



## DSI Buxco Bias Flow

601-2200-001

601-2200-002

601-2201-001

USER MANUAL

# Table of Contents

Essential Safety Notes .....	3
Environmental Conditions.....	3
Hazards and Warnings.....	3
Welcome.....	5
Scientific Background .....	5
Bias Flow Options.....	5
System Components.....	6
Front and Rear Panels.....	6
Calibrating Flow Rates .....	8
Setup.....	9
Calibrating @ 1.0 LPM .....	9
Calibrating @ 2.5 LPM .....	9
Operation.....	11
Large Animal Bias Flow .....	11
Front and Rear Panels.....	11
Care and Cleaning.....	12
Bias Flow Filter and Tubing .....	12
Multi-Function Bias Flow .....	12
Large Animal Bias Flow .....	13
Appendix.....	14
Specifications .....	14
Contact Information .....	15
Data Sciences International (DSI).....	15
DSI Technical Support—North America.....	15
DSI Technical Support—Europe.....	15

## Essential Safety Notes

This section describes potential hazards which may exist in the operation of these units. A number of warning labels and symbols are affixed to your instrument. These symbols are used to inform you of potential dangers which may exist or where caution is required. Before installing your new unit, please take time to familiarize yourself with these warnings and symbols.

**NOTE: THE PROTECTION GIVEN BY THE EQUIPMENT MAY BE IMPAIRED IF USED IN A MANNER NOT SPECIFIED BY THE MANUFACTURER.**

## Environmental Conditions

- Indoor use
- Altitude up to 2000 m
- Storage and operation range 4°C to 40°C; 10% - 80% Rh, Non-condensing
- Mains supply voltage fluctuations not to exceed  $\pm 10\%$  of the nominal voltage
- 601-2200-001 (4-channel Bias Flow, Large Animal)
  - Supply Voltage 200-240VAC, 3A, 50Hz
  - Fuse Type: 3.0 A 250VA SLO-BLO
- 601-2200-002 (4-channel Bias Flow, Large Animal)
  - Supply Voltage 100-120VAC, 2A, 60hz
  - Fuse Type: 3.0 A 250VA SLO-BLO
- 601-2201-001 (Bias Flow Pump, 4-sites)
  - 12VDC, 4A
- Overvoltage Category 2
- Pollution degree 2

## Hazards and Warnings



The Bias Flow is heavy to transport. To transport, use two people grasping either end of the controller and lift using proper techniques.

---



DSI cannot guarantee the safety of this device if used other than intended or used by any procedures other than those described in this manual.

---



Protective  
Ground Terminal

This product requires a connection to protective earthing (ground), only use with a power supply outlet and power supply cord that provides protective ground, earthing.

---



Only use a detachable power cord that allows for protective earthing and is a minimum of 18 AWG. This cord will need to have appropriate agency approvals, such as UL, CSA.

---

Before installing your new unit, please take time to familiarize yourself with these warnings and symbols:



Direct Current (DC)

---



Alternating Current

---



Caution

---



Caution, Risk of electric shock

---



Protective Conductor Terminal

## Welcome

Congratulations on joining the community of users worldwide who rely on DSI's products to perform preclinical physiologic research. Thank you for your interest in DSI products. We are committed to providing you with quality products and services.

This manual will help you get to know your Buxco® Bias Flow pumps. The structure of the manual was designed to sequentially guide you through using your DSI system.

### WHAT YOU WILL BE LEARNING

1. Understand the Buxco® Multi-Function Bias Flow
2. Understanding the Buxco® Large Animal Bias Flow
3. Proper care and cleaning techniques.

## Scientific Background

The Buxco® Bias Flow pumps are used with plethysmographs and exposure chambers to keep fresh air available in the chamber for the subject to breathe. Utilizing a unique internal design, the unit ensures the flow is extremely quiet and minimizes noise introduced on the measured plethysmograph flow.



*Figure 1. – Multi-Function Bias Flow (left) and Large Animal Bias Flow (right).*

## Bias Flow Options

DSI offers a Multi-Function and Large Animal Bias Flows to accommodate the various flow requirements based on the number of subjects and sizes of subjects.

Chamber Type	Part Number	~Flow Capacity per site (LPM)	# of Independently Controlled Pumps	Flow Direction
<b>Multi-Function</b>	601-2201-001	0 – 2.5	4	Push or Pull
<b>Large Animal</b>	601-2200-001 (230 VAC) 601-2200-002 (120 VAC)	up to 20	4	Push or Pull

Please see the **Specifications** section for further details.

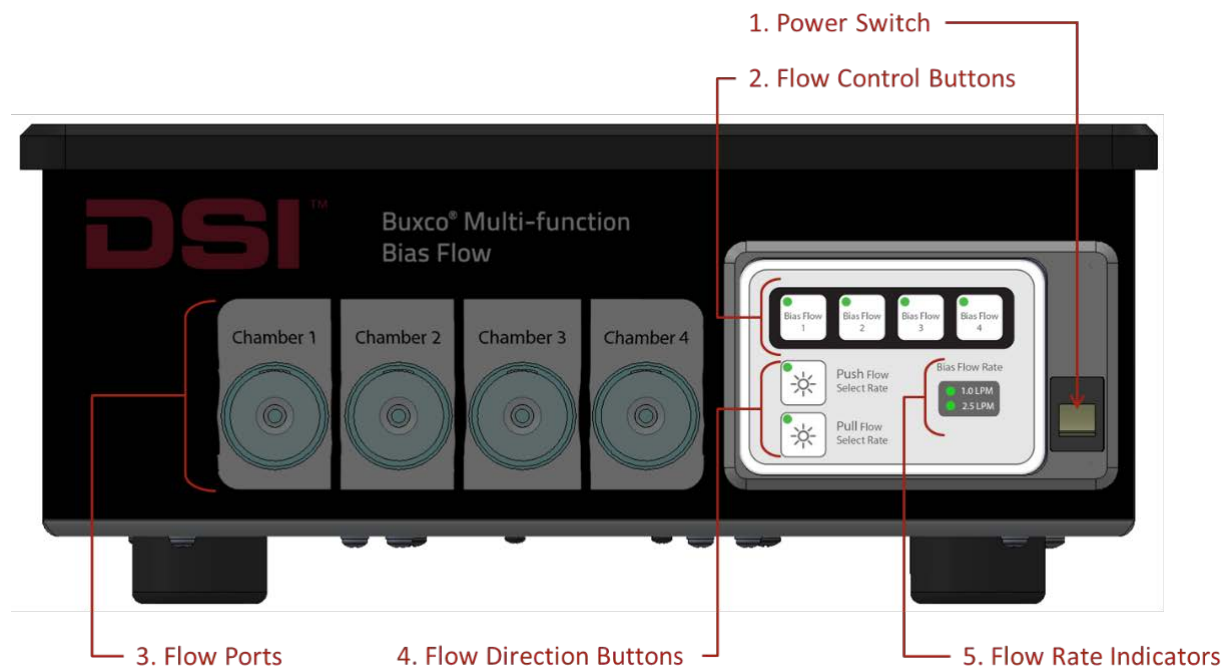
## System Components

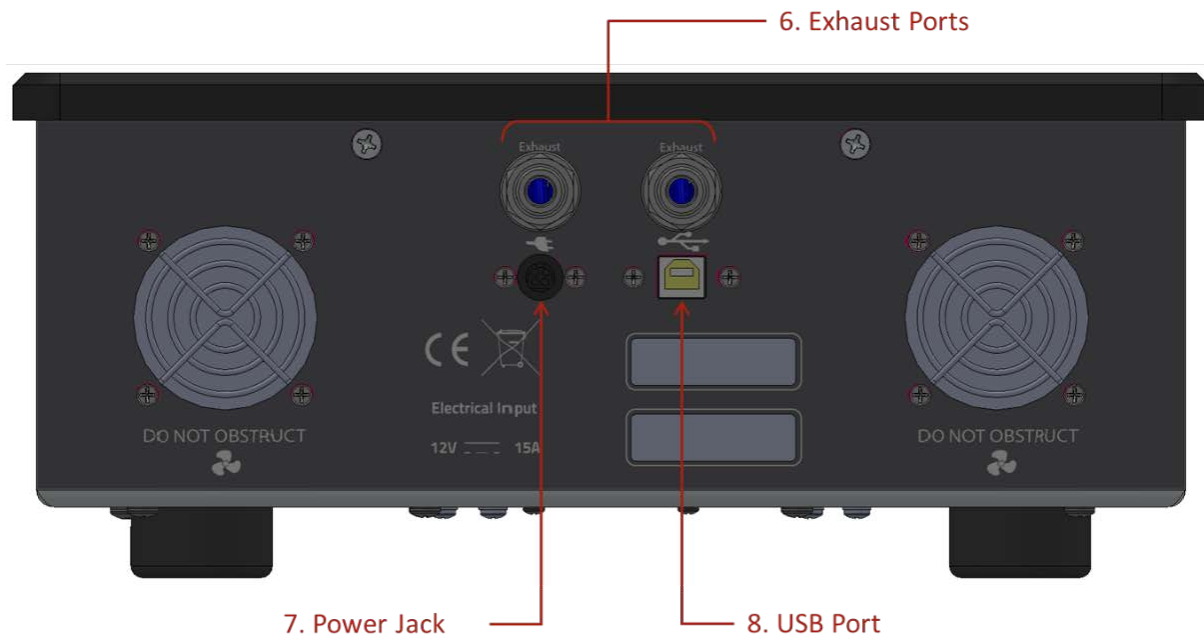
This section will cover the basic hardware necessary when using the Buxco® Bias Flow. Additional components may be necessary depending upon study design and the desired endpoints; these will be discussed in dedicated sections.

The following components should be part of every Buxco® Bias Flow installation:

### Front and Rear Panels

The Multi-Function Bias Flow contains the following user interface elements for user control:





*Figure 2. – DSI’s Multi-Function Bias Flow with Front and Rear Panel labels.*

### 1 – Power Switch

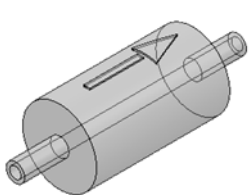
Switches the Bias Flow power on and off.

### 2 – Flow Control Buttons

Each button turns the flow through the associate site on and off; e.g. Bias Flow 1 button controls Chamber 1 flow port. The LED indicator located in the upper left corner of each button may be used to determine when the appropriate flow rate has been achieved. When the LED is illuminated green, the calibrated flow through the associated chamber port is being achieved. If red, the flow has either not yet reached the calibrated flow rate or is out of specification and needs to be calibrated. Please see the **Calibrating Flow Rates** section for instructions.

### 3 – Flow Ports (and In-line Coalescing Filter)

Provides bias flow air supply to the plethysmograph or exposure chamber. An in-line coalescing filter directly connects to these ports, its opposite end then connects to one of the Luer fittings on the chamber. The in-line coalescing filter is directional and therefore, it is important to configure it in the appropriate orientation since the Multi-Function Bias Flow may be used in either Push or Pull directions. An arrow indicator of flow direction is located on the filter.



*Figure 3. – In-line coalescing filter with arrow indicator.*

#### **4 – Flow Direction Buttons**

Separate Push and Pull buttons are available to set the bias flow in either Push or Pull mode. When in Push mode, all 4 Flow Ports will push air into the chamber. Similarly, when in Pull mode all 4 Flow Ports will pull air from the chamber. Green LED indicators provide an easy visualization as to which direction is being used. The illuminated direction is in use.

The buttons are also used to determine the flow rate. Press the button once for the 1.0 LPM setting. Press it a second time for the 2.5 LPM setting.

#### **5 – Flow Rate Indicators**

Green LED indicators provide an easy visualization as to which flow rate is currently in use. The illuminated rate is in use.

#### **6 – Exhaust Ports**

The Exhaust Ports are used to bring air through the Bias Flow and into the chamber when in Push mode, as well as to pull air out of the chamber and through the Bias Flow when in Pull mode. These ports should be kept clean and unobstructed.

If working with harmful materials and in Pull mode, it is possible to connect a tube with sufficient inner diameter to direct the exhaust airflow to a scavenging apparatus or an exhaust hood.

#### **7 – Power Jack**

Connect the power transformer here.

#### **8 – USB Port**

The USB jack is for DSI use only. Researchers should not use this port.

### **Calibrating Flow Rates**

The Multi-Function Bias Flow permits the user to easily calibrate flow rates from 0 – 2.5 LPM to ensure accuracy.



**IMPORTANT.** *The process below will walk through calibration of 1.0 and 2.5 LPM, as those flow rates are called out specifically by the bias flow's Flow Rate Indicators. However, these are simply indicators and users may calibrate the bias flow such that these rate indicators correspond to any user desired flow rate up to 2.5 LPM (e.g. the user could calibrate the bias flow such that the 1 LPM Indicator corresponds to 0.5 LPM and the 2.5 LPM Indicator corresponds to 1.5 LPM).*

The following items are needed for calibration

- A calibrated flow meter  
TSI Model 4100 series Flow Meter (DSI PN: 600-1260-001)



- The filter assembly that comes with the bias flow.  
In-line coalescing filter, Luer fitting, and Tygon tubing (3/16" ID, 5/16" OD).

## Setup

1. Connect the flow meter to the filter assembly tube supplied with the bias flow.
2. Plug the filter assembly into the Chamber 1 port.
3. Switch the Bias Flow power on.
4. Turn on all 4 ports by pressing each of the Flow Control Buttons.
5. Wait for all four port indicator LEDs to turn green.  
**Note:** If any of the LEDs remains red, it is an indication that the flow rate is currently outside of allowable specifications.
6. Select desired direction and flow rate by pressing either **Push Flow** or **Pull Flow** buttons. The pressed flow direction will illuminate.

## Calibrating @ 1.0 LPM

1. To begin calibration:
  - a. Push  
Press and hold the **Bias Flow 1** and **Push Flow** buttons for 3 seconds. The Push Flow and Flow Rate 1.0 LPM LED indicators will begin to flash. The Bias Flow 1 indicator will also be lit.
  - b. Pull  
Press and hold the **Bias Flow 1** and **Pull Flow** buttons for 3 seconds. The Pull Flow and Flow Rate 1.0 LPM LED indicators will begin to flash. The Bias Flow 1 indicator will also be lit.
2. Check the flow rate for Chamber 1 using the flow meter.
3. Adjust the flow rate in small, incremental steps:
  - a. Press the **Push Flow** button to increase the flow rate.
  - b. Press the **Pull Flow** button to decrease the flow rate.
4. Once the correct flow rate is achieved, press **Bias Flow 1** to move to the Bias Flow 2 flow calibration.
5. Move the flow meter and filter assembly to Chamber 2.
6. Repeat steps 2 – 5 for the remaining Chamber Ports.
7. When calibration is complete, press the **Bias Flow 4** button to exit the calibration mode and set the Bias Flow back to normal operation.

## Calibrating @ 2.5 LPM

1. To begin calibration:
  - a. Push  
Press and hold the **Bias Flow 2** and **Push Flow** buttons for 3 seconds. The Push Flow and Flow Rate 2.5 LPM LED indicators will begin to flash. The Bias Flow 1 indicator will also be lit.

b. Pull

Press and hold the **Bias Flow 2** and **Pull Flow** buttons for 3 seconds. The Pull Flow and Flow Rate 2.5 LPM LED indicators will begin to flash. The Bias Flow 1 indicator will also be lit.

2. Check the flow rate for Chamber 1 using the flow meter.
3. Adjust the flow rate in small, incremental steps:
  - a. Press the **Push Flow** button to increase the flow rate.
  - b. Press the **Pull Flow** button to decrease the flow rate.
4. Once the correct flow rate is achieved, press **Bias Flow 1** to move to the Bias Flow 2 flow calibration.
5. Move the flow meter and filter assembly to Chamber 2.
6. Repeat steps 2 – 5 for the remaining Chamber Ports.
7. When calibration is complete, press the **Bias Flow 4** button to exit the calibration mode and set the Bias Flow back to normal operation.

## Operation

To operate the Multi-Function Bias Flow:

1. Connect to chamber Luer fitting.
2. Switch on the Bias Flow.
3. Select the Chamber Ports desired for use.
4. Select the desired flow direction.
5. Select the desired flow rate.
  - a. Press the Flow Direction button once for 1.0 LPM.
  - b. Press the Flow Direction button again for 2.5 LPM.

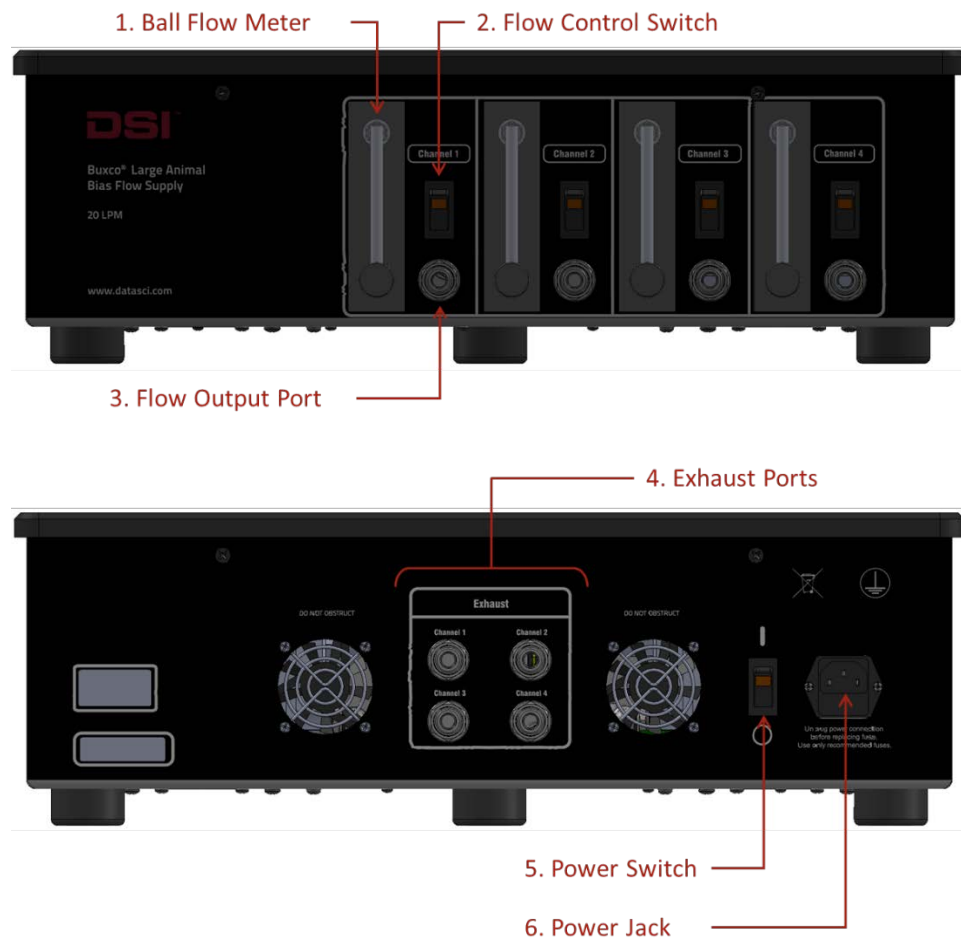
The Flow Rate indication LED should be monitored to ensure the desired flow rate is selected.

## Large Animal Bias Flow

The following sections will outline the components and operation of the Large Animal Bias Flow.

### Front and Rear Panels

The Large Animal Bias Flow contains the following user interface elements for user control:



*Figure 4. – DSI's Large Animal Bias Flow with Front and Rear Panel labels.*

### **1 – Ball Flow Meter**

Controls the flow rate of the fresh air pump. Each of the 4 Bias Flow pumps may be controlled individually up to 20 LPM.

### **2 – Flow Control Switch**

Starts and stops the airflow for the associated bias flow channel.

### **3 – Flow Output Port**

When the Flow Output Port is connected to the plethysmograph or exposure chamber, up to 20 LPM of air will be pulled out of the chamber toward the Bias Flow.

**Note:** The Large Animal can provide a Push flow direction to pump air into the chamber using the Exhaust Ports.

### **4 – Exhaust Ports**

The Exhaust Ports are used to expel air out of the Bias Flow when the Flow Output Port is connected to the chamber. To provide Push flow into the chamber, connect the desired channel Exhaust Port to the chamber Luer fitting. These ports should be kept clean and unobstructed.

If working with harmful materials, it is possible to connect a tube with sufficient inner diameter to direct the exhaust airflow to a scavenging apparatus or an exhaust hood.

### **5 – Power Switch**

Switches the Bias Flow power on and off.

### **6 – Power Jack**

Connect the power cord here.

## **Care and Cleaning**

### **Bias Flow Filter and Tubing**

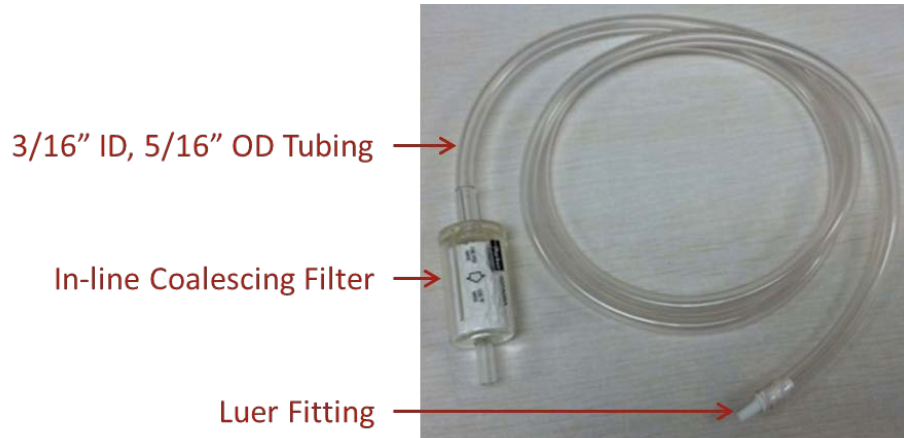
Tubing should be free from cracks, moisture, and deposits. Over time, filters will become obstructed, and will need to be replaced.

#### **Multi-Function Bias Flow**

Replacement part numbers:

- 601-2522-001 (1x In-Line Coalescing Filter, Tygon Tubing, and fitting)
- 601-2522-003 (8x In-Line Coalescing Filter, Tygon Tubing, and fitting)
- 601-2522-004 (1x In-Line Coalescing Filter Only)

- 601-2524-030 (Tubing only – 50')

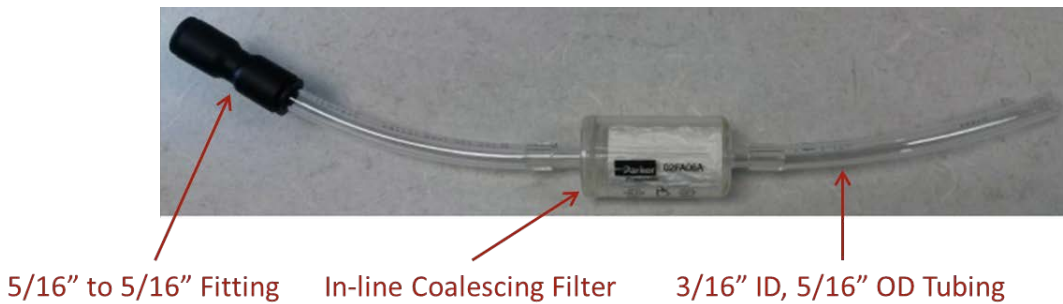


**Figure 5. 601-2522-001 with In-Line Coalescing Filter, Tubing, and Luer Fitting indicators.**

### Large Animal Bias Flow

Replacement part numbers:

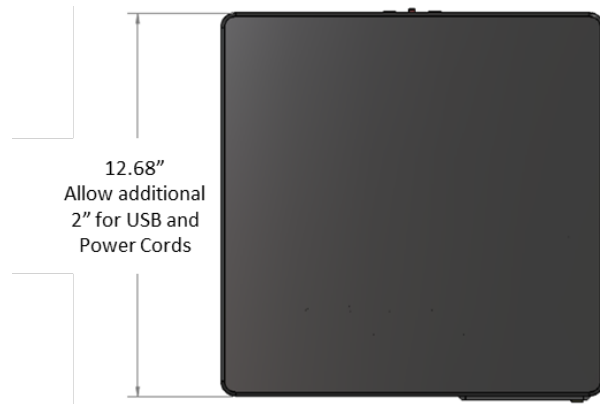
- 012268-001 (Whatman HEPA-VENT filter, 50mm diameter)
- 010179-001 (Clear Polyurethane Tubing, 20')
- 601-6200-001 (4x In-line Coalescing Filter, Tygon Tubing, and fitting)



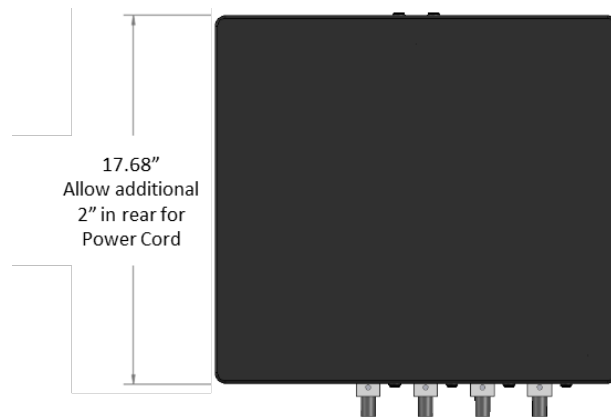
# Appendix

## Specifications

### MULTI-FUNCTION BIAS FLOW



### LARGE ANIMAL BIAS FLOW



## Contact Information

We are available to help you with your questions and concerns. Should you hit a roadblock or need some additional training, please feel free to visit the DSI Support Center at <https://support.datasci.com> to find articles and helpful information in our knowledge base, Chat with an agent, or setup time to receive one-on-one consultation. We are happy to help!

### Data Sciences International (DSI)

119 14<sup>th</sup> Street NW  
New Brighton, MN 55112

#### DSI Technical Support—North America

Email: [Support@datasci.com](mailto:Support@datasci.com)

#### DSI Technical Support—Europe

Email: [Europe-support@datasci.com](mailto:Europe-support@datasci.com)