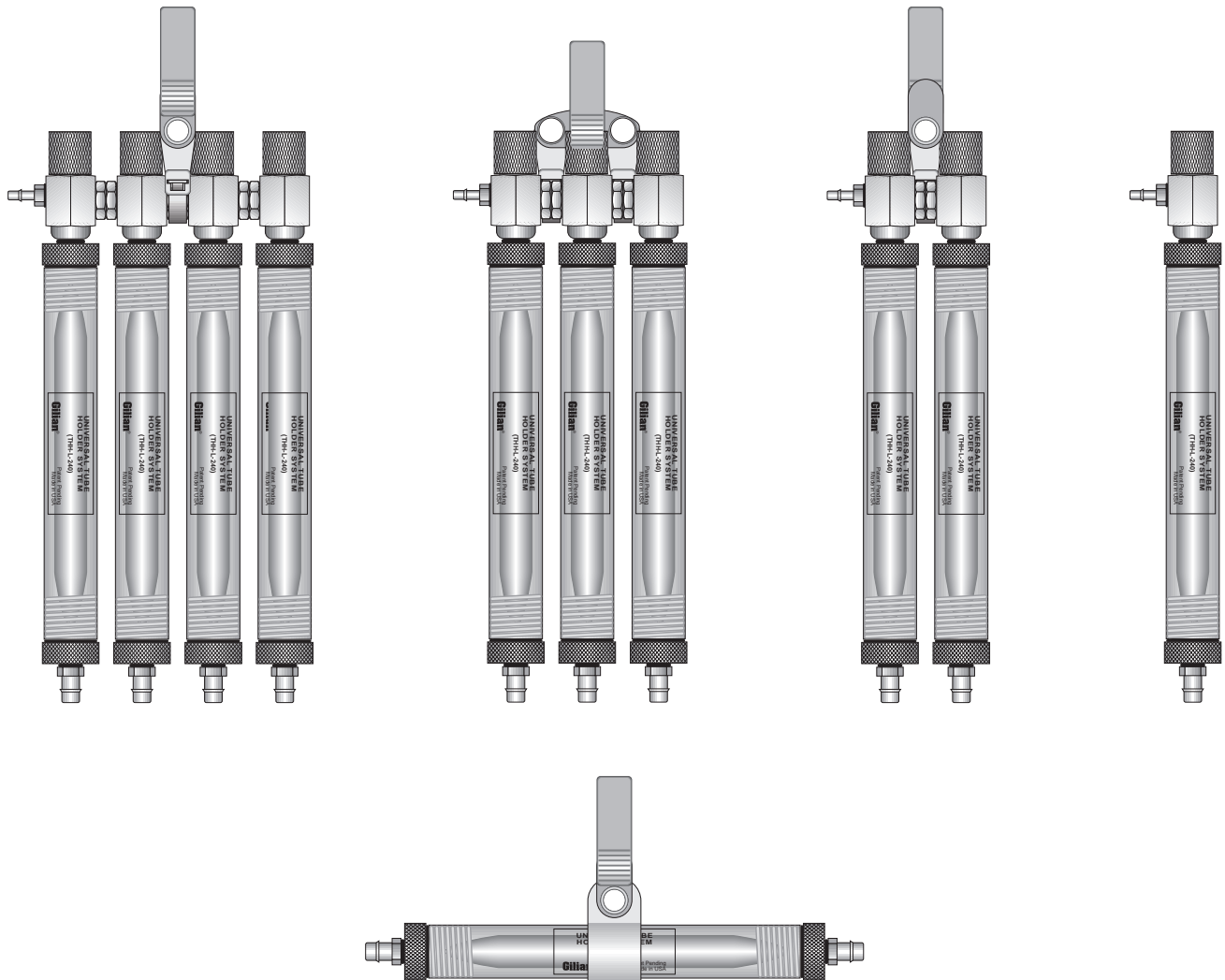


# Gilian<sup>®</sup>

## UNIVERSAL TUBE HOLDER SYSTEM

for Constant Low Flow &  
Constant-Pressure (Multi-Flow) Operation

### INSTRUCTION MANUAL



**SENSIDYNE<sup>®</sup>**

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**Revision D • (Document No. F-PRO-1218)**



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# WARNINGS !

## READ AND UNDERSTAND ALL WARNINGS BEFORE USE

Read and understand **ALL** warnings before using this product. Failure to read, understand, and comply with **ALL** warnings could result in property damage, severe personal injury, or death.

Read and understand **ALL** applicable Federal, State, and Local environmental health and safety laws and regulations, including OSHA. Ensure complete compliance with **ALL** applicable laws and regulations before and during use of this product.

**UNDER NO CIRCUMSTANCES** should this product be used except by qualified, trained, technically competent personnel and not until the warnings, *Operation and Service Manual*, labels, and other literature accompanying this product have been read and understood.

This manual must be read and understood by each user before operating this product or using its accessories, in order to ensure proper and safe use and installation of this product and to ensure familiarity with the proper treatment and safety procedures in the event of an accident.

Make certain you read and understand **ALL** manuals and literature for products used in conjunction with this product.

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

**DO NOT** operate this product should it malfunction or require repair. Operation of a malfunctioning product, or a product requiring repair may result in serious personal injury or death. **DO NOT** attempt to repair or modify the instrument, except as specified in the *Instruction Manual*. Contact the Gilian Service Department to arrange for a Returned Material Authorization (RMA).

Use **ONLY** genuine Gilian replacement parts when performing any maintenance procedures described in this manual. *Failure to do so may seriously impair instrument performance.* Repair or alteration of the product beyond the scope of these maintenance instructions, or by anyone other than a certified Gilian service technician, could cause the product to fail to perform as designed and persons who rely on this product for their safety could sustain severe personal injury or death.

# SECTION ONE INTRODUCTION

## 1.1 INTRODUCTION

The Universal Tube Holder System is an active sampling media system using sorbent tubes to capture gases and vapors. Sorbent tubes are sealed glass tubes packed with charcoal, silica gel, Tenax, or other sorbent material for absorption of gases and vapors. The glass ends are snipped off to allow air to pass through the tube. The tubes are held in place with clear tube holders. These holders have built-in clips to allow the tubes to be positioned within the breathing zone. Holders eliminate contamination within the tube, prevent tube breakage, and allow “in-line” calibration.

The Universal Tube Holder System consists of a series of clear plastic tube housings, along with an assortment of fittings and accessories. The system provides a wide range of configurations for single tube sampling (Constant Low Flow), multiple tube sampling (Constant Pressure, Multi-Flow), and in-series sampling. Multi-flow manifolds are available for Single, Dual, Triple, and Quad tube sampling. Tube holders come in a variety of sizes, from standard to sizes for Kitagawa and Draeger tubes.

All fittings in the Tube Holder System contain O-rings to maintain an air sealed Tube Cassette, and to permit easy assembly. The see-through housings are ideal for colorimetric tubes. A cross-section of a typical tube holder with tube is shown in Figure 1.

## 1.2 THEORY OF OPERATION

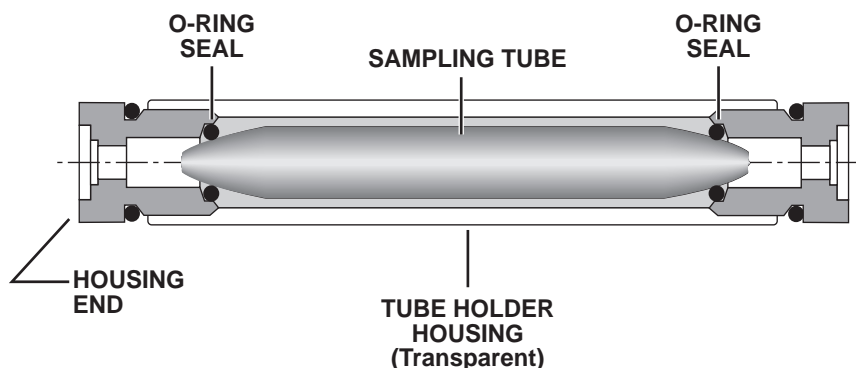
The Constant Pressure, Multi-Flow system consists of a variable flow controller manifold that is screwed into a tube holder end and tube holder housing (refer to Figure 2). The barb fitting, located on the side of the controller manifold, is connected to a length of plastic tubing and attached to the suction side of the air sampling pump.

In operation, the air sampler is set within the low flow sampling range, while maintaining 20” H<sub>2</sub>O against the variable flow controller.

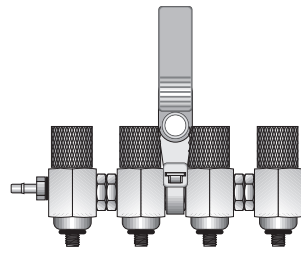
A small flat blade screwdriver is used to adjust the Flow Adjust Valve in the manifold, setting the flow rate for that individual tube cassette. If multiple tube sampling is being done, each tube is adjusted individually. The flow rate within each tube is maintained independently.

### NOTE

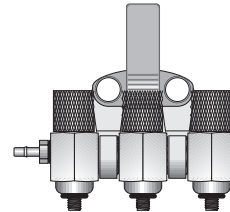
*The total amount of flow passing through the manifold cannot exceed the maximum low flow range.*



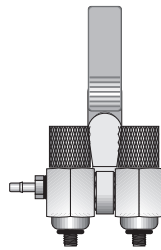
**Figure 1**  
**Typical Sorbent Tube Installation**



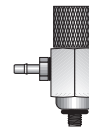
1 QUAD MANIFOLD



2 TRIPLE MANIFOLD



3 DUAL MANIFOLD



4 SINGLE MANIFOLD

6 HOUSING END



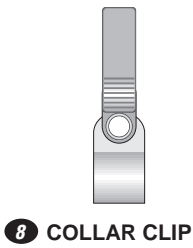
5 TUBE HOLDER HOUSING



6 HOUSING END



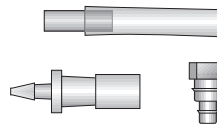
7 HOSE BARB FITTING



8 COLLAR CLIP



9 COUPLING



10 ADAPTERS



11 FITTINGS WRENCH

Figure 2  
Universal Tube Holder System Components

## SECTION TWO

# INSTALLATION & SET-UP

### 2.1 TUBE INSTALLATION & SET-UP

Refer to Figure 3 and follow the steps below:

- 1) Before you install the Tube Holder, refer to Appendix A and make certain the Tube Holder Housing and Housing Ends are correctly matched.
- 2) Install a Housing End on the Tube Manifold. Make certain there is an O-ring between the Housing End and the Manifold.
- 3) Select the appropriate Tube Holder Housing to be used and screw it onto the Housing End about half way down the threads.
- 4) Prepare the sorbent tube ends and install into the Tube Holder Housing. Make certain the arrow on the sorbent tube faces toward the Manifold.
- 5) Install the other Housing End and tighten gently. The sorbent tube will be contained and sealed with the O-rings (refer to Figure 1).

#### **IMPORTANT**

*It is not necessary to thread the Housing Ends all the way down to meet the housing. You risk breaking the sorbent tube if you do this. However, this may not apply when using shorter sorbent tubes.*

- 6) Before connecting the Tube Holder configuration to the pump, set the pump to Low Flow mode and adjust the flow rate to 1 LPM.
- 7) Attach the small end of the plastic tubing over the hose barb on the Manifold. Attach the larger end to the suction side of the sampling pump.

### 2.2 FLOW CONTROLLER CALIBRATION

The Variable Flow controller should be calibrated with the sorbent tubes installed inside the tube holders to assure greater calibration accuracy.

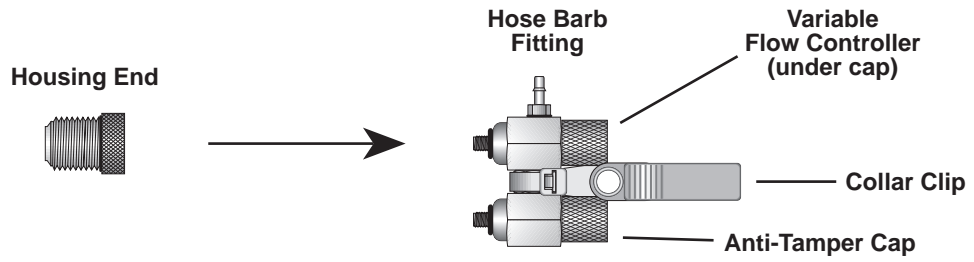
Refer to Figure 4 and follow the steps below to complete calibration:

- 1) Make certain the Tube Holder configuration and tubing are attached to the suction side of the sampling pump.
- 2) Unscrew and remove the Anti-Tamper Cap on the Flow Controller you wish to adjust
- 3) Using a small, flat-blade screwdriver (jeweler's style), turn the adjust valve to adjust the flow rate. Turning the valve clockwise decreases the flow rate. Turning the valve counter-clockwise increases the flow rate.
- 4) After the desired flow rate has been set, replace the Anti-Tamper Cap.
- 5) Repeat Steps 2, 3 & 4 for the remaining Flow Controllers you wish to adjust.
- 6) When all Flow Controllers have been adjusted, check the flow accuracy with a rotameter, film flowmeter, or Gilibrator-2 Calibrator.

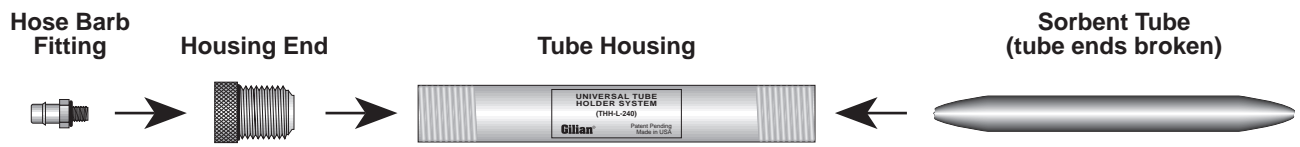
#### **IMPORTANT**

*The total combined flow rate through the manifold should not exceed the total low flow range of the sampler.*

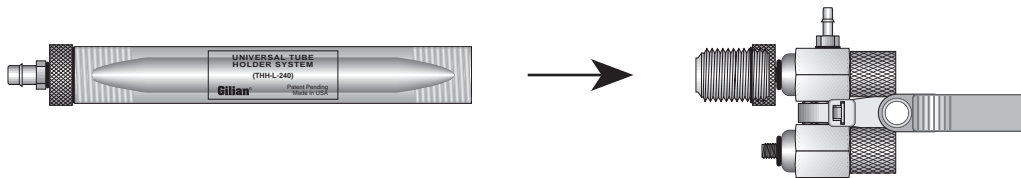




INSTALL HOUSING END

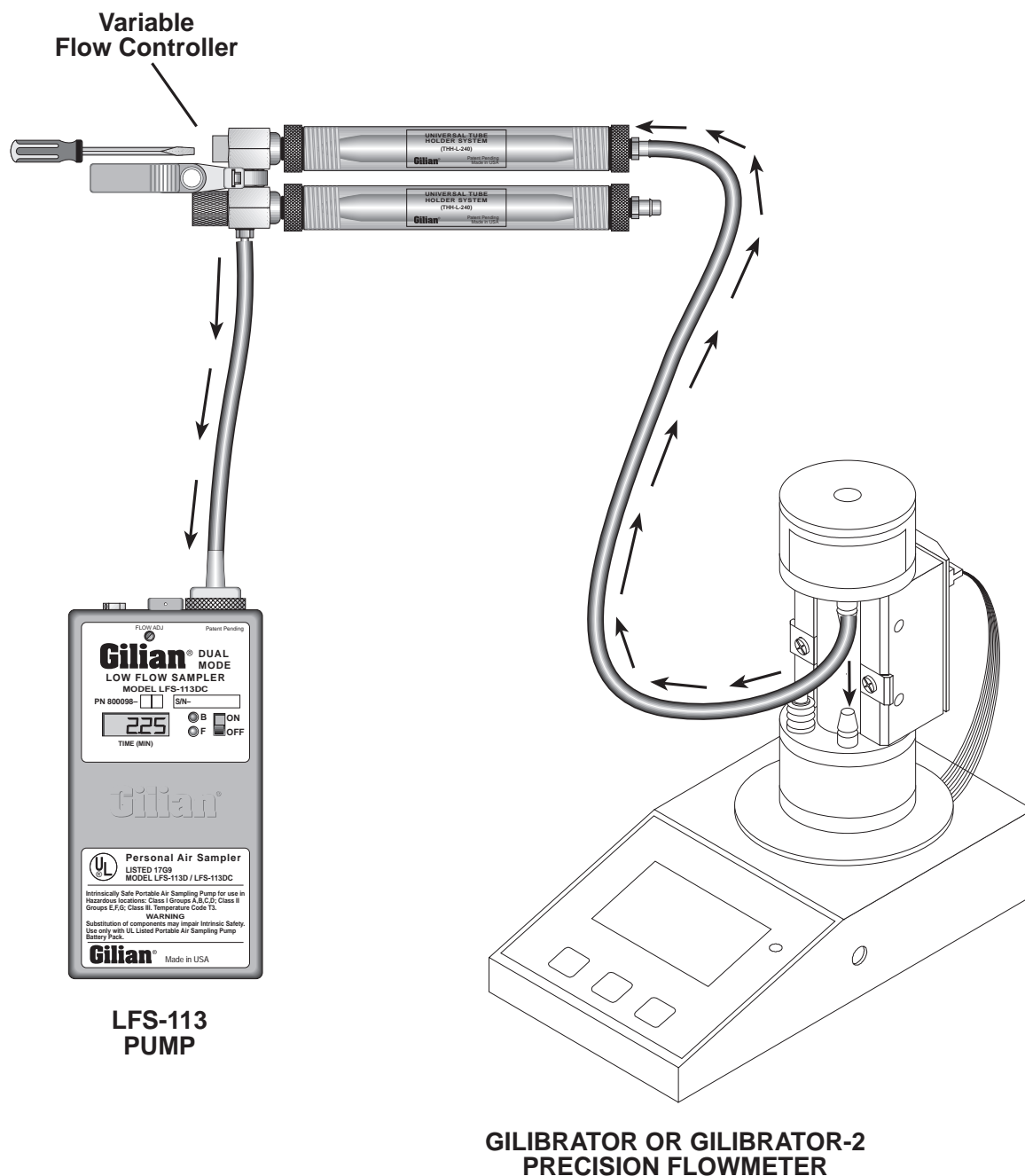


PREPARE TUBE AND TUBE HOUSING



INSTALL TUBE HOLDER HOUSING ON MANIFOLD

Figure 3  
Tube Holder Installation & Set-Up



**Figure 4**  
**Typical Flow Controller Calibration Set-Up**

## 2.3 TUBE HOLDER RE-CONFIGURATION

The Universal Tube Holder System can be configured as either a Constant Pressure (Multi-Flow) Sampling system or a Constant Low Flow (Single Tube) Sampling system. Tube Holder Kits are shipped from the factory configured for Constant Pressure Sampling.

To change your Tube Holder System from Constant Pressure to Constant Low Flow, refer to Figure 5 and follow the steps below:

- 1) Unscrew one of the Tube Holder Cassettes from the Manifold.
- 2) Remove one of the Housing End from the Tube Holder Housing.
- 3) Prepare the sorbent tube ends and install into the Tube Holder Housing. Make certain the arrow on the sorbent tube faces toward the Manifold.
- 4) Slide the Collar Clip over the Tube Holder Housing.
- 5) Install the other Housing End and tighten gently. The sorbent tube will be contained and sealed with the O-rings (refer to Figure 1).

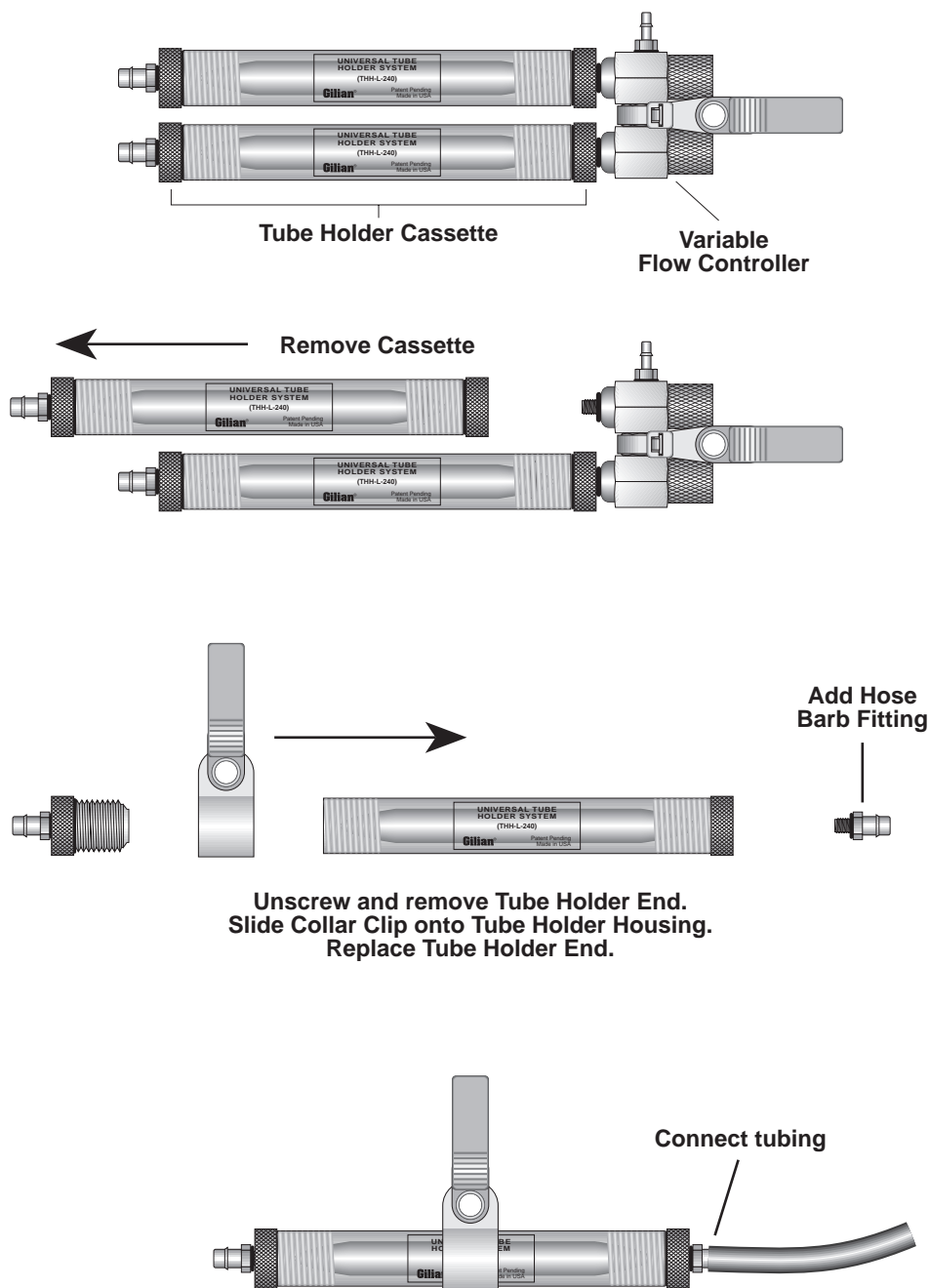
### IMPORTANT

*It is not necessary to thread the Housing Ends all the way down to meet the housing. You risk breaking the sorbent tube if you do this. However, this may not apply when using shorter sorbent tubes.*

- 6) Install an additional Hose Barb Fitting on the other Housing End.
- 7) Connect one end of the clear tubing to a Hose Barb Fitting. When you are ready to sample, connect the other end of the tubing to the suction side of the sampling pump.
- 8) It is best to calibrate the sampling pump's air flow rate while a sorbent tube is installed and a rotameter, film flowmeter, or Gilibrator-2 Calibrator is installed in-line (refer to Figure 6).

This is necessary to determine an accurate low flow setting. Adjust the flow rate of the sampling pump using a small, flat-blade Screwdriver (jeweler's style). Turn the flow adjust valve clockwise to decrease the flow rate and counter-clockwise to increase the flow rate. Verify the adjusted flow rate on the rotameter or calibration device.

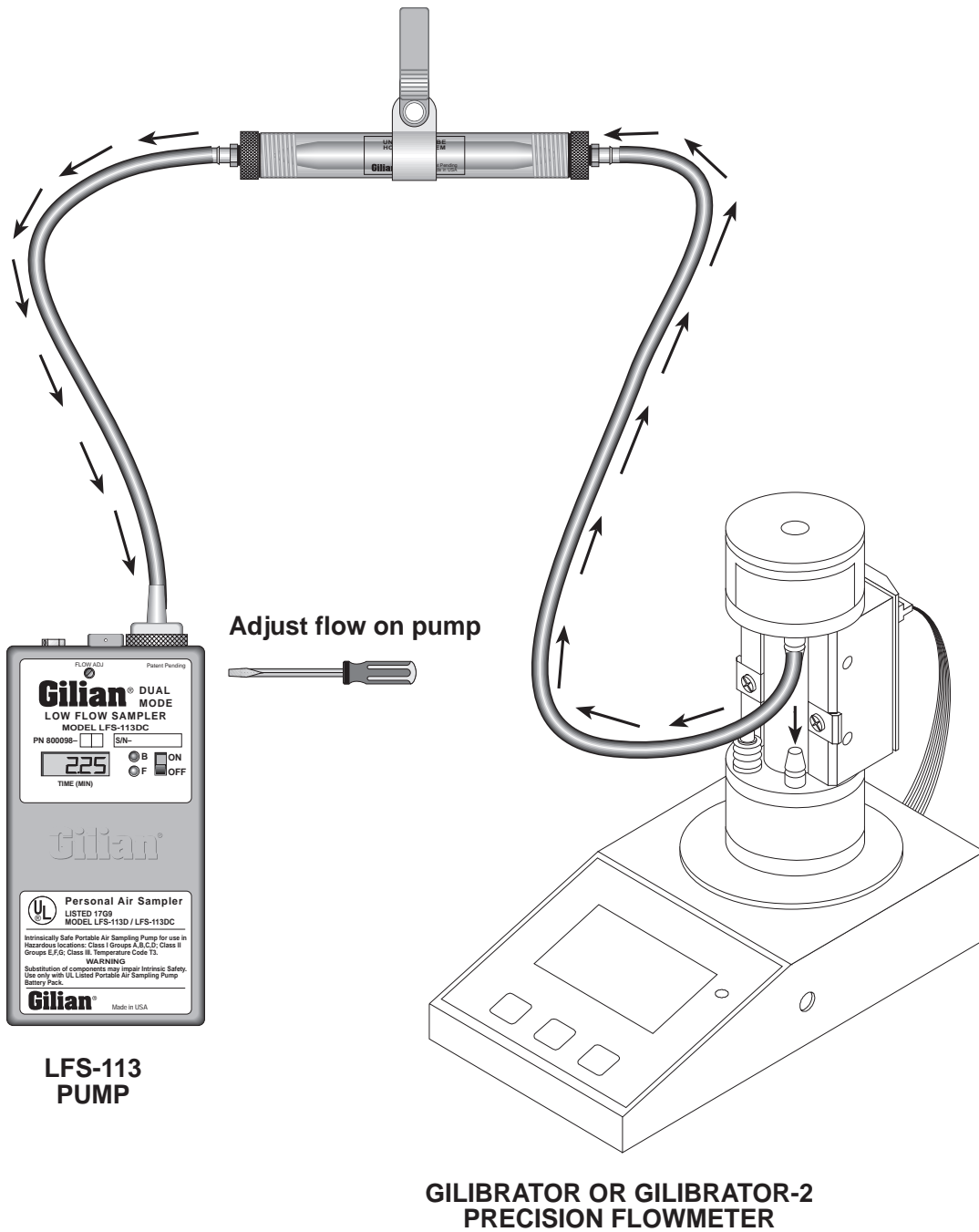
CONSTANT-PRESSURE, MULTI-TUBE SAMPLING CONFIGURATION



Unscrew and remove Tube Holder End.  
Slide Collar Clip onto Tube Holder Housing.  
Replace Tube Holder End.

CONSTANT LOW FLOW, SINGLE TUBE SAMPLING CONFIGURATION

Figure 5  
Tube Holder Re-Configuration



**Figure 6**  
**Typical Constant Low flow Calibration Set-Up**

# APPENDIX A PARTS LIST

## TUBE HOLDER KITS

Tube Holder Kits contain a Tube Manifold, Tube Holder Housing, Tube Holder Ends, Hose Barb Fitting, Collar Clip, Fittings Wrench, 36" of Tubing, and an Instruction Manual. Exceptions are noted in the table below. The table at the bottom of the page shows the number and size of the Tube Holder Housings that come with each kit.

Part No.	Description
800263	Single Tube Kit (Kitagawa), 5 x 150 mm [no Manifold]
800149	Single Tube Kit, 6 x 70 mm [no Manifold]
800259	Single Tube Kit, 7-10 x 110 mm, [no Manifold]
800260	Single Tube Kit, 7-10 x 150 mm [no Manifold]
800261	Single Tube Kit, 7-10 x 175 mm [no Manifold]
800262	Single Tube Kit (Draeger), 7 x 130 mm [no Manifold]
800254	Single Tube Kit (Kitagawa), 5 x 150 mm
800253	Single Tube Kit, 6 x 70 mm
800255	Single Tube Kit, 7-10 x 110 mm
800256	Single Tube Kit, 7-10 x 150 mm
800257	Single Tube Kit, 7-10 x 175 mm
800258	Single Tube Kit (Draeger), 7 x 130 mm
800252	Single Variable Tube Starter Kit
800251	Dual Variable Tube Kit
800148	Dual Variable Tube Kit, 6 x 70 mm
800250	Triple Variable Tube Kit
800249	Quad Variable Tube Kit
800232	Deluxe Tube Kit (1-2-3)

Kit PN°	Tube Manifold				Tube Holder (mm)					
	Single	Dual	Triple	Quad	5x150 †	6x70 †	7-10x110	7x130	7-10x150	7x175
800263					1					
800149						1				
800259							1			
800262								1		
800260									1	
800261										1
800254	1				1					
800253	1					1				
800255	1						1			
800258	1							1		
800256	1								1	
800257	1									1
800252	1					1	1		1	1
800251		1				2	2		2	2
800148		1				2				
801407		1					2			
800250			1			3	3		3	3
800230			1			3				
800249				1		4	4		4	4
800231				1		4				
800232	1	1	1		2	4	3	2	3	3

† These Tube Holders use 1/2" Housing Ends. The other Tube Holders use 5/8" Housing Ends

## TUBE HOLDER COMPONENTS

Item #	Part No.	Description
<b>Tube Holder Manifolds (Refer to Figure 2)</b>		
1	800072	Single Tube Manifold
2	800073	Dual Tube Manifold
3	800074	Triple Tube Manifold
4	800075	Quad Tube Manifold
	800229	Tube Holder Plug for Manifold
<b>Tube Holder Housing (Refer to Figure 2)</b>		
5	200102	S-225 Tube Holder Housing, 6 x 70 mm (1/2" OD)
5	200102-10	S-225 Tube Holder Housing, 6 x 70 mm (1/2" OD) - 10 pack
5	200104	S-255 (Kitawa) Tube Holder Housing, 5 x 150 mm (1/2" OD)
5	200104-10	S-255 (Kitawa) Tube Holder Housing, 5 x 150 mm (1/2" OD) - 10 pack
5	200113	L-240 Tube Holder Housing, 7-10 x 110 mm (5/8" OD)
5	200113-10	L-240 Tube Holder Housing, 7-10 x 110 mm (5/8" OD) - 10 pack
5	200112	L-255 Tube Holder Housing, 7-10 x 150 mm (5/8" OD)
5	200112-10	L-255 Tube Holder Housing, 7-10 x 150 mm (5/8" OD) - 10 pack
5	200114	L-265 Tube Holder Housing, 7-10 x 175 mm (5/8" OD)
5	200114-10	L-265 Tube Holder Housing, 7-10 x 175 mm (5/8" OD) - 10 pack
5	200115	L-247 (Draeger) Tube Holder Housing, 7 x 130 mm (5/8" OD)
5	200115-10	L-247 (Draeger) Tube Holder Housing, 7 x 130 mm (5/8" OD) - 10 pack
<b>Housing End (Refer to Figure 2)</b>		
6	800062	Tube Housing End (1/2"), for 6 mm OD
6	800062-10	Tube Housing End (1/2"), for 6 mm OD - 10 pack
6	800063	Tube Housing End (1/2"), for 5 mm OD
6	800063-10	Tube Housing End (1/2"), for 5 mm OD - 10 pack
6	800064	Tube Housing End (5/8"), for 7-10 mm OD
6	800064-10	Tube Housing End (5/8"), for 7-10 mm OD - 10 pack
6	800071	Tube Housing End (5/8"), for 1/4" OD [Open End]
6	800071-10	Tube Housing End (5/8"), for 1/4" OD [Open End] - 10 pack

# APPENDIX A

## PARTS LIST

### TUBE HOLDER COMPONENTS

Item #	Part No.	Description
<b>Hose Barb Fitting &amp; Coupling (Refer to Figure 2)</b>		
7	800170	Tube Holder Hose Barb Fitting
7	800170-10	Tube Holder Hose Barb Fitting - 10 pack
8	800165	Tube Holder Coupling
8	800165-10	Tube Holder Coupling - 10 pack
<b>Tube Holder Collar Clip (Refer to Figure 2)</b>		
9	800135	Collar Clip for 1/2" OD Tube Holder Housing
9	800135-10	Collar Clip for 1/2" OD Tube Holder Housing - 10 pack
9	800136	Collar Clip for 5/8" OD Tube Holder Housing
9	800136-10	Collar Clip for 5/8" OD Tube Holder Housing - 10 pack
9	800066	Collar Clip for 1/4" OD Tube Holder Housing
9	800066-10	Collar Clip for 1/4" OD Tube Holder Housing - 10 pack
9	800142	Collar Clip for 3/8" OD Tube Holder Housing
9	800142-10	Collar Clip for 3/8" OD Tube Holder Housing - 10 pack
9	800134	Collar Clip for 7/16" OD Tube Holder Housing
9	800134-10	Collar Clip for 7/16" OD Tube Holder Housing - 10 pack
<b>Miscellaneous Spare Parts (Refer to Figure 2)</b>		
10	800139	Tube Holder Adapter for 1/2" Tube Holder Ends
10	800138	Tube Holder Adapter for 5/8" Tube Holder Ends
10	200187	Tube Holder Adapter for 3/16" to 1/4" Tube Holder Ends
10	401205	Tube Holder Adapter (only) for 1/4" ID to 1/8"
11	200279	Fittings Wrench
--	200524	Tubing, 10', 3/16" ID
--	200486	Tubing, 10', 1/4" ID
--	800238	Tube Holder O-Ring Kit
--	400253	Tube holder Clear Storage Box



# APPENDIX C RETURNED MATERIAL AUTHORIZATION

Sensidyne maintains an instrument service facility at the factory to provide its customers with both warranty and non-warranty repair service. Sensidyne assumes no liability for service performed by personnel other than Sensidyne personnel. To facilitate the repair process, please contact the Sensidyne Service Department in advance for assistance with a problem which cannot be remedied and/or requires the return of the product to the factory. All returned products require a Returned Material Authorization (RMA) number. Sensidyne Service Department personnel may be reached at:

**SENSIDYNE**  
16333 Bay Vista Drive  
Clearwater, FL 33760 USA  
727-530-3602  
727-539-0550 [FAX]

All non-warranty repair orders will have a minimum fee whether the repair is authorized or not. This fee includes handling, administration and technical expenses for inspecting the instrument and providing an estimate. However, the estimate fee is waived if the repair is authorized.

If you wish to set a limit to the authorized repair cost, state a "not to exceed" figure on your purchase order. Please indicate if a price quotation is required before authorization of the repair cost, understanding that this invokes extra cost and handling delay. Sensidyne's re-

pair policy is to perform all needed repairs to restore the instrument to its full operating condition.

Repairs are handled on a "first in - first out" basis. Your order may be expedited if you authorize an expediting fee. This will place your order next in line behind orders currently in process.

Pack the instrument and its accessories (preferably in their original packing) and enclose your return address, purchase order, shipping and billing information, RMA number, a description of the problem encountered with your instrument and any special instructions. All prices are subject to change without notice.

If this is the first time you are dealing directly with the factory, you will be asked to prepay or to authorize a COD shipment.

Send the instrument, prepaid, to:

**SENSIDYNE**  
16333 BAY VISTA DRIVE  
CLEARWATER, FL 33760 USA

**ATTENTION: Service Department**

**RMA #:** \_\_\_\_\_

## SERVICE OPTIONS

The Sensidyne Service Department offers you a variety of service options which will help increase your user confidence while minimizing costly interruptions and maintenance costs. These options include initial training, on-site technical assistance, and full factory repairs. Sensidyne has developed several programs which will allow you to select just the right options best suited to your applications and needs. For further information, contact the Sensidyne Service Department.

**Sensidyne, LP**  
**16333 Bay Vista Drive**  
**Clearwater, Florida 33760**  
**USA**



**800-451-9444 • 727-530-3602 • 727-539-0550 [fax]**  
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