tube Sampling.....	14
8	Battery Chargers and A/C Power Supply.....	15
9	Parts and Accessories.....	17
	Warranty & Limitation of Liability.....	18
	Service Information & Technical Support.....	19
	Registration Form.....	21

OWNER REGISTRATION

Please complete and fax this card to **407-851-8910** to properly register your unit
OR register on line at www.apbuck.com on the service and support page.

Contact Name _____

Company _____

Address _____

City _____ State _____ Zip Code _____

Country _____ Phone Number _____

Fax _____ Email Address _____

Purchased From _____

Purchase Date _____

Important: List all products purchases and corresponding serial numbers:

**Please obtain an RMA number prior to returning any product. Call us at
407-851-8602 and have the serial number and model of the unit available.**

OWNER SURVEY

Where did you learn about our products:

Mailing

Direct Sale Phone/Fax Website

Magazine

Name & Issue Date

Trade Show

Distributor Referral

Name: _____

Comments: _____

What made you decide to buy:

Product Technology / Features

Product Quality / Reliability

Price

Reputation of Company

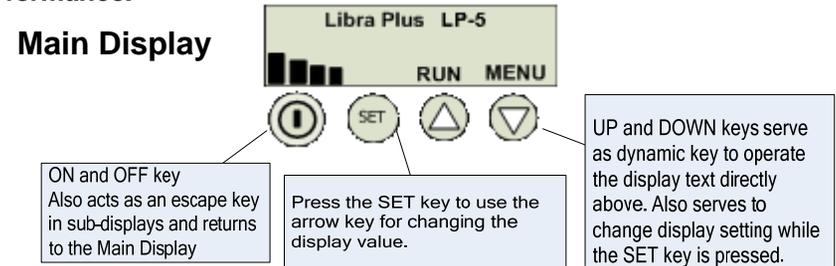
Product Availability

Service / Support

Section 1

Buck-Libra Plus Series Quick Start Guide

Note: Connect a representative sampling filter cassette using 1/4 inch tubing to the pump prior to setting Flow Rate for optimal performance.



Setting the Flow rate

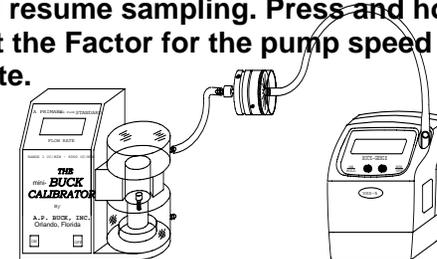
1. Connect sampling filter with a hose to the pump.
2. Turn on the pump by pressing the ON key.
3. Next press the down arrow to the Flow adjust Menu.
4. Press and hold the SET key and use arrows to adjust flow.
(This clears all previous data).
5. Releasing the SET key will store the flow rate.
6. Press the ON/OFF key to return to Main Display, then press the up arrow (RUN) to begin sampling.

Set and Arrows
Flo Adj 2000cc/m

Pump calibration Adjustment if needed at point of Flow Set

1. To measure the flow rate have a Calibrator ready and connected to the filter as shown below.
2. From the Main Display down arrow to the Calibration Mode.
3. Press the SET key and release, pump begins to flow at preset flow rate from the steps above.
4. Measure flow, if it matches +/- 5% of setting, press the ON/OFF key and resume sampling. Press and hold the SET key to adjust the Factor for the pump speed to match desired flow rate.

Calibration Mode
Adj Factor 13713



Section 2

Design and Features

The main purpose of this battery-operated personal sampling pump is to draw contaminants from an air sample into, onto or through a sampling media such as 25 and 37mm filter cassettes, bubble impingers, long-duration color detector tubes to gauge personnel exposure to gases, vapors, particulates, aerosols, etc. Both the analytical method required for the contaminant and the types of contaminants sampled determine the selection of sampling media. Many sampling methods specify the use of filters for collection. (i.e. Asbestos and Lead). The pore size, filter diameter, and filter material affect the ability of the sample pump to draw air through the filter for contaminant collection.

The BUCK-Libra Plus™ Model LP-5 Personal Air Sampler consists of a pump contained in a Lexan case, exclusive and proprietary electronic circuit board for flow control, an LCD display with 2 lines of 16 characters, a single diaphragm pump mechanism and a rechargeable nickel metal hydride battery pack.

Features:

- Flow Compensation for filter plugging and battery voltage
- Compact, Rugged and quiet
- No tools required to change flow rates.
- Battery pack rechargeable while attached or separately
- Stainless steel belt clip with built-in tripod connector
- One-hour rechargeable batteries and optional extended run triple packs
- High impact Lexan case, antistatic and RFI shielded
- "Auto-restart" within one minutes of a flow fault
- Flows up to 4 LPM for special cyclone requirements
- Dual flow range easily handles filters, impingers, cyclones, and tubes
- High backpressure capable for 25mm 0.45 u asbestos filters
- Built in washable stainless steel 100 micron filter
- Displays: elapsed time, accumulated volume and flow rate
- Accuracy +/- 5% of display reading or pump Flow Faults
- Count down timer up to 40 hours, turns off pump.
- Key pad lock system
- One year warranty

SERVICE INFORMATION

For all work not covered under warranty, A.P. Buck, Inc. will repair any instrument for the cost of parts and labor as quoted. If major components must be replaced, A.P. Buck, Inc. will notify the customer before proceeding with repairs.

When returning any instrument for service, please include a Purchase Order marked: "Repair – Cost Not to exceed \$250.00 without customer authorization". Please provide the following information with your instrument:

Company Name:
Address:
Telephone:
Fax:
Contact Name:
Serial Number(s):
Date of Purchase:
Service Required or Description of Problem:

You must obtain an RMA number prior to returning any product. Obtain your RMA number by calling A.P. Buck, Inc. Customer Service at 800-330-BUCK or 407-851-8602. To expedite service and repairs, have your Customer ID handy.

Please ensure that all products returned to A.P. Buck, Inc. contain no hazardous materials. Any obviously contaminated product received will be returned to the customer. All products scheduled for service must be received within 30 days of the RMA number issuance date. Unauthorized products will be returned to the customer.

TECHNICAL SUPPORT SERVICES

Technical Assistance: (407) 851-8602
Fax: (407) 851-8910
Email: apbuck@apbuck.com
Web site: www.apbuck.com
Hours : Monday–Friday
8:00 AM to 4:30 PM (EST)

If you need additional information or help during installation or normal use of this product, contact A.P. BUCK, Inc. Technical Support. Our customer support staff will attempt to answer your installation questions by phone or issue a service authorization number for repair or replacement of your product. Unauthorized returns will not be accepted. When calling for support, please have your product serial number and product model available.

Section 3

WARRANTY

The seller warrants to the Purchaser that any equipment manufactured by it and bearing its name plate to be free from defects in material or workmanship, under proper and normal use and service, as follows: if, at any time within 1 year from the date of sale, the Purchaser notifies the Seller that in his opinion, the equipment is defective, and returns the equipment to the Seller's originating factory prepaid, and the Seller's inspection finds the equipment to be defective in material or workmanship, the Seller will promptly correct it by either, at its option, repairing any defective part or material or replacing it free of charge and return shipped lowest cost transportation prepaid (if Purchaser requests premium transportation, Purchaser will be billed for transportation costs). If inspection by the Seller does not disclose any defect in material or workmanship, the Seller's regular charges will apply. This warranty shall be effective only if installation and maintenance is in accordance with our instructions and written notice of a defect is given to the Seller within such period. This warranty is exclusive and is in lieu of any other warranties, written, oral or implied; specifically without limitation, there is no warranty of merchantability or fitness for any purpose. The liability of the Seller shall be limited to the repair or the replacement of materials or parts as above set forth.

LIMITATION OF LIABILITY

The seller shall not be liable for any claim for consequential loss or damage arising or alleged to have risen from any delay in delivery malfunction or failure of the equipment. The Seller's liability for any other loss or damage arising out of or connected with the manufacture, sale or use of the equipment sold, including damage due to negligence, shall not in any event exceed the price of the equipment supplied by us.

A.P. Buck, Inc. reserves the right to make changes at any time, without notice, in prices, colors, materials, specifications, and models; and to discontinue models.

Pump Specifications

Model: LP-5

Flow Range: 0.8-5 LPM (800-5000 cc/min)
5-800 cc/min with Universal Low Flow Holder
P.N. APB-109030

Compensation Range:

- 5000 cc/min up to 5" water back pressure
- 4500 cc/min up to 7" water back pressure
- 4000 cc/min up to 10" water back pressure
- 3500 cc/min up to 20" water back pressure
- 3000 cc/min up to 30": water back pressure
- 2500 cc/min up to 35": water back pressure
- 2000 cc/min up to 35": water back pressure
- 1500 cc/min up to 25": water back pressure
- 1000 cc/min up to 25": water back pressure
- 800 cc/min up to 15": water back pressure

Accuracy: 5% or less of Compensation Range back pressure

Run Time:

Flow Rate cc/min	37 mm 0.8u	25mm 0.8u	25mm 0,45u
2000	43 hours	29 hours	12 hours
2500	32 hours	20 hours	9 hours
3000	22 hours	14 hours	
3500	16 hours	11 hours	

Low Flow using Universal Low Flow Holder

5 to 800 24 hours

Data Storage: Last flow rate, elapsed clock time and accumulated volume is saved into memory until cleared for next sampling.

Display: Back-lighted LCD with 2 lines by 16 Characters

Normal Operation Battery Level, Flow Rate, Elapsed Time, Volume Collected, Timer

Flow Fault Displays: Flow Fault, or Filter Off

5 Menu Displays: Adjust Flow, Clear Data, Calibration, Timer, Key Pad Lock option

Section 3 cont.

Flow Faults

Flow Fault for blockage of hose/filter and greater than +/-5% for flow of 2000 to 3500cc/m with Auto-Restart for one minute, then turns off pump with data saved.

Filter OFF detects hose or filter has come off, stops pump and saves data. Pump turns OFF in 5 minutes.

Power Supply:

Single Pack, NiMH Batteries: 4.8V, 2.15 Ah

Triple Pack, NiMH Batteries 4.8V, 6.45 Ah

Recharge Time: QuickOne and QuickFive Chargers

Single Pack 1 Hour

Triple Pack 3 Hours

Quick-Chargers: input voltage 100 to 240 VAC

A/C adapter/ overnight Charge 110 VAC or 240 VAC

Approvals CE EMC Directive (EMCD) 89/336/EEC

Temperature:

Operating 32°F to 113°F (0°C to 45°C)

Storage 32°F to 113°F (0°C to 45°C)

Charging 41°F to 104°F (5°C to 40°C)

Case: Polycarbonate steel fiber filled, RFI/EMI-shielded

Size:

4.5"H x 4"W x 2"D (11.4 cm H x 10.2 cm W x 5 cm D)

Weight: 19 oz (538g)

Section 9

Parts and Accessories

1. BUCK QuickOne™ Charger 100–230 VAC (APB-601800) Single Station Automatic One Hour Charger for use with the *BUCK-Libra Plus Series* of Pumps.
2. BUCK QuickFive™ Charger 100–230 VAC (APB-605800), Five Station Automatic One Hour Charger for use with the *BUCK-Libra Plus Series* of Pumps.
3. BUCK Standard Charger 120VAC (APB-603400) Designed to charge the *Libra Plus Pump* battery-pack (max 16 hours charge time). Not Recommended for the triple pack.
4. BUCK "One Hour" Rechargeable "Standard" Battery Pack (APB-109023) for the *Libra Plus Series* of Pump. These self contained packs may be charged independently from the pump and used as additional back up batteries in the field. Simple four screw changing operation.
5. BUCK Triple Rechargeable Battery Pack (APB-109323) for the BUCK-Libra Plus Pumps.
6. BUCK Adjustable Universal Low Flow Tube Holder (APB-109030). Desired flow may be precisely adjusted for flows of 5 to 800 cc/min. with the *mini- BUCK Calibrator™* and a screw-driver using the tube holder's built-in adjustable screw.
7. Tube Cover for Adjustable Universal Low Flow Tube Holder (Sorbent sample tube size determines cover size).
8. Luer Adapter (APB-109000) (pkg 10). Adapter (black) fits onto tubing to easily attach filter cassette outlet to tubing to aid in calibration.
9. Sample Hose Clip (APB-109020) (pkg 10). Clothing clip for attaching hoses and sampling heads to a worker's collar or shirt, with snap nylon strap for 3/8" O. D. hose.
10. Multi Low Flow Manifold (APB-109034). Poly-carbonate manifold allows connection of up to three sorbent tubes and Protective Covers for independent multiple low flow sampling with a single pump.
11. Non-Adjustable Flow Sample Holder (APB-109032). To be used with any model of Buck pump in Constant Flow.
12. 5-Pack Pump Case (APB-109017). Designed to hold up to 5 *Libra Plus Series* pumps, QuickOne™ or QuickFive™ charger (s), accessories, media, tubing, etc. Rugged design protects contents even when shipped by UPS™, air freight, etc.

Section 4 LIBRA PLUS OPERATION DISPLAYS

A/C Power Supply (continuous sampling)

The Standard Battery Charger for BUCK pumps, will supply enough power to operate the Libra Plus Pump continuously while sampling. Simply plug the charger into the battery pack into 120 VAC outlet and turn the pump on to sample.

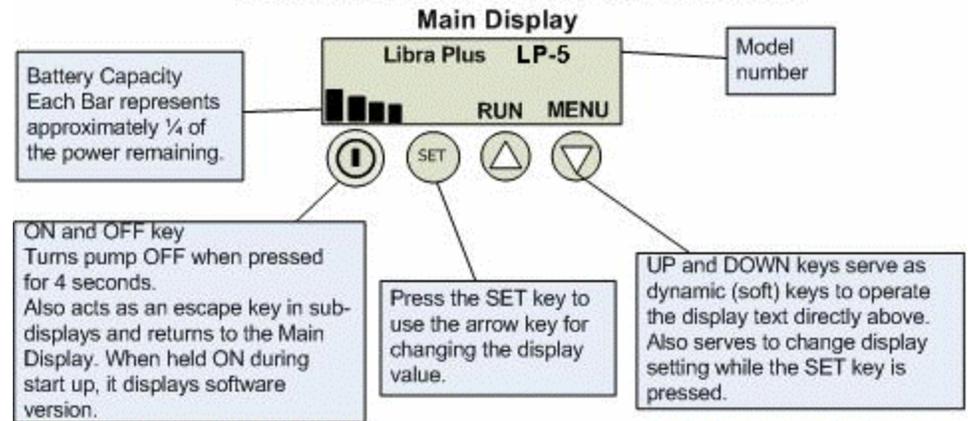
Interchangeable Batteries

The BUCK-Libra Series incorporates a unique system of interchangeable batteries to provide additional flexibility in sampling. A Triple Pack is available for extended run times. All run times are tripled from those stated for a single Standard Pack.

Battery Pack

The *BUCK-Libra Series* Standard Battery Pack consists of four nickel metal hydride batteries. The batteries are rated at 2150mA hour capacity. The QuickOne™ and QuickFive™ Battery Chargers connect to the back of each battery case; by lifting the protective rubber cover, the charger lead can be easily inserted. A Triple Battery Pack may be substituted for the standard battery pack to provide three times as much battery capacity for the Libra Plus. When a Battery Pack or pump with Battery Pack is connected to a BUCK QuickOne™ or QuickFive™ Charger, a yellow LED (CHARGING) will indicate the charging cycle has begun. The charge cycle takes approximately one hour for the single packs and 3 hours for the triple packs. When the charging cycle is completed, a green LED will light (READY) indicating end of cycle. Individual battery packs may be charged independently of the pump if required. The pump may be left connected to the charger in “trickle charge” indefinitely. Battery pack cases are connected to the pump case bottom with four self-retaining screws.

Caution: Never charge batteries in hazardous areas.



A MENU Display

Protection Mode
Key Lock Yes No

Key Lock Display

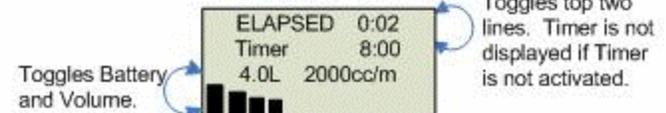
Enter Key Lock
4 seconds

The Key Pad Lock is activated from the MENU “Protection Mode Keypad Lock”. Only during sampling does it function when activated. To unlock the proper key sequence must be press within 4 seconds. Unsuccessful unlock will return to the sampling display.

Unlock is by pressing the keys one at a time from left to right (all four). 1st ON/OFF 2nd SET 3rd UP arrow 4th Down arrow

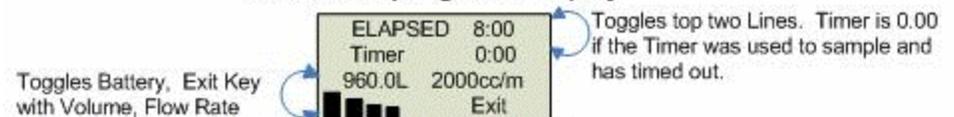
Unlocked returns to Main Display for turn off. It will relock when Run is started.

Sampling Display



The Sampling Display remains on the entire sampling time. To exit from Run Mode press the ON/OFF key for 4 seconds. If the Key Lock is activated the unlock code must be entered first, then the pump will stop and return to the Main Display. Press the ON/OFF for a 4 second count down to turn pump off.

Saved Sampling Data Display



This display appears first when the pump has been stopped and turned off. The pump motor is off to enable the saved sampling data to be reported. Pressing the Exit key (down key) will return to the Main Display to allow resumption or setting of pump.

Section 4

LIBRA PLUS OPERATION DISPLAYS

Contued

Flow Fault Displays

Flow Fault will occur when the the pumps constant flow control system cannot maintain the flow at $\pm 5\%$ of the set point. There are two events that cause Flow Fault , Flow Blockage and Filter Off. Either of these events stops the pump and saves the sampling data until conditions are cleared to resume sampling.

Flow Default Exit	Flow Fault Retry 1 Exit	Flow Fault Retry 2 Exit	Flow Fault Retry 3 Exit
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This display will appear if pump has turned off for Flow Blockage

This display will appear if pump flow is blocked or filter is plugged and cannot maintain $\pm 5\%$. It will attempt to restart for 30 seconds

This display will appear after Retry 1 and will attempt to restart for 30 seconds

This display will appear after the Retry 2 and will turn pump off.

Flow Blockage will stop pump and sequence through the 3 retries as shown above. After a minute it turns the pump off. When the pump is restarted it will return to first display, press the down key to Exit. Automatic restart will be attempted during the Fault Display. If during the attempted restarts the flow can resume the pump goes back to the Sampling Display.

Filter Off Exit

Filter OFF will be displayed if the sampling filter or hose has become disconnected. Pressing the Exit down key will return to the Main Display. In Filter Off display the pump will turn OFF after five minutes. Pump sampling data is saved in memory. Replacing the filter/hose and pressing the Run key in the Main Menu will resume sampling.

Section 8

BATTERY CHARGERS and A/C Power Supply

Note: The **BUCK QuickOne™** and **QuickFive™** Battery Chargers are designed to charge only the Nickel Metal Hydride (NiMH) battery packs for the **BUCK-Libra Plus Pumps**.

BUCK QuickOne™ and QuickFive™ Battery Chargers Description

The **BUCK QuickOne™** and **QuickFive™** Chargers are microprocessor-controlled battery chargers providing an entirely automatic battery charging cycle in approximately one hour. The pump battery pack can be recharged with or without the pump connected. When inserting the charger lead into the battery pack socket, first lift up the protective rubber cover. The charger uses a voltage/temperature detection technique that provides a full recharge. When plugged in, the Yellow and Green LED light to indicate the microprocessor is functioning and the charging cycle is in progress (“Yellow”) and finished or ready (“Green”).

The **QuickOne™** and **QuickFive™** Chargers will charge a completely discharged pump battery in one (1) hour. Three (3) hours for the optional Triple Pack with a fully discharged pack. After a full charge, a trickle charge cycle (“Green” LED) will begin. Batteries may be left in trickle charge indefinitely.

The charger is designed to operate from a 100 - 240 VAC. The charger begins operation automatically when plugged in to an AC source.

Operation

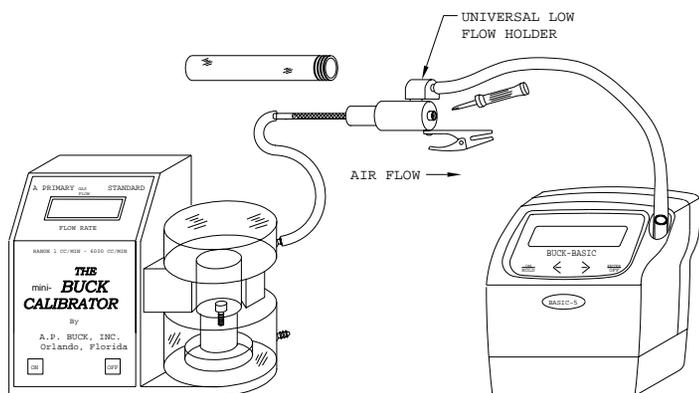
When plugged in, the “Charging” light will indicate Yellow (ON). When the green light turns ON and Yellow turns OFF, the batteries are fully charged.

Standard Charger

The Standard Charger is designed to charge the BUCK PUMP NiMH battery single pack in 16 hours. The connection is made through the same charge port on the rear bottom of the battery pack. The RED LED light on the A/C charger will light. After 16 hours, the pump batteries will be fully recharged for portable operation. The battery pack can be charged either on or off the pump. Note: The Standard Charger is not recommended for the Triple Packs.

Section 7

LOW FLOW TUBE SAMPLING (5 to 800 cc/min.)



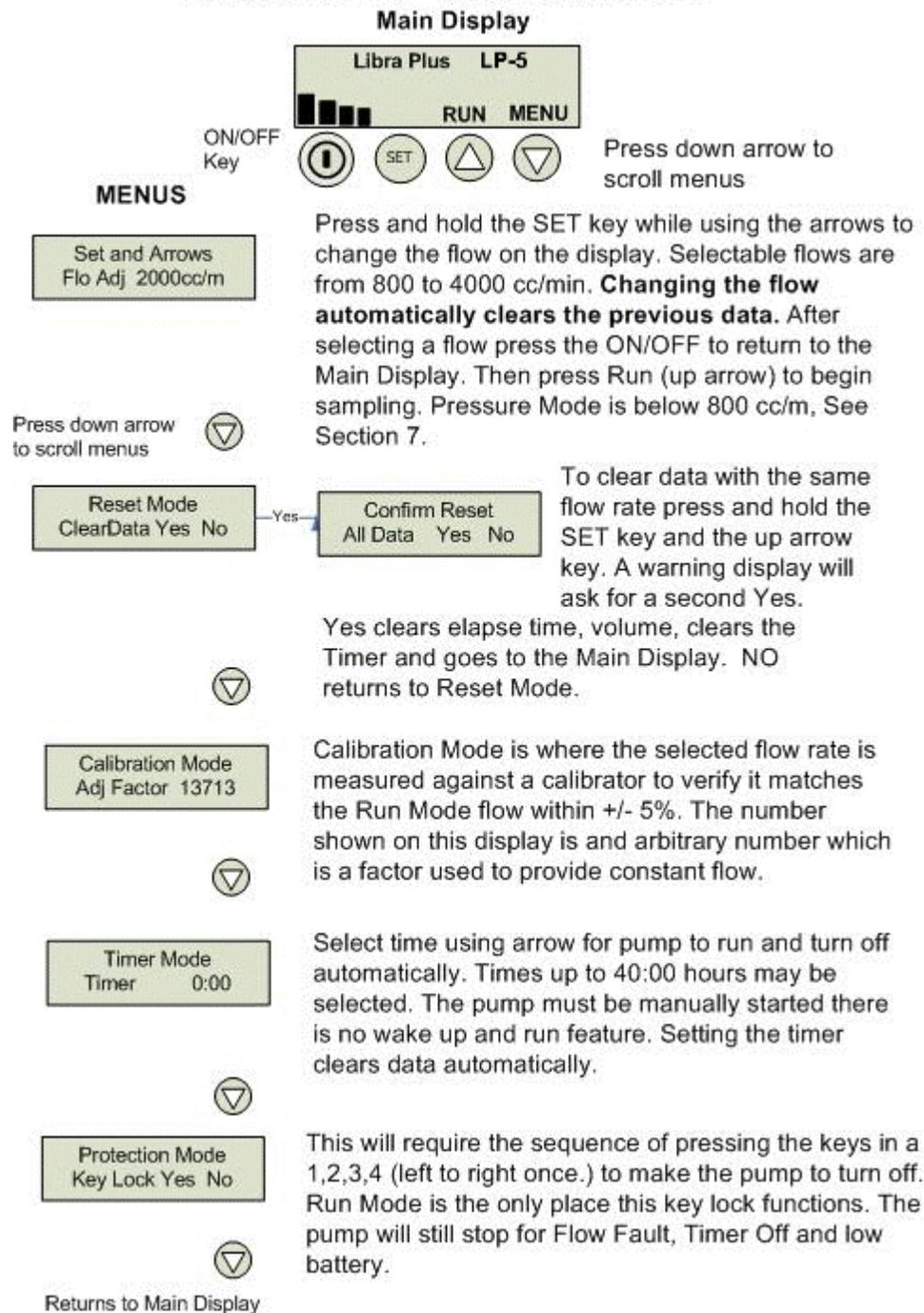
Using the setup as shown above, flows of 5 to 800 cc/min. may be collected in adsorbent tubes (charcoal, silica gel, etc.). **NOTE:** first set up sorbent tube in Tube Holder with proper tubing before turning pump on.

Low Flow Sampling Procedure:

1. The pump must be in **PRESSURE MODE** under *Flow Adj. MENU*. Arrow the flow below 800 cc/m. This will place the pump in Pressure Mode and turn on the pump motor to operate at a set speed.
2. Using the mini-BUCK Calibrator M1 (0.1 to 300 cc/min.) or M5 (1 to 6000 cc/min.), measure the flow through the adsorbent tube as shown above. Use a screw driver to adjust the flow to the desired rate.
3. Once the sample flow rate has been set, press the SET and Arrow key to match the measured flow on the Calibrator. An accuracy flow of $\pm 5\%$ will be maintained throughout the sampling day. In Run Mode the flow rate will be displayed and the accumulating volume will be accurate.
4. Some new higher flow thermal desorption with higher backpressure tubes may be used in "Constant Flow" Mode with the non-adjustable tube holder (P.N. APB-109032) for flow above 800 cc/min.

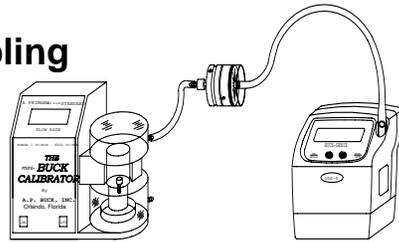
Section 4

LIBRA PLUS OPERATIONAL MENUS



Section 5 Filter Cassette Sampling

Note: Connect a representative sampling filter cassette using 1/4 inch tubing to the pump prior to setting Flow Rate.



Main Display



ON and OFF key
Also acts as an escape key
in sub-displays and returns
to the Main Display

Press the SET key
to use the arrow
key for changing
the display value.

UP and DOWN keys serve
as dynamic key to operate
the display text directly
above. Also serves to
change display setting while
the SET key is pressed.

Setting the Flow rate

1. Connect sampling filter with a hose to the pump.
2. Turn on the pump by pressing the ON key.
3. Next press the down arrow to the Flow adjust Menu.
4. Press and hold the SET key and use arrows to adjust flow.
(This clears all previous data).
5. Releasing the SET key will store the flow rate.
6. Press the ON/OFF key to return to Main Display, then press the up arrow (RUN) to begin sampling.

Set and Arrows
Flo Adj 2000cc/m

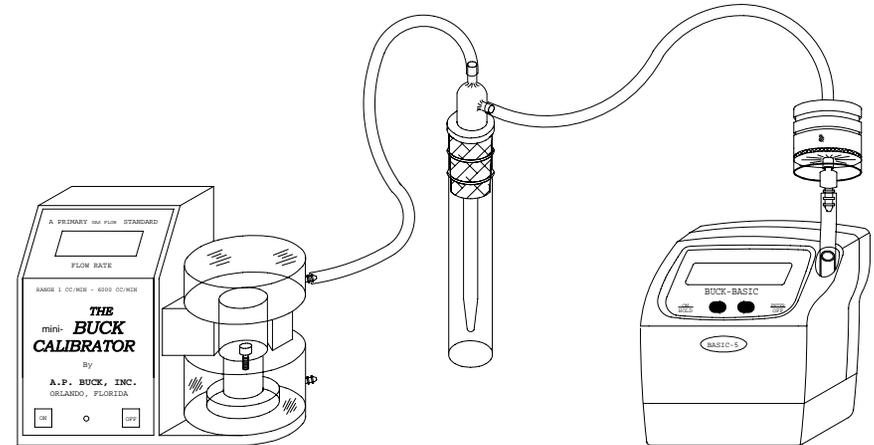
To clear all sampling data and sample at the previous flow rate, from the Main Display press the down arrow key twice to the "Clear Data Menu". Press and hold the SET key and press the up key for Yes clear data. Press the ON/OFF key to return to the Main Display and press up arrow to begin sampling.

Pump calibration Adjustment if needed at point of Flow Set

1. To measure the flow rate have a Calibrator ready and connected to the filter as shown above.
2. From the Main Display down arrow to the Calibration Mode.
3. Press the SET key and release, pump begins to flow at preset flow rate from the steps above.
4. Measure flow, if it matches +/- 5% of setting, press the ON/OFF key and resume sampling. Press and hold the SET key to adjust the Factor for the pump speed to match desired flow rate.
5. Press ON/OFF to return to Main Display and begin sam-

Calibration Mode
Adj Factor 13713

Section 6 Bubbler and Impingers Sampling



CAUTION: FIRST SET THE FLOW WITHOUT SOLUTION IN BUBBLER. The default flow rate at 2000cc/min. or previously selected flow may be too fast and draw bubbler solution into the pump. Generally, 1,000 cc/min. is the flow of choice.

Connect a standard 37mm three piece filter cassette (with a 0.8 micron filter in place) close to the inlet of the pump. This serves as a protective trap to prevent any fluids from being drawn into the pump.

1. Attach a bubbler using desired length of hose to the input of the cassette, so the order of the sampling train from right to left (traveling upstream of the flow) is pump, cassette and then bubbler as shown in drawing. Set flow at 1,000 cc/min
2. Turn pump off, and next add solution to bubbler and reinstall flow tube to holder.
3. Press Run begin sampling. Even though different brands of bubblers/impingers have varying amounts of flow resistance, the *BUCK-Libra* Series Pumps will operate at the pre-selected flow.