

# Gilian 5000

## Air Sampling Pump

### Operation Manual



**SENSIDYNE®**

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**REF 360-0103-01 (Rev A)**

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## WARNINGS

### **READ AND UNDERSTAND ALL WARNINGS AND INSTRUCTIONS BEFORE USE**

Failure to read, understand, and comply with ALL accompanying literature, product labels, and warnings could result in property damage, severe personal injury, or death.

Read and understand ALL applicable environmental health and safety laws and regulations. Ensure complete compliance with ALL applicable laws and regulations before and during use of this product.

DO NOT remove, cover, or alter any label or tag on this product, its accessories, or related products.

UNDER NO CIRCUMSTANCES should this product be used except by qualified, trained, technically competent personnel.

The Gilian 5000 portable Air Sampling Pump is intended for both indoor and outdoor use when protected from splashed or wind blown liquids. The unit is not waterproof so NEVER submerge the unit in water. Pump failure or faulting may result.

Pump is Intrinsically Safe when used with specified battery pack 783-0007-01. Refer to Certifications and Approvals section for approval ratings.

DO NOT operate this product should it malfunction, require repair, or have a cracked or broken case.

DO NOT repair or modify, except as specified in Operation Manual. All user controls and adjustments are made by sealed keypad on front of pump. The only user-replaceable parts are the Battery pack, Pump Filter, and optional Low Flow Adapter with filter. (See Section Four and Appendix C).

Use ONLY specified Sensidyne parts when performing maintenance procedures described in this manual. Intrinsic safety certifications become void by substitution of components, unauthorized repair or alteration. All other Service to be performed by Sensidyne Authorized Service Departments only. (See Appendix A for Parts List. See Appendix E for Service Contact Information).

This product uses rechargeable Nickel-Metal-Hydride batteries. Always fully charge before use. DO NOT open case, charge or replace batteries in an explosive atmosphere. Use only battery pack and chargers specified in Parts List. Do not insert any foreign objects into the battery charging jack. Do not insert any foreign objects into the battery connection slot at the top of the battery pack. Shorting the contacts will blow the protective fuse. DO NOT operate pump while charging. Caution: Both charger and battery become warm during charging.

If the equipment is can come into contact with aggressive substances, then it is the responsibility of the user to take suitable precautions that prevent it from being adversely affected, thus ensuring that the Intrinsic Safety protection is not compromised. Aggressive substances are acidic liquids or gases that may attack metals, or solvents that may affect polymeric materials or other solvents or corrosives. Suitable precautions are regular checks as part of routine inspections and establishing from material data sheets that chemicals known to be present do not affect material of the pump (polycarbonate, polyphenylene, epoxy).

DO NOT operate with a dirty or blocked inlet filter or kinked tubing. Pump failure or faulting may result.

If further translation is required, please contact the Sensidyne EU Authorized Representative (see Appendix E for contact information).

# Certification and Approvals

## Gilian 5000 Air Sampling Pump REF 610-0801-01



NEC/CEC I.S. CL I, DIV 1, GPS A, B, C, D  
 CL II, GPS E, F, G,  
 CL III T4  
 Ta = -20 to +45°C



II 1 G Ex ia IIC T4 Ta = -20 to +45°C FM 07ATEX0018X

ATEX Explosion Protection:

II = Equipment Group

1 - Equipment Category

G = Hazardous Gases, vapors or mists

Ex = Explosion Protection equipment in compliance with EN/IEC/CAN/ANSI  
 60079 Standard Series

ia = Intrinsic safety protection method

IIC = Gas group

T4 = 135°C, maximum external surface temperature

Ta = -20 to +45°C ambient temperature range

### Approval Standards:

#### United States:

FM 3600 1998

FM 3610 2007

ANSI/ISA 60079-0 2005

ANSI/ISA 60079-11 2002

#### Canada:

CSA/CAN C22.2 No. 157 1992

CSA/CAN C22.2 No. 157 1992

CAN/CSA E60079-0-02 2002

CAN/CSA E60079-11 2002

#### International

IEC 60079-0 Ed. 4.0 :2004

IEC 60079-11 Ed. 5.0 :2006

#### Europe:

EN 60079-0:2006

EN 60079-11:2007

**Complies with EN1232:1977 Type P**

## SECTION ONE

### Introduction

- **Components**

**See Figure 1.1**

(1) Filter Housing Assembly (Inlet Port)

(2) Belt Clip

(3) Battery Charging Jack (with cover)

(4) 4-button Keypad

(5) Operation LED (Green). Flashes when the pump is functioning normally.

(6) Liquid Crystal Display (LCD)

(6.1) Ready Mode display alternately shows the Set Flow Rate, Sample Time, and Total Volume Sampled. Sampling display alternately shows the Live Flow, Sample Time, and Total Volume Sampled. Displays "FLO," "CAL," "Clr" during selection of those operations.

(6.2) **VOL & L.** Shows total volume sampled (liters).

(6.3) **MIN.** Elapsed time during sampling.

(6.4) **CC/MIN.** Displays set flow rate (Ready Mode) or live flow rate (Sampling Mode).

(6.5) **SET.** Appears during Set Flow Rate Mode and Calibration Mode.



Figure 1.1  
Gilian 5000

(6.6) **FAULT.** Appears when pump cannot maintain flow within  $\pm 5\%$ .

After fault shutdown pump attempts to restart every 3 minutes for 30 minutes.

**FAULT** appears when pump is initially turned on, but disappears when pump reaches preset flow rate.

(6.6) **HOLD.** If, after 30–35 seconds, fault cannot be corrected, pump stops and **HOLD** appears

(6.7) **HRS.** Shows number of run hours since last flow calibration. Pump must be calibrated every 200 run hours or every 30 days.

(6.8) **Battery Indicator.**

3 bars = High charge

2 bars = Medium charge

1 bar = Low charge

---

**NOTE**

The Gilian 5000 automatically calculates the total air volume sampled using the following formula:

$$\text{Total Air Volume (Liters)} = \text{Air Flow Rate (cc/min)} \times \text{Sample Time (minutes)} / 1000 \text{ cc/Liter}$$

OR

$$\frac{\text{AFR} \times \text{ST}}{1000}$$

---



## SECTION TWO

### Setup

#### 2.1 Preparation

NiMH battery pack must be fully charged (about 4 hours). Refer to Section Four for battery maintenance.

Charge battery pack through built-in jack. Battery pack may be charged while attached to pump, or separately.

---

#### **CAUTIONS & NOTES**

Both charger and battery pack become warm during charging.

Charger switches automatically to trickle mode when battery is fully charged. **DO NOT** operate pump while charger is attached.

Do not short battery terminals. Shorting will blow internal fuse.

---

## 2.2 Pump Start-Up

- Power Up (see Figure 2.1)

Press and release POWER button (1).

### **Start-Up Sequence (approx. 10 seconds):**

Self Test screen (2)

Version No. screen (3)

Last Cal screen (4)

Screen shows number of run hours since last calibration.

- **Ready Mode**

After start-up, pump enters Ready Mode (5).

In Ready Mode display cycles through following screens:

Flow Rate Set Point (6)

Total Sample Time (7)

Total Volume Sampled (8)

If no buttons are pushed, Ready Mode continues cycling through screens for 75 minutes then turns off.

To begin sampling go to Section 3.1 (Starting The Sample Run).

- **Power Down**

Press and hold POWER button until unit turns off (3–4 seconds). Display will show “OFF” before shutting down.

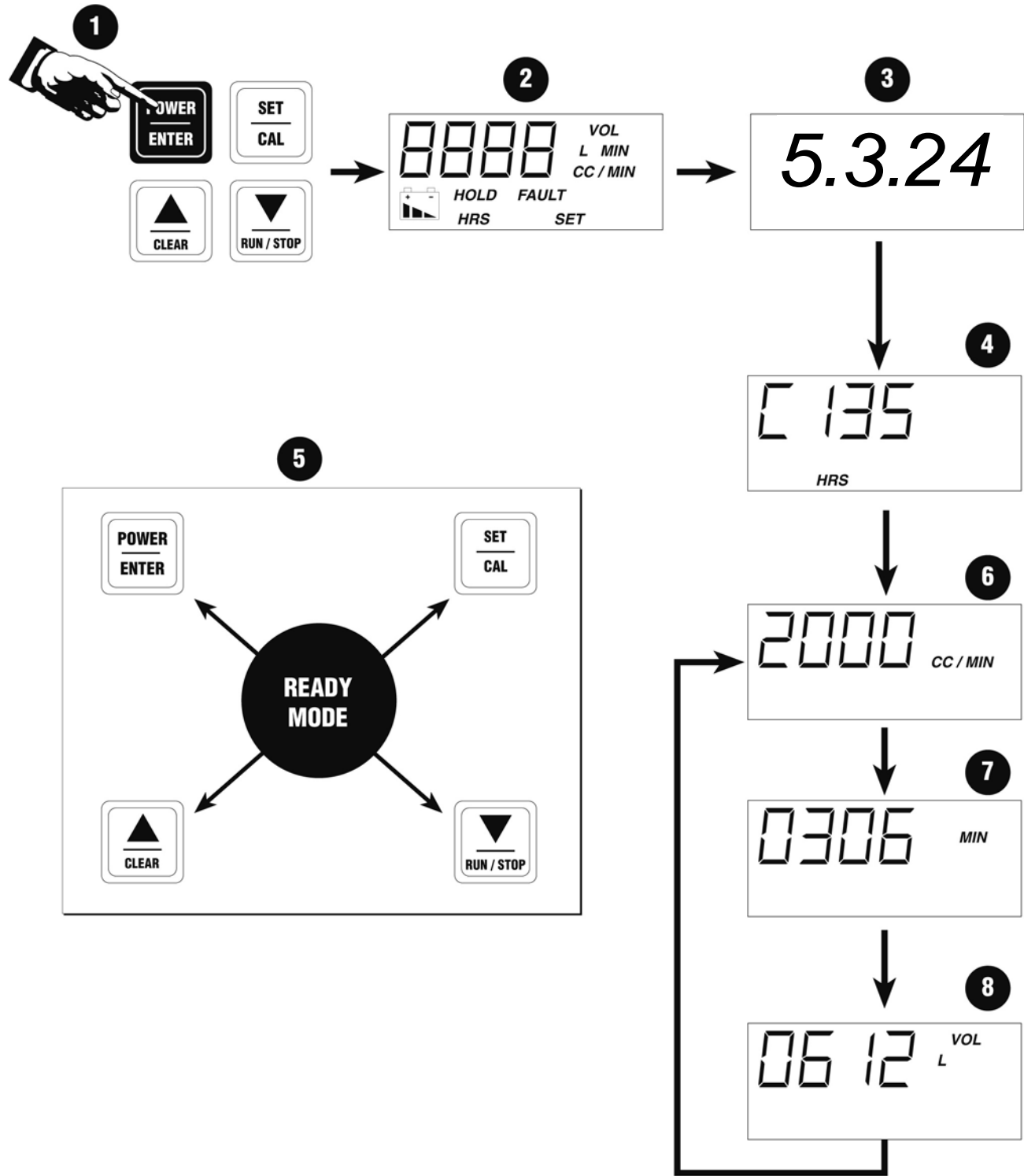


Figure 2.1  
Power-Up / Ready Mode

## 2.3 Setting The flow Rate

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### NOTE

This section is required only if you are changing pump flow rate. If you're using previously set flow rate, simply verify it using a Gilibrator 2 (see Section 2.4.2).

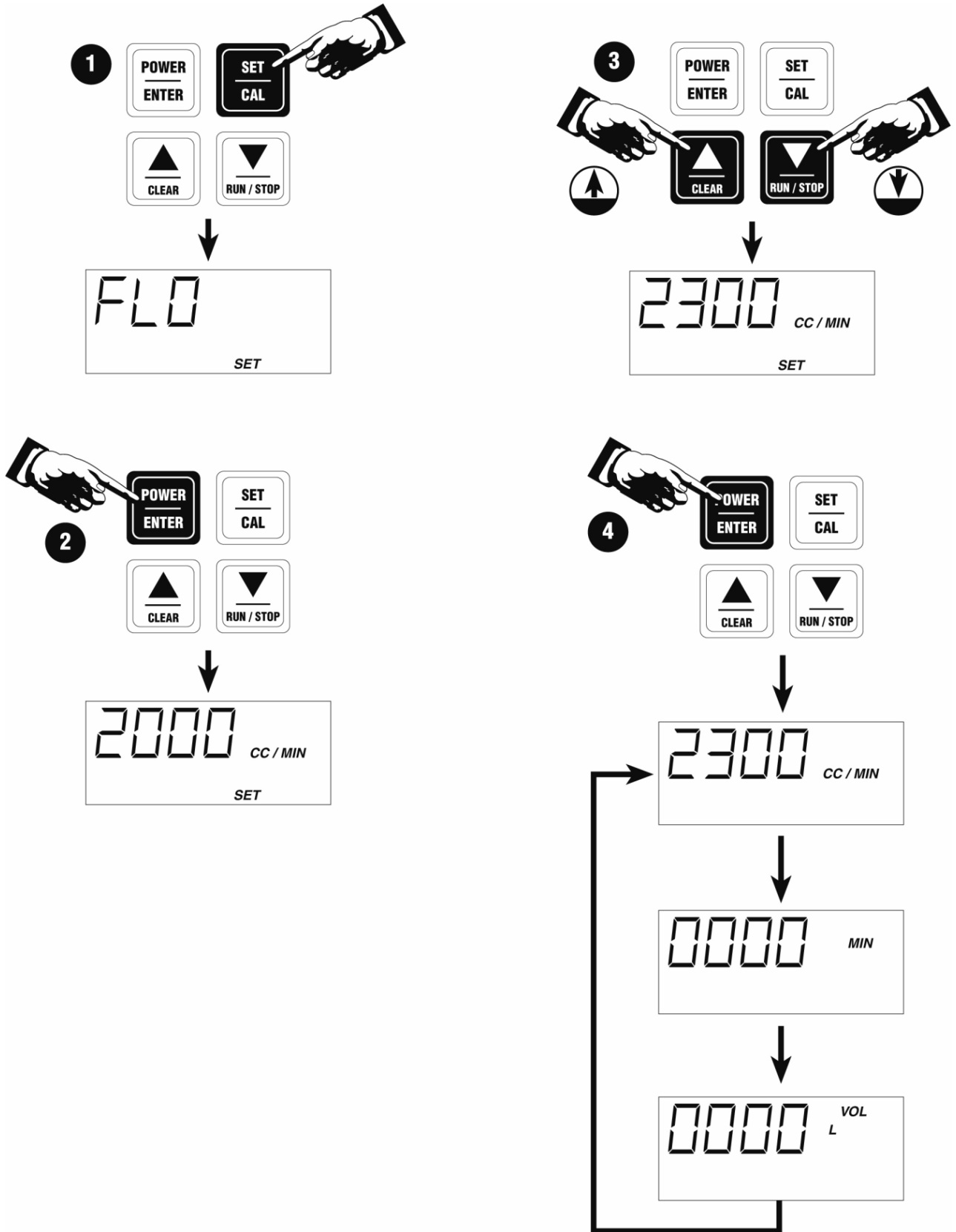
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### See Figure 2.2

If pump is off, press POWER button.

- (1) When pump is in Ready Mode, press SET button once. "FLO" is displayed.
- (2) Press ENTER button to begin setting the flow rate.
- (3) Press and hold ▲ button to increase flow rate set point or ▼ button to decrease flow rate set point.
- (4) When desired flow rate set point is reached press ENTER button. Elapsed Time and Total Volume will be cleared.

Go to Section 2.4 to calibrate pump.



**Figure 2.2**  
Setting The Flow Rate

## 2.4 Calibration

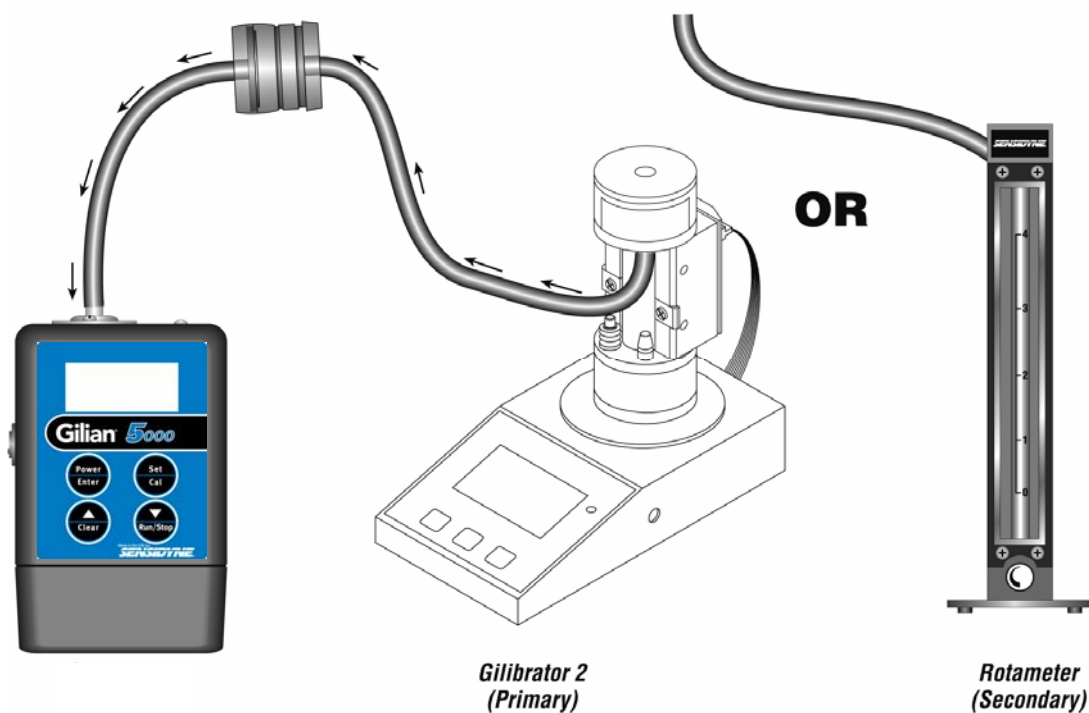
The pump should be calibrated at least every 30 days, for optimum accuracy of the displayed flow. Calibration is also recommended when a new flow is chosen. Use the set-up method described in 2.4.1 followed by the calibration procedure in 2.4.2.

### 2.4.1 Sample Media Method Set-Up

- See Figure 2.3

- (1) Prepare a Gilibrator-2 using a standard wet cell.
- (2) Choose a sample media either the same or of similar back pressure to that used in the field.
- (3) Attach 1/4" ID tubing from pump to media and from media to Gilibrator-2.

Proceed to Section 2.4.2 for display calibration procedure.



**Figure 2.3**  
**Sample Media Method Set-Up**

### 2.4.2 Display Calibration Procedure

- See Figure 2.4

Before performing display calibration, the pump, must be set up following Section 2.4.1.

---

**NOTE**

To exit Calibration Mode without changing any values, simply press ENTER twice. This action will also reset the hours since last calibration.

---

If pump is off, press POWER button.

- (1) At Ready Mode, press SET/CAL button twice.
- (2) Press ENTER button to enter Calibration Mode. "SCAL" is displayed for 10 seconds, then, pump motor starts running. The set flow rate is displayed.
- (3) Measure flow rate using Gilibrator-2.

---

**NOTE**

Actual pump flow rate is displayed on Gilibrator 2.

---

- (4) Adjust pump display to match actual flow rate on Gilibrator 2. Press and hold ▲ button to increase. Press and hold ▼ button to decrease.
- (5) When pump display matches Gilibrator 2 display press SET button.  
  
Pump motor continues running and adjusts speed to deliver adjusted flow rate. Pump display changes to show the newly calibrated flow rate.
- (6) Continue to measure live flow rate on Gilibrator 2. If pump display does not match measured Gilibrator flow rate within a few cc's, you may repeat Steps 4 and 5 until display shows the actual flow rate. When the displays DO match, go to Step (7).
- (7) Press ENTER button again to complete calibration.

The pump stops before returning to Ready Mode.

**Note On Field Calibration**

The above display calibration procedure serves to make internal pump adjustments and improve the accuracy of the flow display. It does not replace field calibration as described by OSHA and NIOSH. A flow verification using the Gilibrator and the exact field sampling train should be conducted before and after each field sample. Procedures for field calibration may be referenced in the *NIOSH Manual of Analytical Methods* at [www.cdc.gov/niosh](http://www.cdc.gov/niosh) or in the *OSHA Technical Manual* at [www.osha.gov](http://www.osha.gov).

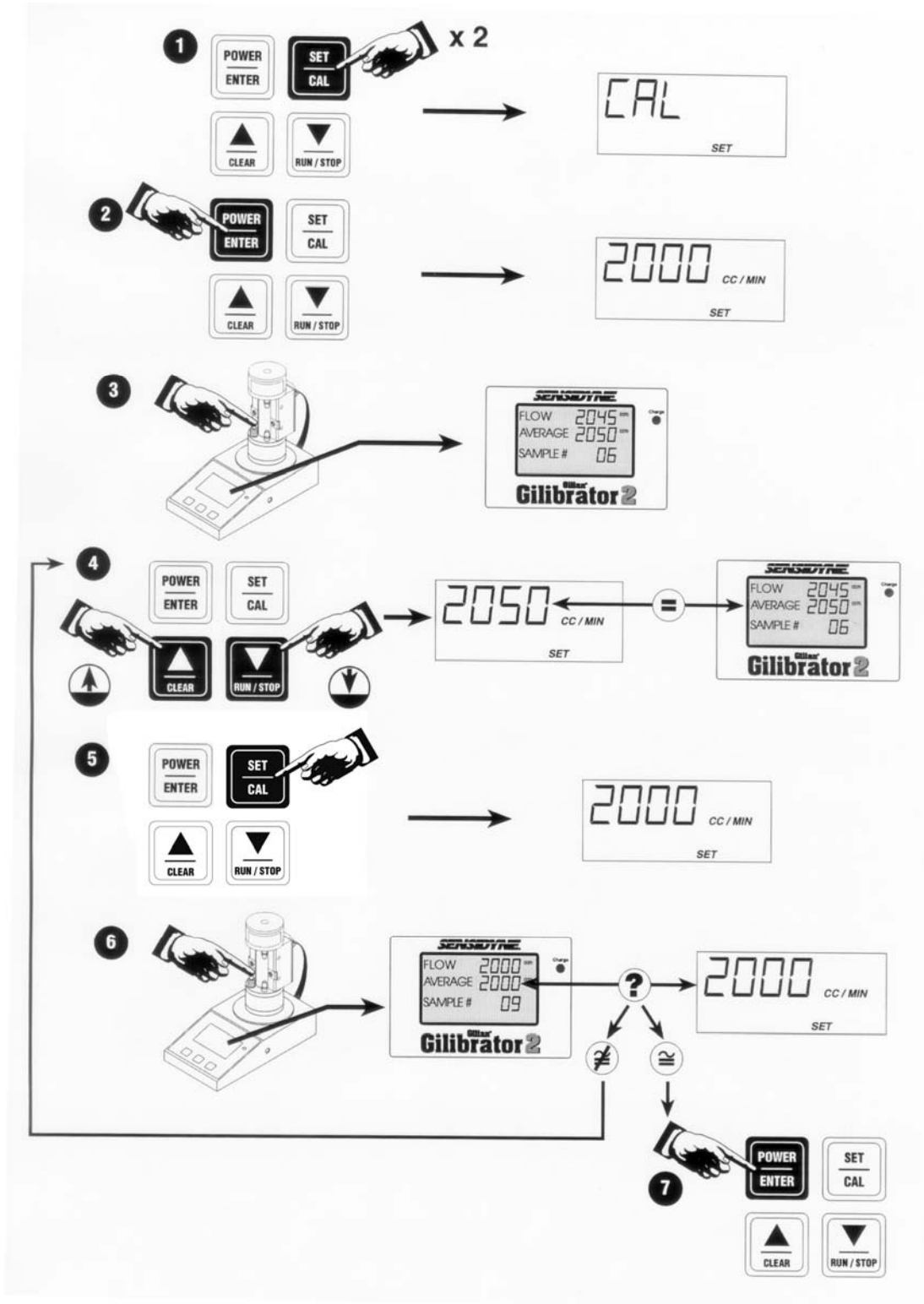


Figure 2.4  
Display Calibration Procedure



## SECTION THREE

### Operation

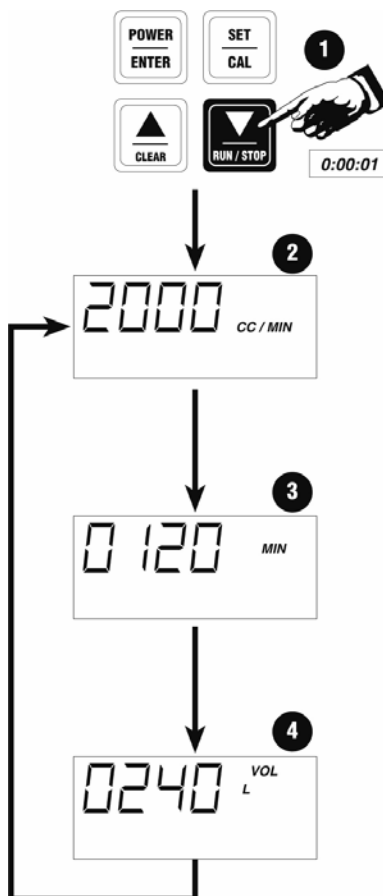
#### 3.1 Starting The Sample Run

**NOTE: Total Run Time and Total Volume Sampled are cumulative from one sample run to the next unless you reset the flow rate, clear the display, or calibrate the display. If you want to clear the values before starting a sample run, see Section 3.5 for instructions on clearing the run data.**

Make sure pump is fully charged, that flow rate has been properly set, and that the pump has been field calibrated using actual sampling set-up. Make certain all sample tubing and any sample media have been properly installed.

- If pump is turned off, press POWER button to turn power on.
- Press and **hold** the RUN button [1] until “SCAL” is displayed, then release button. Pump motor will start 10 seconds later. **Note:** “SCAL” indicates pump is doing an internal Self Adjustment. This self adjustment may occur during the course of a sample if the temperature changes by more than 3°C. The pump is not operating and the clock does not count the time while the pump is in the SCAL mode.
- After the pump starts, the controls may be locked if desired. (described in section 3.3)

During sampling, pump alternately displays following screens: Live Flow Rate (cc/min) [2], Total Run Time (min) [3], Total Volume Sampled (liters) [4].



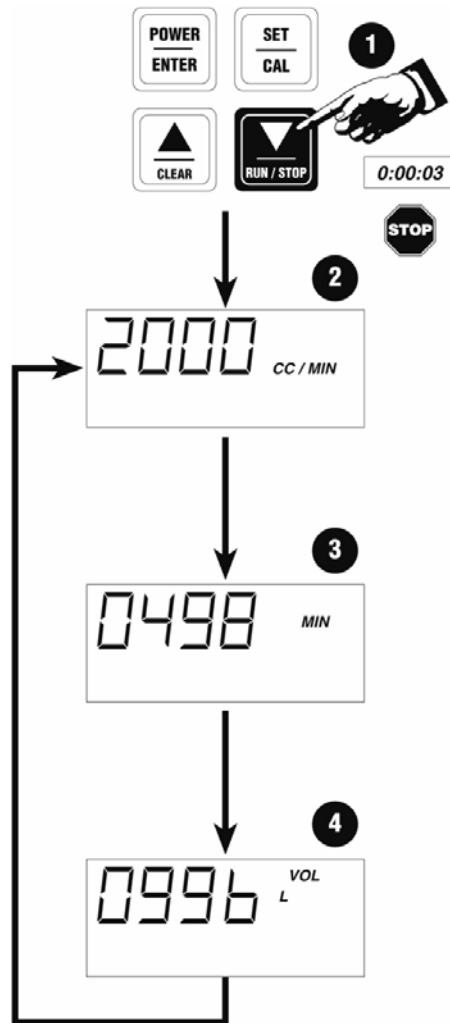
### 3.2 Stopping The Sample Run

- Press and **hold** the STOP button [1] until pump motor stops.
- Pump alternately displays following screens: Set Flow Rate (cc/min) [2], Total Run Time (min) [3], Total Volume Sampled (liters) [4].

#### NOTE

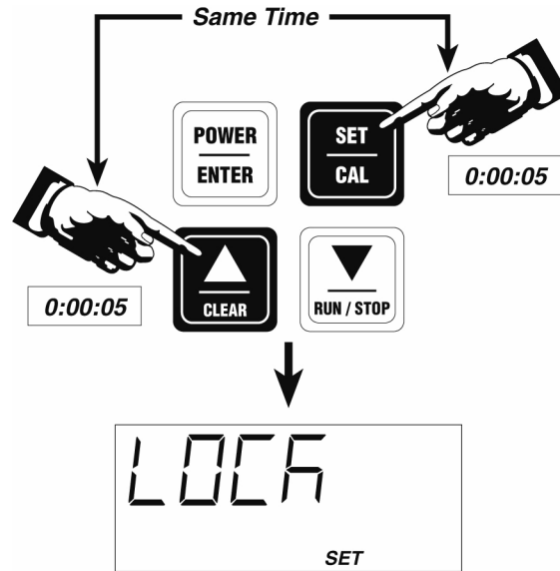
If the pump motor does not stop, go to Section 3.4 to unlock the keypad.

- You may power down by pressing and holding the POWER button for 4-5 seconds. The display will show “OFF” before shutting down. Sample data will be retained until the clear run function is performed (section 3.5).



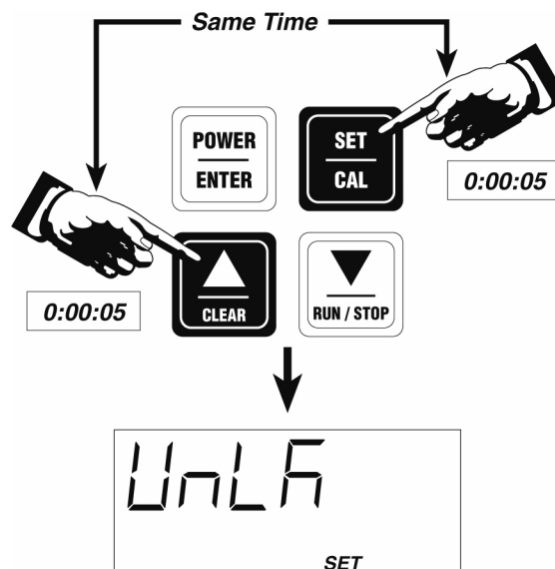
### 3.3 Locking The Keypad

The keypad can be locked during sampling to prevent tampering. To lock, press and **hold** both buttons for 5 seconds. After locking, the unit returns to normal sampling after 2-3 seconds.



### 3.4 Unlocking The Keypad

To unlock, press and **hold** both buttons for 5 seconds. After unlocking, the unit returns to normal sampling after 2-3 seconds.



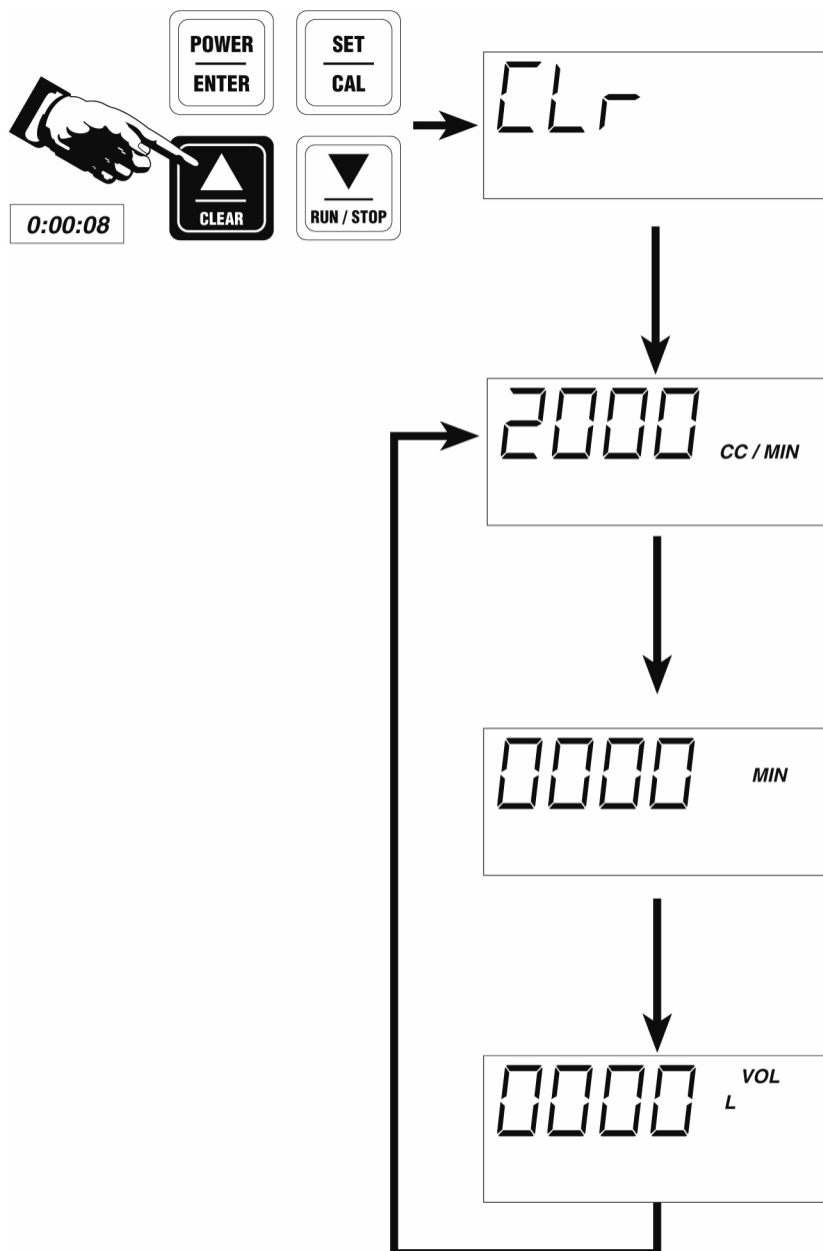
### 3.5 Clearing The Run Data

- If the pump is off press POWER button.
- Wait until Ready Mode, then press and hold CLEAR button for 8 seconds. The pump will display “CLr”, and the “CLr” display will flash for a total of 8 seconds. As long as “CLr” is displayed the data can be saved by releasing the CLEAR button.

#### NOTE

If you remove the battery pack before powering down the pump, all stored data will be lost.

**NOTE: Changing the flow rate will also clear previous run data.**



## SECTION FOUR

### Maintenance

#### 4.1 Battery Maintenance

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#### NOTE

- Do not charge or replace battery pack while in an explosive atmosphere. Use only Sensidyne charger PN 298-0013-01 or other charger designated for Gilian 5000.

The Gilian 5000 pump uses rechargeable Nickel-Metal-Hydride batteries that must be fully charged and properly maintained for maximum run time. The battery pack has a charge time under 4 hours using Fast Charger (PN 298-013-01). Battery pack may be charged separately or while on the pump.

Make certain charger plug is fully inserted into jack on battery pack (see Figure 1.1, #4 for charger jack location).

See Appendix D for more information on charger operation.

After charging is complete, make certain the rubber jack cover is plugged back into the charging jack to protect the jack during operation.

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#### CAUTIONS & NOTES

Both charger and battery pack become warm during charging.

Charger switches automatically to trickle mode when battery is fully charged. **DO NOT** operate pump while charger is attached.

Do not short battery terminals. Shorting will blow internal fuse.

---

All NiMH batteries lose charge when not in use. If battery pack has not been charged for 3-4 days, recharge battery before use. This ensures that batteries are fully charged just prior to sampling. NiMH batteries stored for extended time periods should be recharged every 1-2 months to avoid complete discharge.

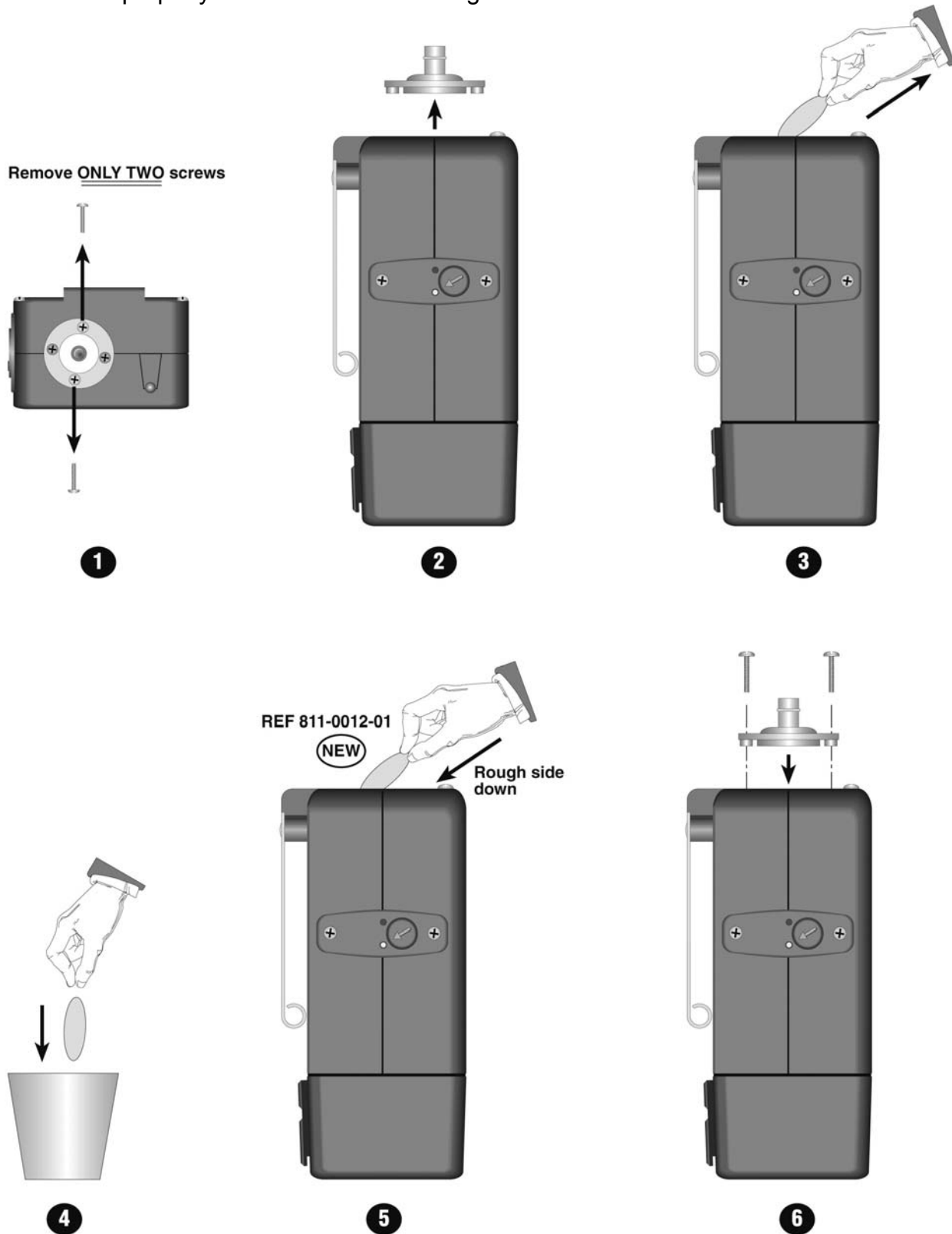
Battery pack has an estimated life of 300–500 charge/discharge cycles, depending on use. Table below shows estimated battery life based on usage level.

#### **Pump Usage Weekly Use Est. Battery Life**

High.....	40-60 hrs.....	1.0-1.5 yrs
Medium .....	20-39 hrs.....	1.5-2.5 yrs
Low.....	< 20 hrs.....	2.5 yrs

## 4.2 Pump Filter Maintenance

Change internal pump filter PN 811-0012-01 when it is dirty or damaged. Reuse o-ring and ensure it is properly seated when reinstalling.



# APPENDIX A

## Parts List

- Spare PARTS & ACCESSORIES

Part Number	Description
811-0802-01	Single Charger 100-240Vac, 50-60 Hz, US Cord
811-0802-02	Single Charger 100-240Vac, 50-60 Hz, Euro Cord
811-0802-03	Single Charger 100-240Vac, 50-60 Hz, UK Cord
298-0013-01	Single Charger 100-240Vac, 50-60 Hz, No Cord
811-0801-01	Five Unit Power Pack 100-240Vac, 50-60 Hz, US Cord
811-0801-02	Five Unit Power Pack 100-240Vac, 50-60 Hz, Euro Cord
811-0801-03	Five Unit Power Pack 100-240Vac, 50-60 Hz, UK Cord
811-0801-04	Five Unit Power Pack 100-240Vac, 50-60 Hz, No Cord
783-0007-01	Battery Pack
800143	Filter Cassette Kit
811-0012-01	10 Filters
360-0103-01	Operation Manual
360-0104-01	Quick Start Guide
801961	Low Flow Adapter
801980	Fixed Mount Assembly
811-0803-01	Diagnostic Panel & Carrying Case
811-0804-01	Diagnostic Panel with Stand
800149	Tube Holder Kit, Single Tube Holder Kit (No Manifold), 6 x 70 mm
800259	Tube Holder Kit, Single Tube Holder Kit (No Manifold), 7-10 x 110 mm
800148	Tube Holder Kit, Dual Manifold (Holders/Ends/Tubing), 6 x 70 mm
801407	Tube Holder Kit, Dual Manifold (Holders/Ends/Tubing), 10 x 110 mm
200484	Tubing, 36", 1/4" ID
800159	Tubing, 36", 1/8" ID (with 1/4" ID adapter)
200505	Tubing, 36", 1/8" ID

# APPENDIX B

## Specifications

### Performance

Operating High Flow Range .....	1000–5000 cc/min
Accuracy .....	± 5%
Constant Flow control .....	< ± 5% of set flow (after calibration) between 1-5 LPM;
Constant Flow Compensation.....	5000cc up to 24" water back pressure 4000cc up to 30" water back pressure 3000cc up to 50" water back pressure 2000cc up to 60" water back pressure 1000cc up to 70" water back pressure
Flow Fault .....	If flow changes exceed 5%, fault icon appears. If fault exceeds 30 seconds, pump shuts down. Pump attempts to restart every 3 minutes for up to 30 minutes.

### General

Controls .....	Power/Enter, Set/Cal, ▲/Clear, ▼/Run/Stop
Indicators .....	Flashing Green LED ("Normal Operation")
Icons (LCD) .....	Battery Indicator, Hold, Fault, Set
Dimensions .....	3.2" (W) x 5.4" (H) x 2.3" (D)
Weight .....	19.5 oz.
Display (Normal Operation) .....	Live Flow, Elapsed Time & Volume Sampled

### Electrical

Battery Pack .....	Removable, Sealed, Rechargeable Nickel-Metal-Hydride (7.2V)
Battery Level Indicator .....	Icon displays Full, Mid, & Low charge levels
Interface Connectors .....	Charging Jack
Charge Time .....	< 4 hours



# APPENDIX B

## Specifications

### Intrinsic Safety Equipment Ratings:

*(Refer to Certifications and Approvals Section)*

US and Canada.....	Class I, II, III Div 1, Gps A, B, C, D, E, F, G T4 Class I, Zone 0 Group IIC T4
Europe.....	ATEX Ex II 1 G, Ex ia IIC T4

### CE Compliance:

EMC Emissions.....	EN 55011:1998/A1:1999 Group 1 Class B
EMC Immunity.....	EN 61326:1997/A1:1998/A2:2001 IEC 1000-4-2:1995/EN 61000-4-2:1995 IEC 1000-4-3:2002/EN 61000-4-3:2002/A1:2002
EN1232:1997 .....	Type P

### Environmental

#### Temperature

Operating .....	0°C to 45°C (32°F to 113°F)
Storage .....	-20°C to 45°C (-4°F to 113°F)
Charging .....	5°C to 40°C (41°F to 104°F)

#### Humidity

Operating .....	0–85 %RH, non condensing
Storage .....	0–98 %RH, non-condensing

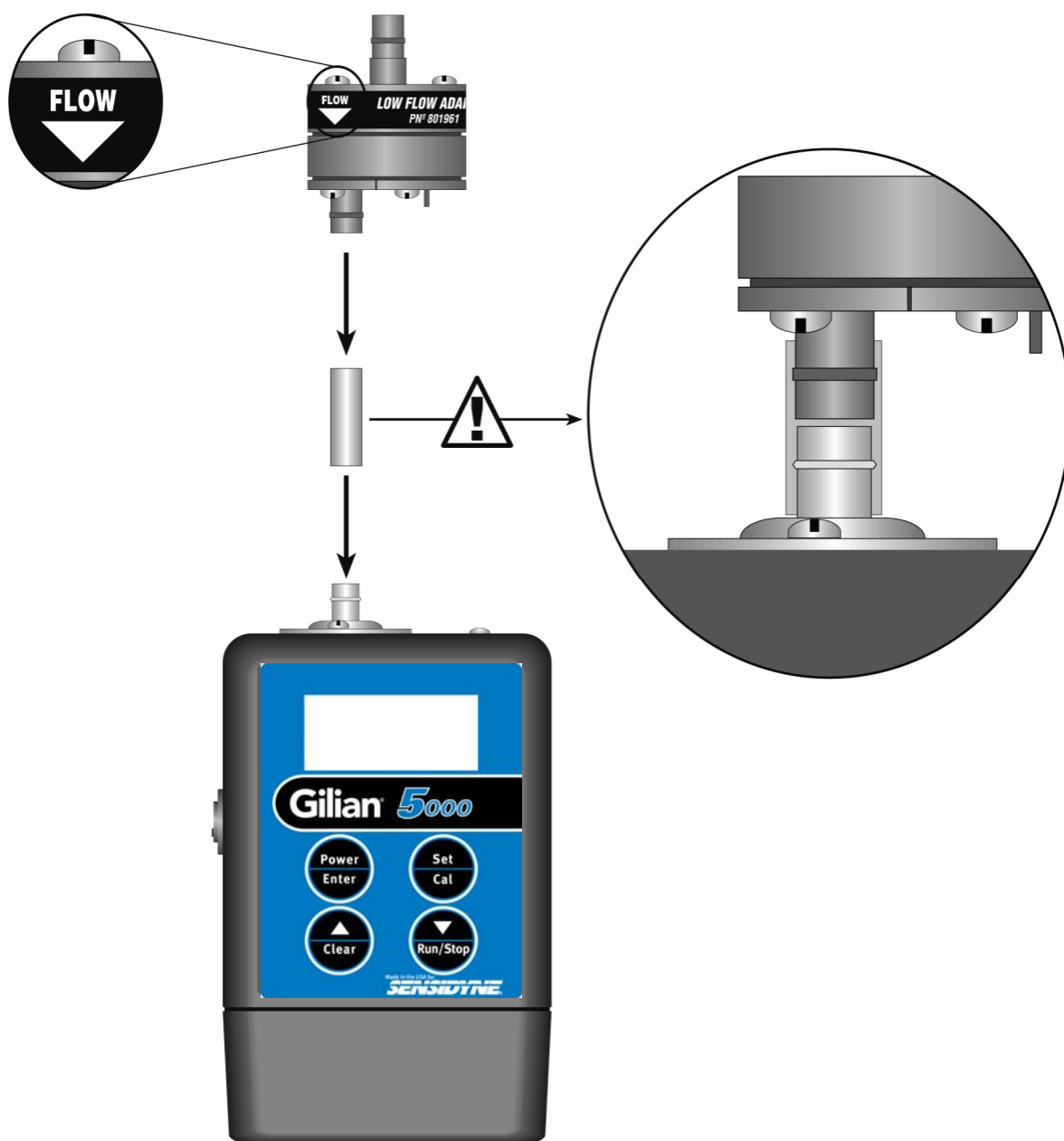
# APPENDIX C

## Low Flow Adapter

- **Direct Installation to Gilian 5000**

Caution: To prevent kinking, connection between low flow adapter PN 801961 and Gilian 5000 should be as short as possible. The two air boss connections should nearly touch inside the tubing.

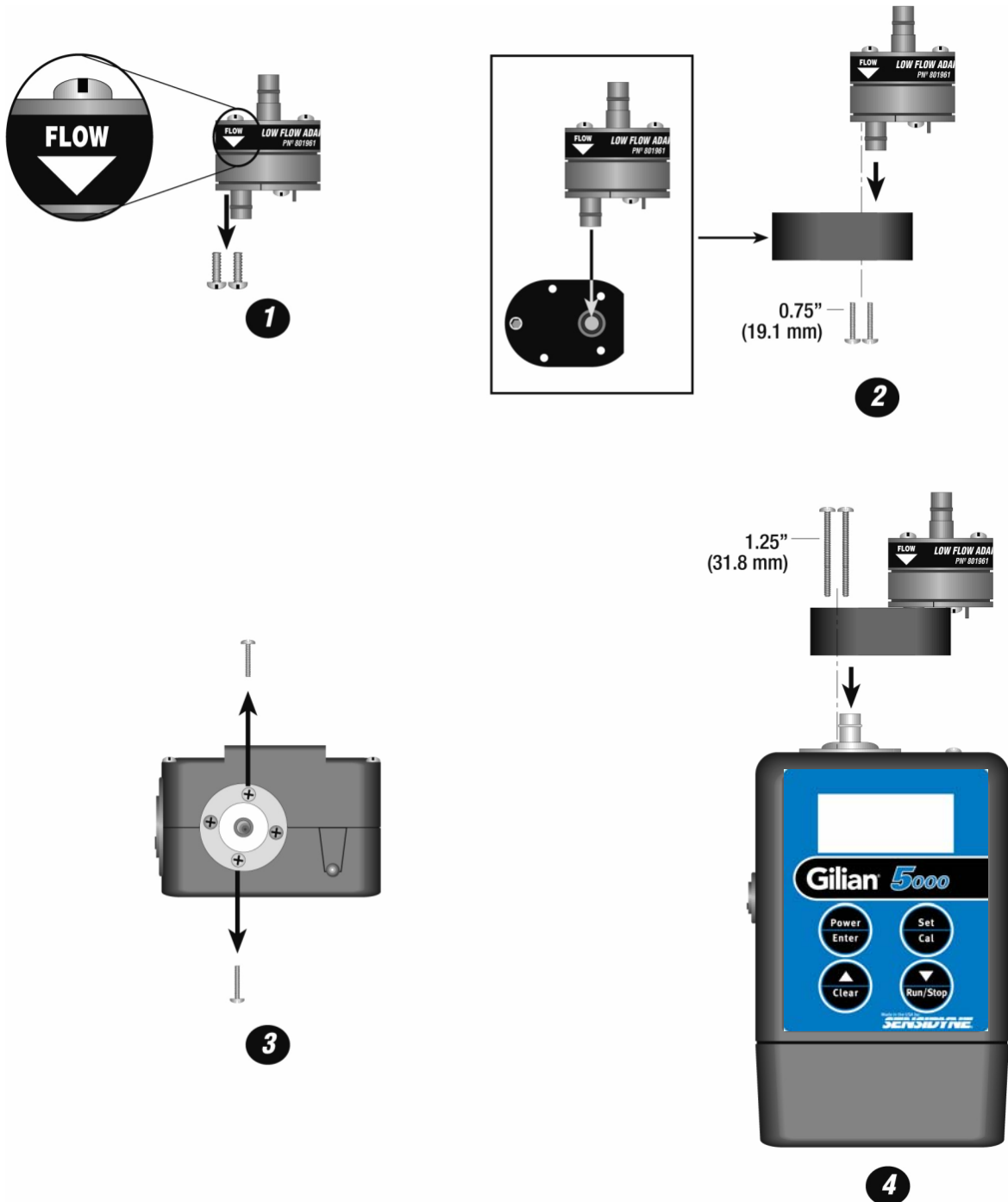
**Note:** The low flow adapter may also be installed at the lapel end of the sampling tube close to the sample holder.



# APPENDIX C

## Low Flow Adapter

- Installation To Gilian 5000 Using Fixed Mount Assembly PN 801980

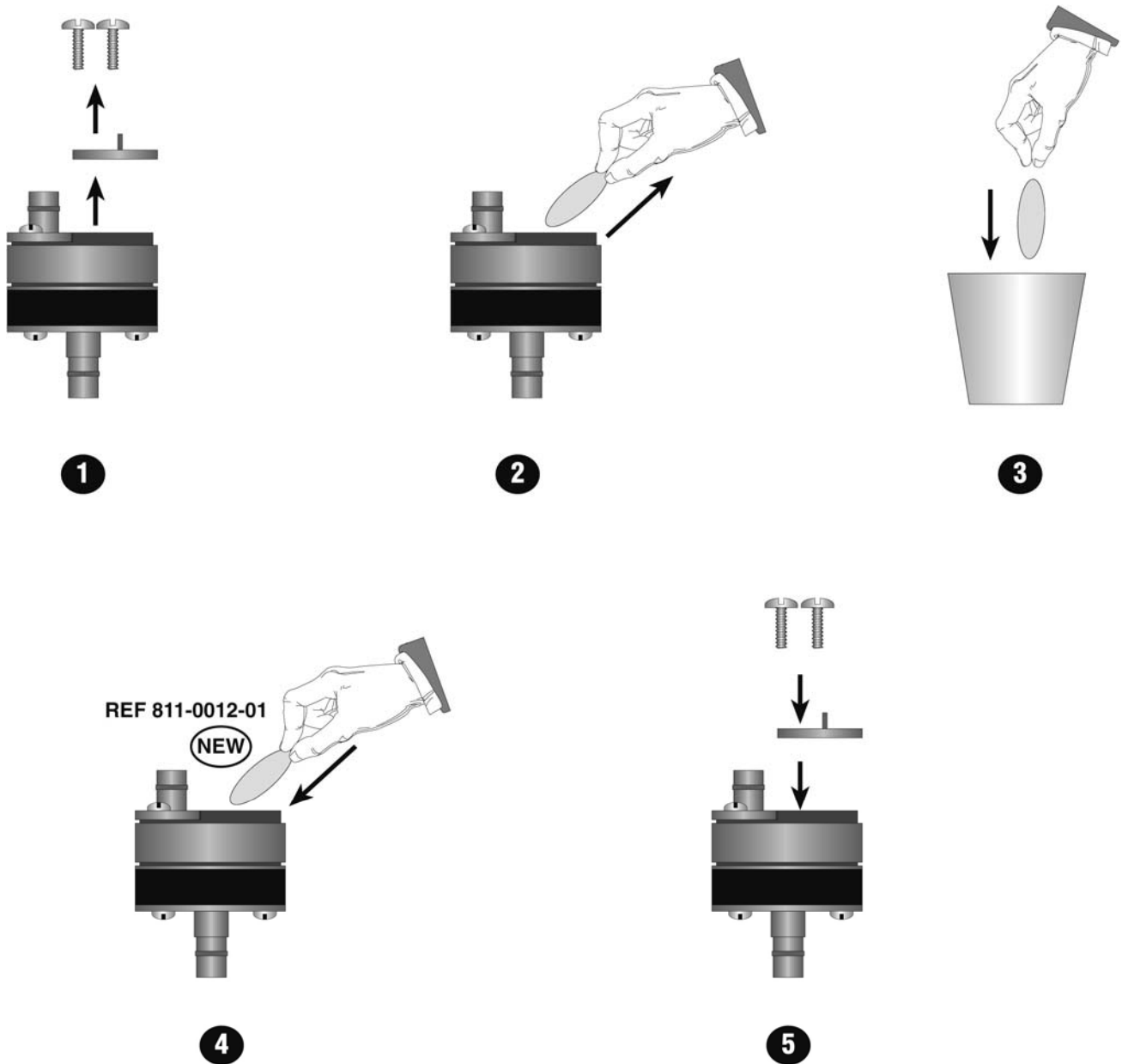


# APPENDIX C

## Low Flow Adapter

- **Filter Maintenance**

Change Low Flow Adapter filter PN 811-0012-01 when it is dirty or damaged.

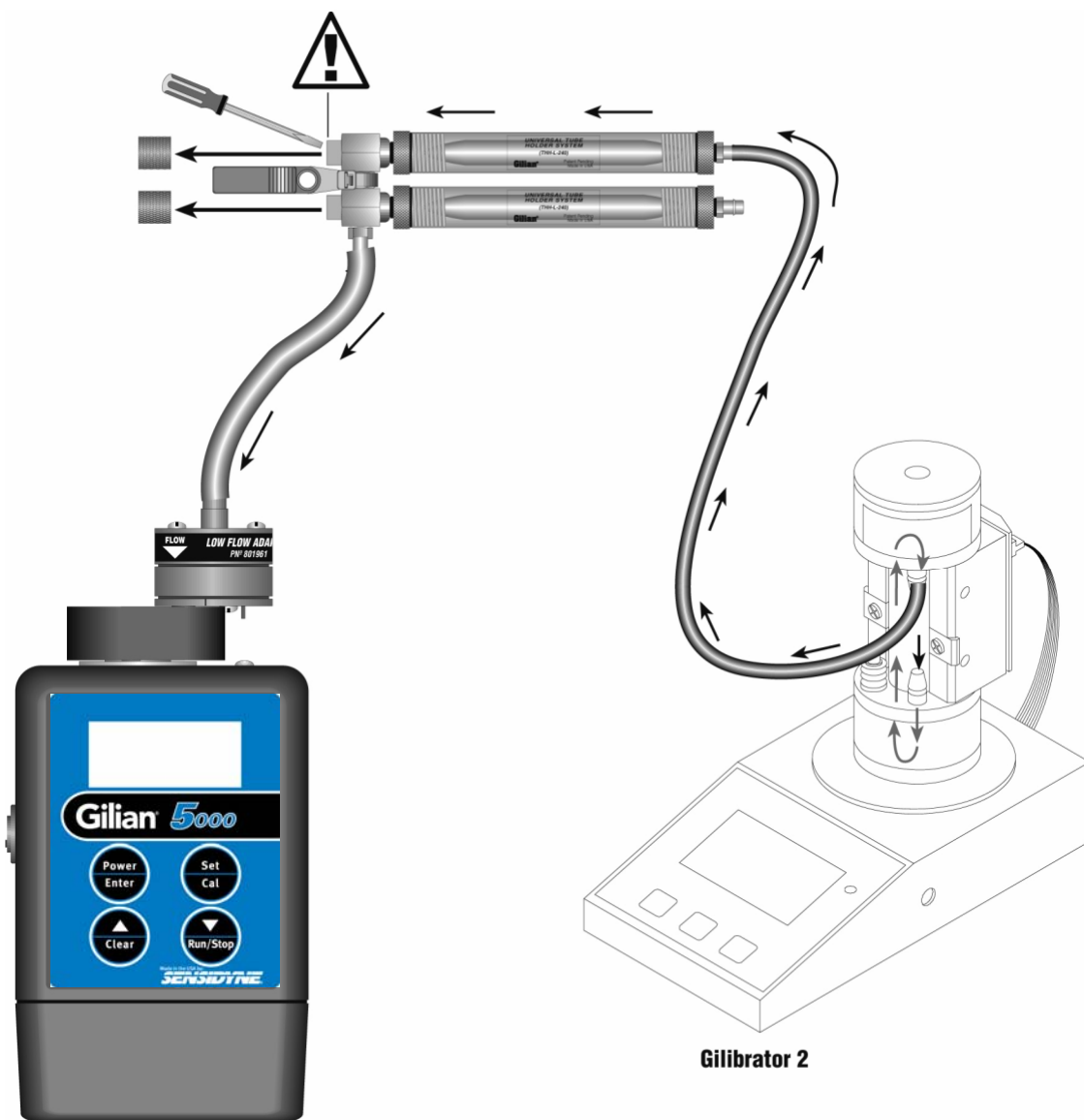


## APPENDIX C

### Low Flow Adapter

- **Low Flow Operation Example**

Set flow rate on pump to 1500 cc/min (Section 2.3). Calibrate pump using appropriate back pressure (Section 2.4). Attach low flow equipment as shown. Remove tube holder manifold caps. Adjust the flow rate for each tube at the manifold.



## APPENDIX D

### Fast Charger PN 298-0013-01

The fast charger is available as a single unit and with a five unit power station.

The fast charger is a universal input (100 - 240 VAC, 50-60Hz) charger with the capacity to rapidly charge NiMH battery packs. It delivers 1 amp in fast charge mode and monitors the battery for  $dV/dt$  changes to terminate charge when the battery reaches full charge. After the completion of fast charge, charging current is reduced and the battery is topped off for a fixed time. After completion of top off, the battery enters a trickle charge mode that automatically maintains full charge.

#### Indicator

Orange	No connection or bad battery; Initialization of charge cycle
Red	Fast charge
Green/Orange flash	Top off charge
Green	Trickle charge
Orange/Green flash	Charge cycle error (typically battery fault)
Red flashing	Internal charger fault

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# APPENDIX E

## Factory Calibration & Service

### USA

**Sensidyne, Inc.**  
**16333 Bay Vista Drive**  
**Clearwater, Florida 33760 USA**

**800-451-9444**

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