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Technical Manual and Specifications

Purifier® Axiom®

Type C1 Biosafety Cabinet Models

30441 30448
30461 30468

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Labconco Purifier Axiom Technical Manual and Specifications
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INTRODUCTION

This text is designed for you, the Biohazard Cabinet Certifier. Based on your suggestions, comments, and ideas, Labconco has compiled this information for you to use in the certification or servicing of our Purifier Axiom Biosafety Cabinets.

When you use this document in your office or in the field, we would appreciate your input so that we can make further improvements to future editions.

As always, we at Labconco want to assist you in having a better understanding of our products and their operation; if you have any questions, or need additional information, please contact us.

Thanks again for all your support in the past, and in the future.

Labconco

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Should you require Technical Assistance, Service Parts, or have general questions regarding the Purifiers, please direct them to our Product Service Department, so that your call can be properly routed and answered.

SECTION ONE –
Background Information

Quickstart

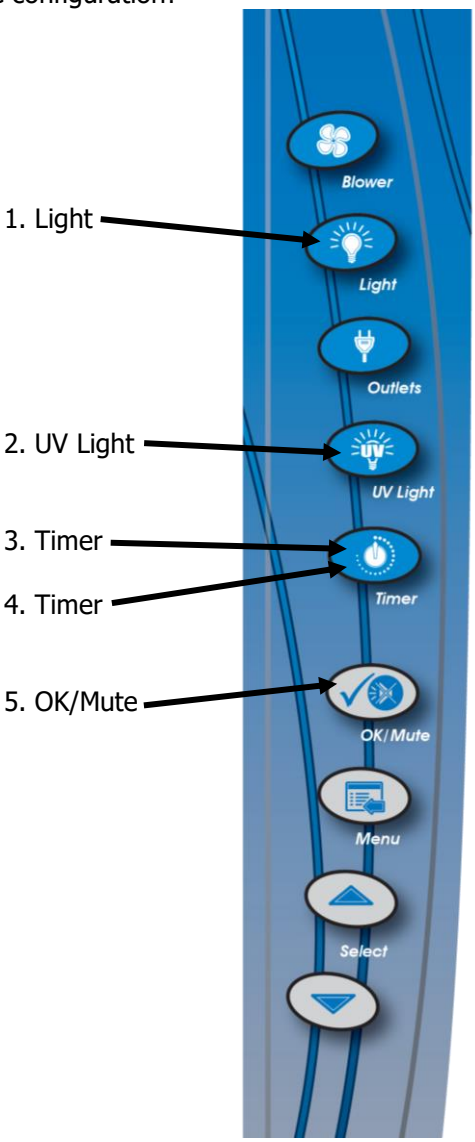
The Axiom is a significant step forward in Biosafety Cabinet technology. While many internal components are the same or similar to our Logic+-platform products, its operation and certification are different. The *Quickstarts* that follow will help you show you how to answer the questions asked in each case. Keystrokes are shown in ***bold blue italics***, while screen selections are shown in *green italics*.

Quickstart

What's the password for the Axiom?

Like the Logic, the Axiom models password protects the user from entering the *Calibration* menu to prevent them from adjusting the blower speed, filter gauge or the airflow sensor readings. New to the Axiom is a *Service* menu selection entitled *Configuration*; entering this option allows you to configure the Axiom's exhaust connection status, whether its sash height is 8" or 10" and airflow sensor options-there is more on this in the Quickstart "How do I change the BSC configuration?"

The password for all protected screens is:



Quickstart

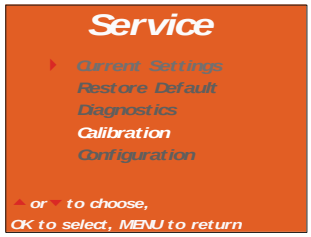
How do I recalibrate the

- ✓ blower speed
- ✓ filter life gauge
- ✓ airflow sensor reading

of the Axiom?

1. Press the ***Menu*** button.
2. Press the ▼ button until the *Services* option is highlighted (it will turn yellow).
3. Press ***OK/Mute*** to enter the Services menu screen.

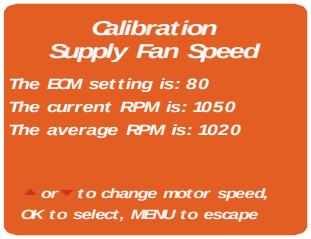
4. Press the ▼ button until the *Calibration* option is highlighted (it will turn white).
5. Press ***OK/Mute*** to start the calibration procedure.



6. You will see a *warning screen* alerting you that you are about to alter the BSC's settings.
7. Press ***OK/Mute*** to input the password.

8. When requested for the password press ***Light***, ***UV light***, ***Timer***, ***Timer*** then ***OK/Mute***.

9. If the password is properly entered, the first certification screen will display the supply blower motor's PWM setting. Press the ▲ or ▼ button to increase or decrease the blower speed as needed. When the speed is set properly, press the ***OK/Mute*** button to lock the new blower speed setting, and continue to the filter life screen.



Quickstart

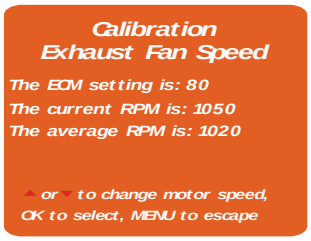
How do I recalibrate the

- ✓ blower speed
- ✓ filter life gauge
- ✓ airflow sensor reading

of the Axiom? - Continued

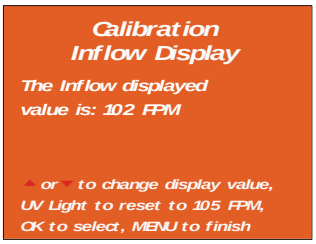
10. If this is an initial certification or a recertification after supply HEPA filter replacement, select *Reset Filter Gauge to 100%*. If this is an annual recertification, select *Leave Gauge unchanged*. If you want to set the filter gauge at a preset value, select *Set Gauge to new setting*. Then press ***OK/Mute***.

11. The next certification screen will display the exhaust blower motor's PWM setting. Press the ▲ or ▼ button to increase or decrease the blower speed as needed. When the speed is set properly, press the ***OK/Mute*** button to lock the new blower speed setting, and continue to the filter life screen.



12. If this is an initial certification or a recertification after exhaust HEPA filter replacement, select *Reset Filter Gauge to 100%*. If this is an annual recertification, select *Leave Gauge unchanged*. If you want to set the filter gauge at a preset value, select *Set Gauge to new setting*. Then press ***OK/Mute***.

13. If the unit is has no airflow sensor, after the filter gauge option is selected and you press ***OK/Mute***, the Axiom will power down, and then restart with the new settings. If the Unit has an airflow sensor, you will then be asked to calibrate the inflow sensor to match the value you obtained when you measured the inflow. After the inflow is calibrated, and you press ***OK/Mute***, the Axiom will power down, and then restart with the new settings.

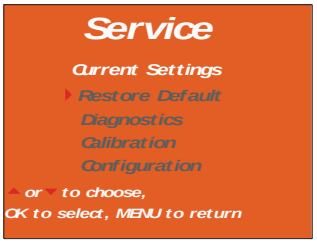


Quickstart

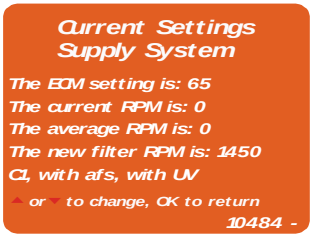
How do I see the Current Settings of the Axiom?

1. Press the ***Menu*** button.
2. Press the ▼ button until the *Services* option is highlighted (it will turn yellow). Press ***OK/Mute*** to enter the Services menu screen.

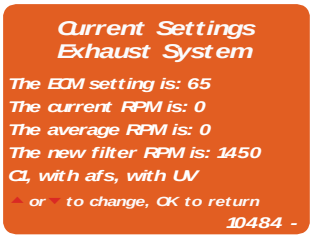
3. Press the ▼ button until the *Current Settings* option is highlighted (it will turn white). Press ***OK/Mute*** to see the configuration.



4. The first screen shows the current settings of the supply blower system.



5. By pressing the ▲ or ▼ button, you can see the current settings of the exhaust blower system. If you are recertifying the unit, you may want to record the data on this screen. The firmware revision is shown in the bottom right corner as a -, or as a letter.



Quickstart

How do I change the Configuration of the Axiom?

1. Press the ***Menu*** button.
2. Press the ▼ button until the *Services* option is highlighted (it will turn yellow).
3. Press ***OK/Mute*** to enter the Services menu screen.

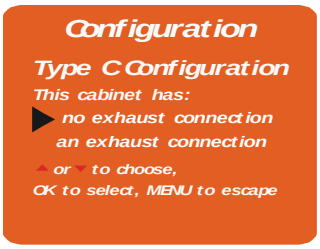
4. Press the ▼ button until the *Configuration* option is highlighted (it will turn white).
5. Press ***OK/Mute*** to alter the configuration.

6. You will see a *warning screen* alerting you that you are about to alter the BSC's settings.
7. Press ***OK/Mute*** to input the password.

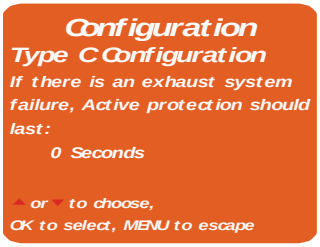
8. When requested for the password press ***Light***, ***UV light***, ***Timer***, ***Timer*** then ***OK/Mute***.

How do I change the Configuration of the Axiom? – continued

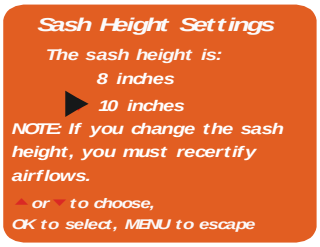
9. The first screen allows you to decide if the cabinet is connected to an exhaust system or not. When the unit is configured for no exhaust connection, the Axiom will ignore the inlet relief valve sensor's status. Selecting connected to an exhaust system activates the sensor; if the valve is open, the unit operates normally, if closed, an exhaust alarm is activated. Use the ▲or▼ buttons to select the exhaust configuration, and then press OK/Mute.



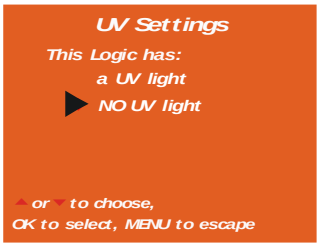
10. If the unit is configured to be connected to an exhaust system, then the next screen allows you to program the amount of time interval of Active Protection. Active Protection will allow the Axiom blowers to continue to operate after the detection of an exhaust system failure. This will maintain a safe inflow to allow the user a programmed time interval to secure any hazardous materials in the cabinet before the BSC shuts off.



11. This screen configures the sash height. After your selection is chosen, and you press OK/Mute.



12. This screen configures the unit for a UV light or not. After your selection is chosen, and you press OK/Mute, the unit will shut off and then reset in the new configuration.



13. If the unit is configured to NOT have a UV light, and the user presses the UV Light button, they will get this message.

Quickstart

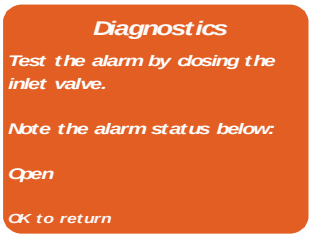
How do I run a diagnostic on the sash position switches?

1. Press the ***Menu*** button.
2. Press the ▼ button until the *Services* option is highlighted (it will turn yellow).
3. Press ***OK/Mute*** to enter the Services menu screen.

4. Press the ▼ button until the *Diagnostic* option is highlighted (it will turn white).
5. Press ***OK/Mute*** to enter the Diagnostic submenu.

6. Press the ▼ button until the Diagnostic *Sash sensors* option is highlighted (it will turn white). Press ***OK/Mute***.

7. Lower the sash, and note the status line – it should properly report the sash as open too high, open, nearly closed or closed when the sash is in the corresponding position.* Press ***OK/Mute*** to exit the diagnostic.



Quickstart

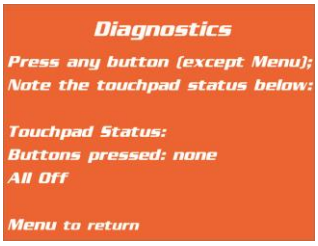
How do I run a diagnostic on the keypad, relays and contacts?

1. Press the ***Menu*** button.
2. Press the ▼ button until the *Services* option is highlighted (it will turn yellow).
3. Press ***OK/Mute*** to enter the Services menu screen.

4. Press the ▼ button until the *Diagnostic* option is highlighted (it will turn white).
5. Press ***OK/Mute*** to enter the Diagnostic submenu.

6. Press the ▼ button until the Diagnostic *Keypad-Relays* option is highlighted (it will turn white). Press ***OK/Mute***.

7. Press any button on the keypad (except *Menu*), and note the display.



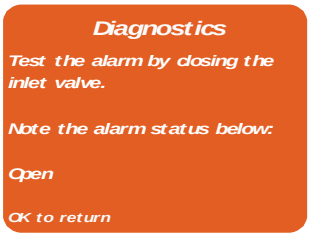
How do I run a diagnostic on the Inlet Relief Valve?

1. Press the ***Menu*** button.
2. Press the ▼ button until the *Services* option is highlighted (it will turn yellow).
3. Press ***OK/Mute*** to enter the Services menu screen.

4. Press the ▼ button until the *Diagnostic* option is highlighted (it will turn white).
5. Press ***OK/Mute*** to enter the Diagnostic submenu.

6. Press the ▼ button until the Diagnostic *Inlet Relief Valve* option is highlighted (it will turn white). Press ***OK/Mute***.

7. The display shows the status of the Inlet Relief Valve. During normal operation, it will be open, and during an exhaust alarm, it will be closed. NOTE: The inlet relief valve function is OPPOSITE OF THE MAGNETIC SWITCH FUNCTION! – WHEN THE INLET VALVE IS OPEN, THE MAGNETIC SWITCH IS CLOSED.



Quickstart

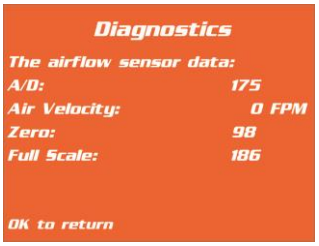
How do I run a diagnostic on the Airflow Sensor?

1. Press the ***Menu*** button.
2. Press the ▼ button until the *Services* option is highlighted (it will turn yellow).
3. Press ***OK/Mute*** to enter the Services menu screen.

4. Press the ▼ button until the *Diagnostic* option is highlighted (it will turn white).
5. Press ***OK/Mute*** to enter the Diagnostic submenu.

6. Press the ▼ button until the Diagnostic *Airflow Sensor* option is highlighted (it will turn white). Press ***OK/Mute***.

7. The display shows the status of the airflow sensor. Its current output, alarm setting and zero point in Millivolts, along with the corrected Inflow velocity currently being displayed.



Quickstart

How do I set up automatic operation of the blower and lights?

1. Press the ***Menu*** button.

2. Press the ▼ button until the *MyLogic* option is highlighted it will turn blue).
3. Press ***OK/Mute*** to enter the MyLogic menu screen.

4. Press the ▼ button until the option *configure my Logic for use* option is highlighted (it will turn white).

5. Press the ▼ button to select either Smart-Start or manual operation of the cabinet blower. (In Smart-Start, the cabinet blower will automatically start every time the sash is opened.

6. Press the ▼ button to select either Smart-Start or manual operation of the fluorescent lights.

7. Press the ▼ button to select either Night-Smart or manual operation of the cabinet blower. (In Night-Smart, the cabinet blower will automatically operate at idle every time the sash is closed.

8. Press the ▼ button to select either Night-Smart or manual operation of the UV Light.*

9. Press the ▼ button to select the time interval the UV light will operate for until it automatically shuts off.*

* - These screens will only appear if the unit is configured for a UV light.

Axiom Filter Life Gauge Operation and Resetting for Local Conditions

The filter life gauge calculates the remaining filter life by measuring and comparing the current motor speed to the initial speed noted at the factory during assembly, and the calculated maximum motor speed, using the formula:

100-(100x (<u>current speed-original speed</u>)) = % filter life left
max. speed-original speed

So ***anything*** that changes the motor's current speed, like:

- ✓ Blocking the grille.
- ✓ Raising the air temperature.
- ✓ Lowering the barometric pressure.

will increase the motor's speed, causing the Filter Life Gauge to decrease. Electronic dampening of the gauge will limit the change in readings to approximately 1%/minute.

Axiom Biosafety Cabinets being installed at altitudes or operating at temperatures significantly different from those at the time of manufacture (900 +/- 500 ft above sea level, 75° +/- 5° F) ***must*** have their filter life gauge recalibrated for local conditions. Failure to do so will result in the users noticing a steady drop in Percent (%) Filter Life remaining as the unit operates. Below are the instructions on how to correct the Filter Life Gauge for local conditions.

1. Ensure to correct all measurement equipment for local conditions (temperature, absolute pressure). Anemometers may not have this ability and might have to be done manually; whereas, a ShortRidge™ instrument has a setting to correct for local conditions.
2. As the elevation or the ambient temperature rises, the motor power factor will have to be reduced to compensate. For an initial certification, the motor speed should be reduced until it equals the Axiom's "Initial Motor Speed" as reported on the unit's test sheet, plus approximately 10-15 RPM per each additional 1000 feet of elevation.
3. The Axiom MUST be recertified using instruments corrected for local conditions.
4. When the unit is recertified, and operating properly, the certifier MUST RESET THE FILTER LIFE GAUGE, INDICATING A NEW FILTER HAS BEEN INSTALLED.
5. Only by performing Step #4 AFTER THE UNIT IS READJUSTED AND RECERTIFIED FOR ITS LOCAL CONDITION, will the filter life gauge register 100% (+/- 2%) during operation. As the Filters then load, the filter life gauge will then begin to drop as appropriate.

QuickChart – Axiom Type C1 BSCs – Imperial Units

Model	30441	30448	30461	30468
Type	C1	C1	C1	C1
Cabinet Size (in feet)	4	4	6	6
Sash Opening (inches)	10	8	10	8
Starting Serial #	1503_	1503_	1503_	1503_
Downflow Data				
Nominal Avg. Downflow (FPM)	65+/-5	65+/-5	65+/-5	55+/-5
grid # of points (rows x columns)	24 (3x8)	24 (3x8)	36(3x12)	36(3x12)
Grid distance from back & sides	6.0	6.0	6.0	6.0
Distance between rows	5.55	5.75	5.55	5.75
Distance between columns	5.21	5.21	5.50	5.50
Inflow Data				
Nominal Average Inflow (FPM)	105+/-5	105+/-5	105+/-5	105+/-5
Sash Open Area (Sq. Ft)	3.37	2.69	5.03	4.03
Nominal Avg. Exhaust Vol. (CFM)	354	283	529	423
Avg. Exhaust Vol. Range (CFM)	337-371	269-296	503-553	403-443
Secondary Inflow Data				
Sash Opening Template[1]	4+	4+	6+	6+
Sensor distance (inches)[2]	3.25	3.25	4	4
# of Test points	8	8	12	12
Test point location	*	*	*	*
Avg. Inflow Vel. (FPM) of test points at nominal	328	262	265	212
Avg. Inflow Vel. Range (FPM) of test points	312-344	249-274	251-277	202-222
Correction Factor (CF)	1.08	1.08	2	2
Average Inflow Volume (AIV) = (Avg. velocity x CF)	337-371	269-296	503-553	403-443
Sash Open Area (Sq. Ft)	3.37	2.69	5.03	4.03
Inflow Velocity Range (AIV / Sash open area)	100-110	100-110	100-110	100-110
Supply HEPA Data				
Air Displacement (CFM)	530	530	660	660
Laskin Nozzles needed	1	1	1	1
Theoretical aerosol conc. (ug/l)[3]	25	25	20	20
Width x Depth x Height (in.)[4]	48x18x3.06	48x18x3.06	72x18x3.06	72x18x3.06
Performance (CFM)	445	445	665	665
Performance (Pressure in. H_2O)	.5+/-.1"	.5+/-.1"	<.42"	<.42"
Labconco P/N	3838401	3838401	3838403	3838403
Exhaust HEPA Data				
Air Displacement (CFM)	354	283	529	423
Laskin Nozzles needed	1	1	1	1
Theoretical aerosol conc. (ug/l)[3]	38	48	26	32
Width x Depth x Height (in.) [4]	26x18x5.88	26x18x5.88	48x18x5.88	48x18x5.88
Performance (CFM)	354	354	529	52
Performance (Pressure in. H_2O)	<0.3	<0.3	<0.3	<0.3
Labconco P/N	3838511	3838511	3838513	3838513
Exhaust Volume Data				
DIM Exhaust Volume (CFM)$_5$	400	323	570	463
Traverse Exhaust Volume (CFM)[6]	480	387	684	556
Differential Pressure (in. H_20)[7]	0.3	0.3	0.3	0.3
IRV Inflow Range (CFM)[8]	20-100	20-100	20-100	20-100
Nominal IRV Slot Velocity (FPM)	240-260	240-260	240-260	240-260
Nominal IRV Slot Volume (CFM)	50	50	50	50
Supply Motor/Blower Data				
Motor HP	1/3	1/3	1/3	1/3
Exhaust Motor/Blower Data				
Motor HP	1/3	1/3	1/3	1/3
Fluorescent Lamp Data				
Fluorescent Lamps (2 each)	F32T8 TL741	F32T8 TL741	F40T8 SP41	F40T8 SP41
Fluor. Lamp Labconco Part #	9721900	9721900	9721903	9721903
Fluor. Ballast Labconco Part #	3838100	3838100	3838100	3838100

QuickChart – Axiom Type C1 BSCs – Metric Units

Model	30441	30448	30461	30468
Type	C1	C1	C1	C1
Cabinet Size (in m)	1.22	1.22	1.83	1.83
Sash Opening (mm)	254	203	254	203
Starting Serial #	1503_	1503_	1503_	1503_
Downflow Data				
Nominal Avg. Downflow (FPM)	65+/-5	65+/-5	65+/-5	55+/-5
grid # of points (rows x columns)	24 (3x8)	24 (3x8)	36(3x12)	36(3x12)
Grid distance from back & sides (mm)	152	152	152	152
Distance between rows (mm)	141	146	141	146
Distance between columns (mm)	132	132	140	140
Inflow Data				
Nominal Average Inflow (m/s)	.533+/-.03	.533+/-.03	.533+/-.03	.533+/-.03
Sash Open Area (Sq. m)	.313	.250	5.03	4.03
Nominal Avg. Exhaust Vol. (m3/s)	354	283	.468	.374
Avg. Exhaust Vol. Range (m3/s)	337-371	269-296	503-553	403-443
Secondary Inflow Data				
Sash Opening Template[1]	4+	4+	6+	6+
Sensor distance (mm)[2]	83	83	102	102
# of Test points	8	8	12	12
Test point location	*	*	*	*
Avg. Inflow Vel. (m/s) of test points at nominal	1.67	1.33	1.35	1.08
Avg. Inflow Vel. Range (m/s) of test points	1.58-1.75	1.27-1.39	1.28-1.40	1.03-1.16
Correction Factor (CF)	.0929	.0929	.1700	.1700
Average Inflow Volume (AIV) = (Avg. velocity x CF)	.0147-.017	.0118-.0130	.022-.025	.0175-.020
Sash Open Area (Sq. m)	.313	.250	.468	.374
Inflow Velocity Range (AIV / Sash open area)(m^3/s)	.05+/-.003	.05+/-.003	.05+/-.003	.05+/-.003
Supply HEPA Data				
Air Displacement (m3/s)	.250	.250	.311	.311
Laskin Nozzles needed	1	1	1	1
Theoretical aerosol conc. (ug/l)[3]	25	25	20	20
Width x Depth x Height (in.)[4]	48x18x3.06	48x18x3.06	72x18x3.06	72x18x3.06
Performance (CFM)	445	445	665	665
Performance (Pressure in. H_2O)	.5+/-.1"	.5+/-.1"	<.42"	<.42"
Labconco P/N	3838401	3838401	3838403	3838403
Exhaust HEPA Data				
Air Displacement (m3/s)	.167	.134	.250	.200
Laskin Nozzles needed	1	1	1	1
Theoretical aerosol conc. (ug/l)[3]	38	48	26	32
Width x Depth x Height (in.)[4]	26x18x5.88	26x18x5.88	48x18x5.88	48x18x5.88
Performance (CFM)	283	283	423	423
Performance (Pressure in. H_2O)	<0.3	<0.3	<0.3	<0.3
Labconco P/N	3838511	3838511	3838513	3838513
Exhaust Volume Data				
DIM Exhaust Volume (m3/s)[5]	.189	.152	.269	.219
Traverse Exhaust Volume (m,3/s)[6]	.227	.183	.323	.262
Differential Pressure (Pascal)[7]	75	75	75	75
IRV Inflow Range (m/s)	.010-.047	.010-.047	.010-.047	.010-.047
Nominal IRV Slot Velocity (m/s)	1.22-1.32	1.22-1.32	1.22-1.32	1.22-1.32
Nominal IRV Slot Volume (m3/s)	.235	.235	.235	.235
Supply Motor/Blower Data				
Motor HP	1/3	1/3	1/3	1/3
Exhaust Motor/Blower Data				
Motor HP	1/3	1/3	1/3	1/3
Fluorescent Lamp Data				
Fluorescent Lamps (2 each)	F32T8 TL741	F32T8 TL741	F40T8 SP41	F40T8 SP41
Fluor. Lamp Labconco Part #	9721900	9721900	9721903	9721903
Fluor. Ballast Labconco Part #	3838100	3838100	3838100	3838100

QuickChart – Axiom/Cell Axiom Type C1 BSCs footnotes

Axiom Model Identification

- ✓ The primary serial tag is on the lower right edge of the front dress panel.
- ✓ The secondary serial tag is located on the front of the electronics module on the top right side of the cabinet.
- ✓ The first two digits of the serial number are the year of production; the next two are the month. The next 5 digits are the sequence of production, and the letter following the serial number is the revision level of the cabinet.

Downflow Test Specifications

- ✓ All models are classified as uniform downflow.
- ✓ All tests performed as described in ANSI/NSF Standard 49:2012.
- ✓ UV Lamp, IV bar and all other accessories must be removed before measuring downflow.

Inflow Test Specifications

- ✓ All tests performed as described in ANSI/NSF Standard 49:2012.

Secondary Inflow Test Specifications

- ✓ Must use Labconco holder P/N 3836405 to perform this test properly.

1. Use the appropriate template included in Certifier Kit# 3858403.
2. Measured from the bottom edge of the probe holder to the center of the thermal anemometer sensor element.

* - Locate the single row of holes at the front of the grille. Mark the 6th hole from the side wall and subsequent test points every 9 holes until the number of test points marked equals the width of the cabinet in feet (3-foot cabinet, mark the first 3 points). Repeat for the opposite side.

HEPA Filter Leak Test Specifications

3. Based on mineral oil.
4. Without gasket

- ✓ Aerosol generator should be placed in the left rear corner of the work area, pointing toward the rear grille.
- ✓ For uncontaminated units, the upstream concentration can be sampled from the tube located under the work surface.
- ✓ Metric calculation of concentration is:
- ✓ # of Laskin nozzles @ 138K Pascal x 6.372/Volume of air in m^3/sec. = Conc. In ug/l

Exhaust Data

5. Total Exhaust Volume; The sum of the inflow and air drawn into the Inlet Relief Valve.
6. Measured as per ASHRAE methodology for measuring air volume in round ducts.
7. Measured at the exhaust transition sampling point, relative to atmosphere.
8. IRV = Inlet Relief Valve.

UV lamp Specifications

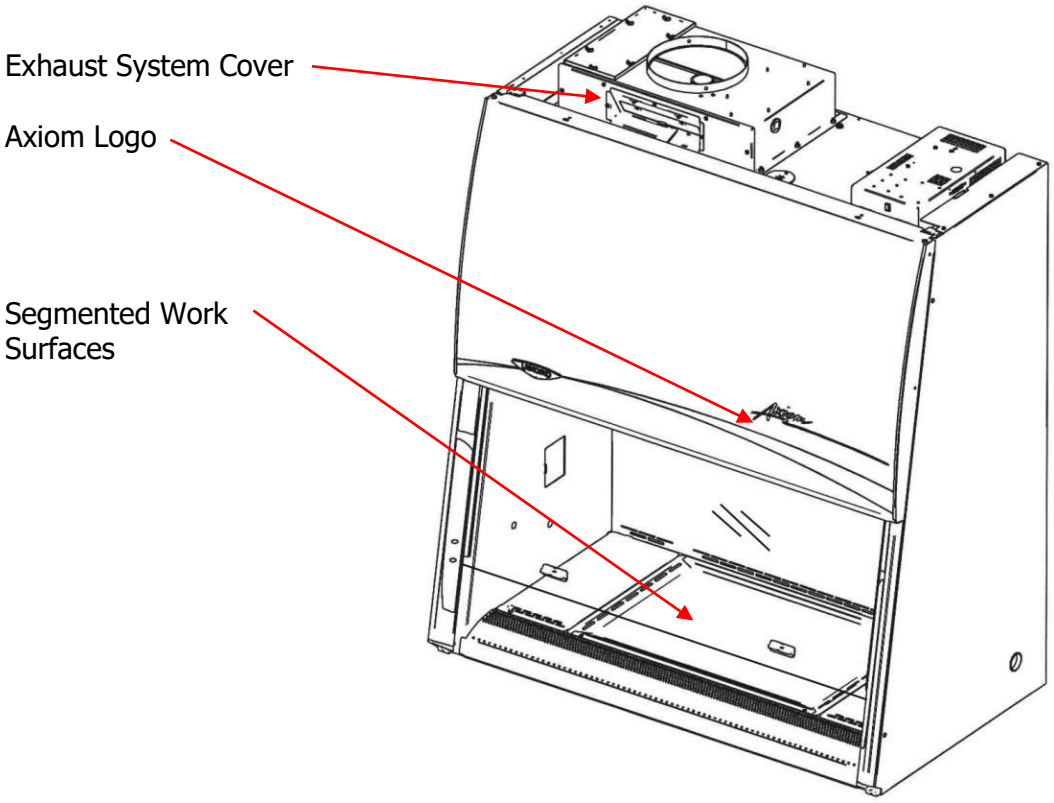
- ✓ For all models, the UV lamp number is G30T8. The Labconco part number is 1271300.
- ✓ For all 115/230 VAC models, the ballast assembly is Labconco part number 3829901. The ballast is Robertson part number PSM2GPH18MVW.
- ✓ For all 100 VAC models, the ballast assembly is Labconco part number 3830600. The ballast is Robertson part number RSO1GPH30100.

IDENTIFYING AXIOM MODELS

The Axiom platform Biosafety Cabinet can be identified readily by several external features, as shown in Figure 1-1:

- Model number Stars with 304xxxxxx
- Serial number beginning with 1503xxxxx.
- Exhaust System Cover.
- Segmented Work Surfaces.

Figure 1-1



SERIAL NUMBER TAGS

The model/serial number tag is located on the bottom right edge of the dress panel. A second tag is located on the front of the electronics module on the top of the unit. This tag includes the unit's operating voltage and amperage. The model and serial numbers of each unit are also recorded on the unit test report attached beneath the front dress panel. These items are shown graphically in the figures 1-3 to 1-5 below:

Figure 1-3

Primary Serial Tag

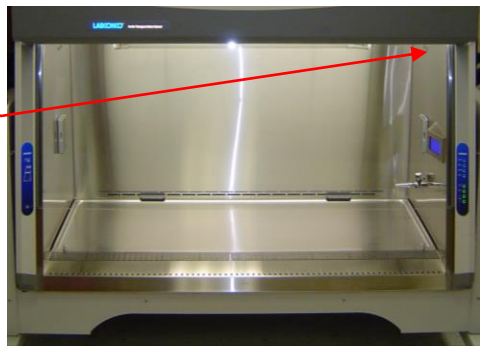


Figure 1-4

Secondary Serial Tag

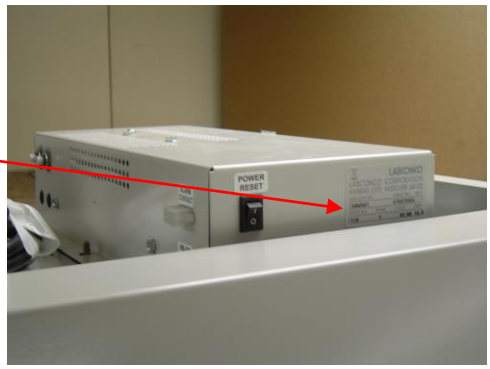
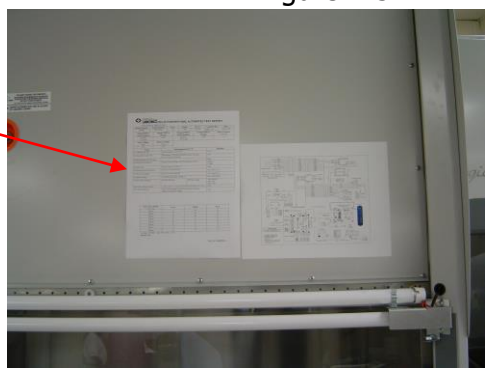


Figure 1-5

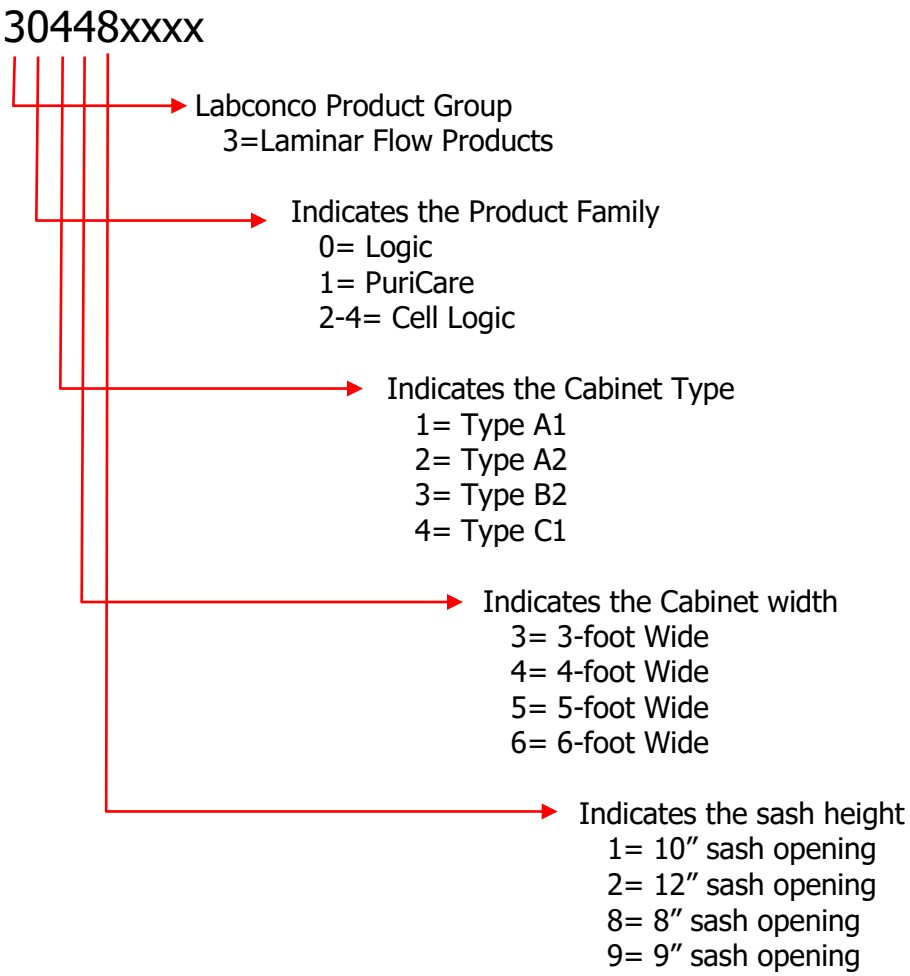
Final Inspection and Test Report Form



Obviously, you can get confirmation of the Biosafety Cabinet's model by contacting Labconco's Product Service Department, and providing us with the serial number. From this number, we can tell the date of production and its model.

AXIOM MODEL NUMBERING SYSTEM

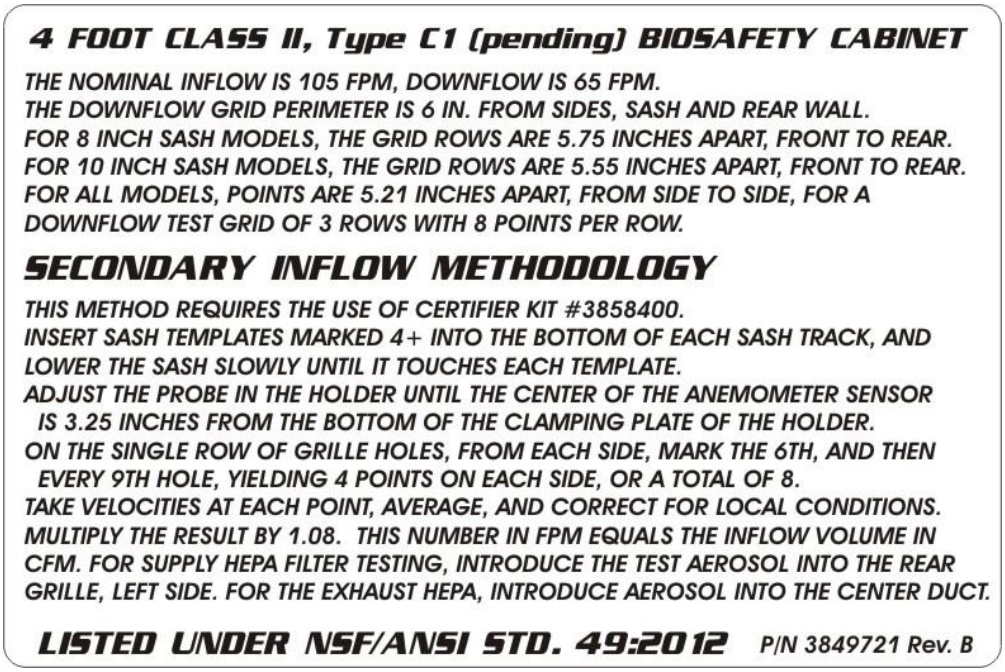
Axiom units' model numbers define the configuration of the cabinet. The first five digits define the unit's configuration, while the last four are assigned based on the unit's options and electrical configuration. Thus, a model number of:



Axiom Data Plate

The Axiom Data Plate contains much of the information required to certify the unit. Information on the plate includes nominal inflow and downflow velocity settings, a description of how to establish the downflow grid and the secondary inflow methodology are also included on the data plate, as shown below. The plate is located in the upper left corner of the dress panel.

Figure 1-6



Final Inspection and Test Report Form

A copy of the Final Inspection Test Report is attached to the blower plenum cover, beneath the front dress panel. The report contains initial setup information on inflow and downflow velocities, and the initial blower torque setting. A copy of the report is shown in Figure 1-7, below

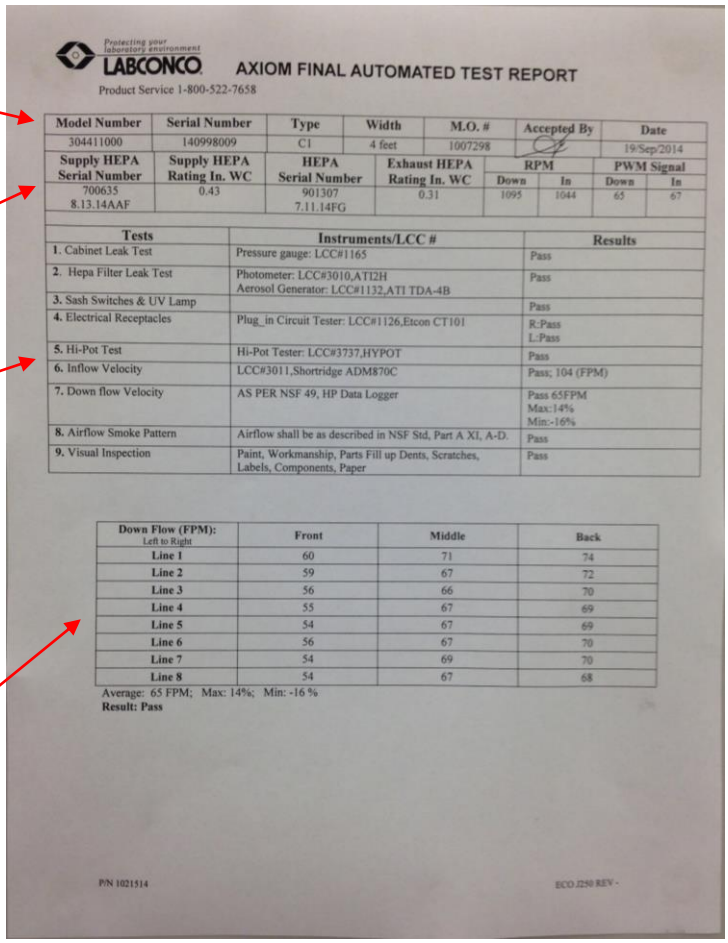
Figure 1-7

Model/Serial Numbers

HEPA Filter Information

Test Results

Downflow Test Results



LABCONCO

AXIOM FINAL AUTOMATED TEST REPORT

Product Service 1-800-522-7658

Model Number	Serial Number	Type	Width	M.O. #	Accepted By	Date
304411000	140998009	C1	4 feet	1007298		19/Sep/2014

Supply HEPA Serial Number	Supply HEPA Rating In. WC	HEPA Serial Number	Exhaust HEPA Rating In. WC	RPM		PWM Signal	
				Down	In	Down	In
700635 8.13.14AAF	0.43	901307 7.11.14FG	0.31	1095	1044	65	67

Tests	Instruments/LCC #	Results
1. Cabinet Leak Test	Pressure gauge: LCC#1165	Pass
2. Hepa Filter Leak Test	Photometer: LCC#3010,ATI2H Aerosol Generator: LCC#1132,ATI TDA-4B	Pass
3. Sash Switches & UV Lamp		Pass
4. Electrical Receptacles	Plug_in Circuit Tester: LCC#1126,Etcon CT101	R:Pass L:Pass
5. Hi-Pot Test	Hi-Pot Tester: LCC#3737,HYPOT	Pass
6. Inflow Velocity	LCC#3011,Shortridge ADM870C	Pass; 104 (FPM)
7. Down flow Velocity	AS PER NSF 49, HP Data Logger	Pass 65FPM Max:14% Min:-16%
8. Airflow Smoke Pattern	Airflow shall be as described in NSF Std, Part A XI, A-D.	Pass
9. Visual Inspection	Paint, Workmanship, Parts Fill up Dents, Scratches, Labels, Components, Paper	Pass

Down Flow (FPM): Left to Right	Front	Middle	Back
Line 1	60	71	74
Line 2	59	67	72
Line 3	56	66	70
Line 4	55	67	69
Line 5	54	67	69
Line 6	56	67	70
Line 7	54	69	70
Line 8	54	67	68

Average: 65 FPM; Max: 14%; Min: -16 %

Result: Pass

P/N 1021514

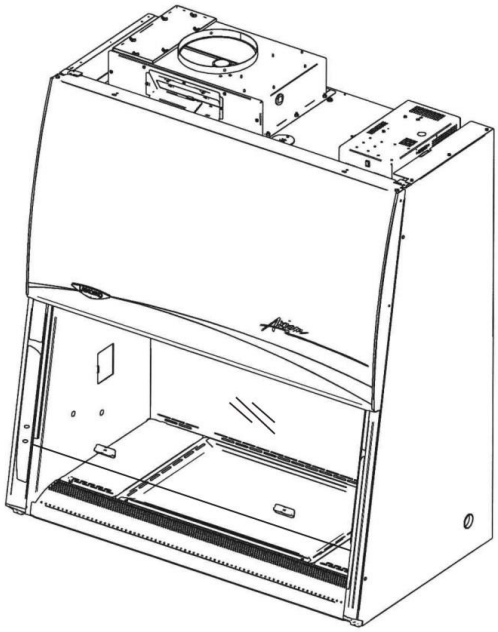
ECO J250 REV -

Theory of Operation

Background

The Axiom Type C1 BSC was the result of a customer request for a Type B (directly exhausted) cabinet that could operate at a constant exhaust system vacuum of only 0.25 inches of H_2O. Realizing that this was impossible for existing Type B technologies, Labconco developed a new type of BSC; The proposed Type C1.

Figure 1-8



Airflow Patterns and Features

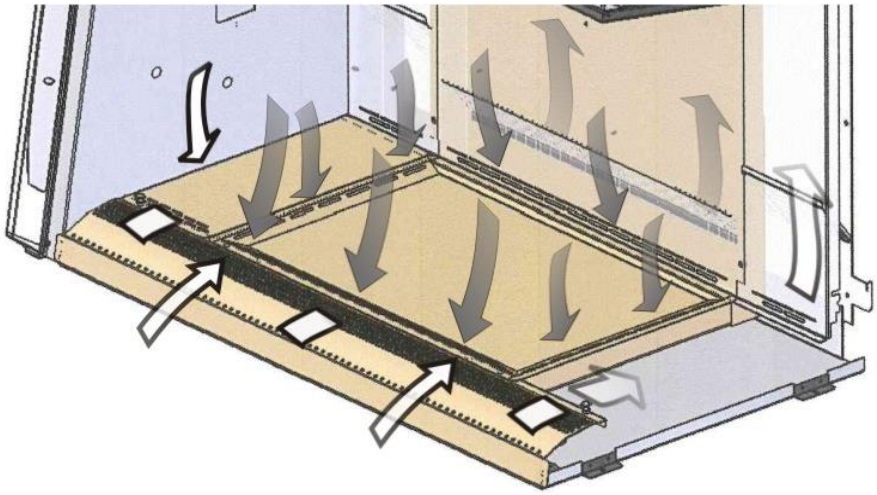
The overall airflow pattern in the Type C1 is similar to a Type B1, with three important differences:

1. In the C1, the directly exhausted portion of downflow air is taken from the center of the work area (The Chem-Zone™).
2. An inlet relief valve, unique to the Axiom, stabilizes the inflow as exhaust system airflows fluctuates, and closes during an exhaust system failure, signaling the Axiom to initiate a timed "Active Protection" of the user and their work.
3. A constant volume exhaust blower upstream of the Exhaust HEPA maintains constant inflow, and allows the unit's blowers to continue to operate during an exhaust system failure (Active Protection), maintaining safe inflows and downflows while the user secures any hazardous materials in the work area.

Chem-Zone™ Directly Exhausted Work Zone

Unique to the Axiom is the Chem-Zone, a directly exhausted work zone. The central portion of the work surface is surrounded by grilles on the sides, front and back. Air entering these grilles is drawn to the Exhaust HEPA filter, and when the cabinet is connected to an exhaust system, out of the laboratory. This feature prevents the recirculation of volatile chemicals as seen in Type A cabinets, while exhausting much less air than Type B2 models. This is illustrated in Figure 1-8a.

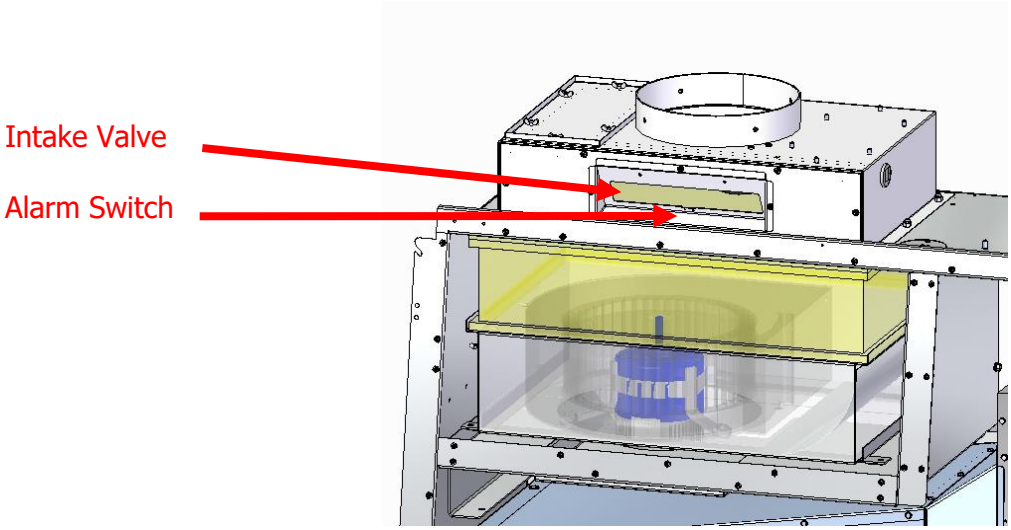
Figure 1-8a



Inlet Relief Valve

Also unique to the Axiom is the Inlet Relief Valve, The intake valve is angled such that the incoming make-up (room) air must keep the valve open to maintain normal operation; a loss of exhaust volume will allow gravity and air pressure to close the inlet valve and open the magnetic switch, resulting in an exhaust alarm.

Figure 1-8b



Exhaust System

Key to the Axiom is its exhaust flexibility. When properly configured, the HEPA-filtered exhaust can be recirculated back into the laboratory.

When configured for, and connected to an external exhaust system, the airflow patterns are similar to the definition of a Type B1, however, the integral exhaust blower and Inlet Relief Valve changes the operating characteristics of the Axiom.

The CAP (Constant Airflow Profile)-programmed exhaust fan motor draws a constant volume of air through the exhaust ductwork and exhaust HEPA filter, and 'presents' the air to the exhaust system. This means the inflow volume will remain constant as the exhaust system fluctuates, or as the exhaust HEPA filter loads.

This arrangement lowers the vacuum required to operate the unit to a constant 0.3 inches H_2O; far lower than traditional Type B BSCs.

The inlet relief valve is pulled opened when the exhaust system draws more air than the Axiom exhausts. If the exhaust system fails, gravity and positive air pressure cause the Inlet Relief Valve to close, activating the sensor to signal an exhaust alarm.

Exhaust System Alarm

The Axiom is unique in its response to an exhaust alarm. Instead of shutting off the BSC's blowers, the Axiom starts its "Activate Protection Protocol" – a certifier-programmed interval of up to 5 minutes. During this interval, the Axiom's exhaust blower speeds up to compensate for the loss of the remote exhaust fan to provide constant inflow. The supply blower maintains downflow. This offers the user time to secure any hazardous material in the BSC. At the end of the Active Protection cycle, the supply blower shuts off, followed by the exhaust fan 10 seconds later, to ensure containment until the unit shuts off completely.

Figure 1-8c

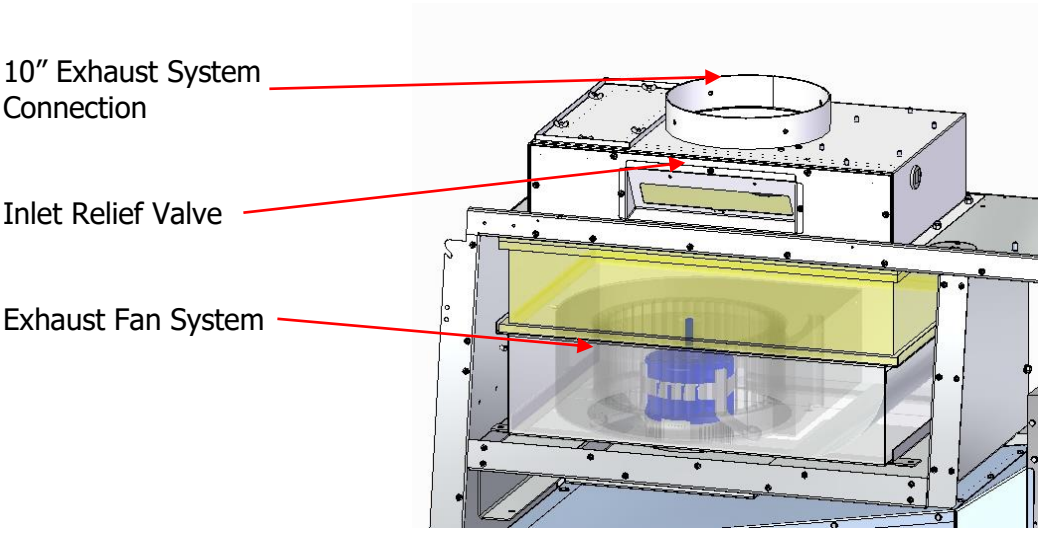
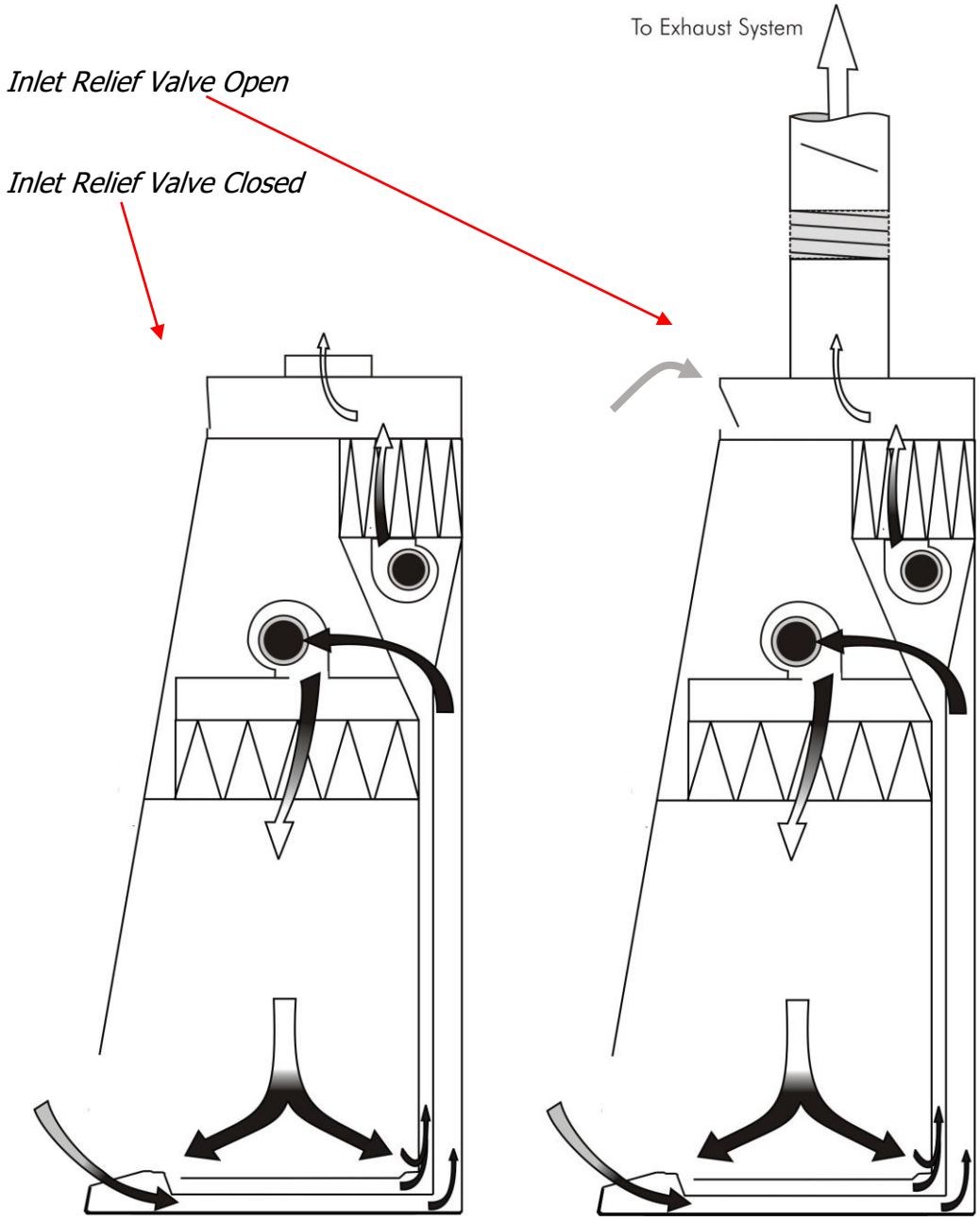


Figure 1-8d



Airflow Patterns of the Axiom in Recirculating and Exhausted Modes.

ECM Motor

The modern Class II Biosafety Cabinet was developed in the early 1960's as a result of the increased availability of High Efficiency Particulate Air (HEPA) filter technology. The motor of choice at the time to drive the cabinet's blower was the Permanent Split Capacitor (PSC) type. At the time, the PSC motor offered manufacturers an inexpensive power source whose speed could be electronically controlled to allow for airflow adjustment as the HEPA filter(s) loaded.

The PSC motor is known as an induction type, for stationary windings (stator) surround a rotating part (rotor) composed of iron or steel. As current passes through the stator windings, it induces a magnetic field in the rotor, causing it to rotate towards the shifting field in the stator. Because a magnetic field must be induced in the rotor, the PSC motor is asynchronous, with the rotor constantly lagging behind the fields being created in the stator. As a result of this asynchronous operation, the PSC motor is inefficient, and generates high amounts of waste heat. Attempting to control the blower speed by reducing its voltage only increases the inefficiency of the PSC motor.

DC motors are more efficient than their AC counterparts. In a typical DC motor, the stator in an AC motor is replaced with permanent magnets. The rotor then has a series of windings around it. When current is applied to the motor, a magnetic field is created in some of the windings of the rotor, causing it to rotate toward the magnetic field created by the permanent magnets. Brushes in contact with a commutator allow the current, and thus the magnetic field in the rotor to progressively shift from winding to winding, forcing the rotor to keep rotating.

The greatest drawback of brushed DC motors is the brushes-they wear themselves and the commutator down, eventually causing motor failure.

With the development of greater microprocessor power in the 1970s and 80s, the stage was set for an even more efficient type of DC motor – the Electronically Commutated Motor (ECM).

Figure 1-9

In the ECM, the magnets and windings switch position – the permanent magnet is on the rotor, and the series of windings are placed around the rotor. The microprocessor precisely controls the creation of magnetic fields in the stator, so that the rotor is always synchronous with the magnetic fields being created in the stator. As a result, the ECM will always run more efficiently and cooler than a comparable PSC motor. Because of the simple, robust construction of the ECM, it offers far greater reliability and operational service life than the PSC motor.

Controlling the motor's operation with a microprocessor adds numerous advantages. Motor speed can be efficiently controlled across a speed range that would damage or destroy a PSC motor. Given enough microprocessor memory and power, the manufacturer can program in any number of user-selected programs controlling motor speed, power and even direction of rotation. The ultimate expression of the power of the ECM was the development of the constant volume algorithm, by General Electric, and used in the Axiom BSC. By

testing a prototype model to a variety of airflows and filter pressures, the motor/blower can be "characterized" for that size cabinet. This characterization allows for the creation of a model-specific motor-blower curve. By programming the curve values into the motor during assembly, the motor will deliver the correct volume of air as the HEPA filters load.

Electronics

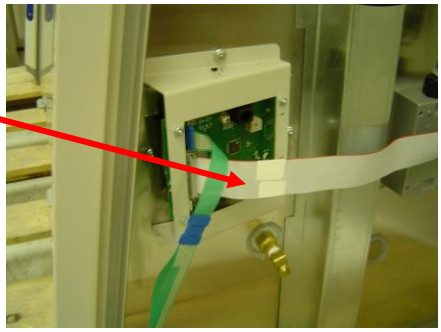
The Axiom utilizes two microprocessors. The first is part of the ECM motor, attached to end of the motor housing, as shown in Figure 1-10. This processor controls motor operation, and communication with the display board. The second is located on the control board, located on the right side wall, as shown in Figure 1-11. It controls the display and its interface to the touchpad.

Figure 1-10

The ECM Microprocessor board is encapsulated in epoxy to prevent moisture and dirt contamination of the microelectronics.

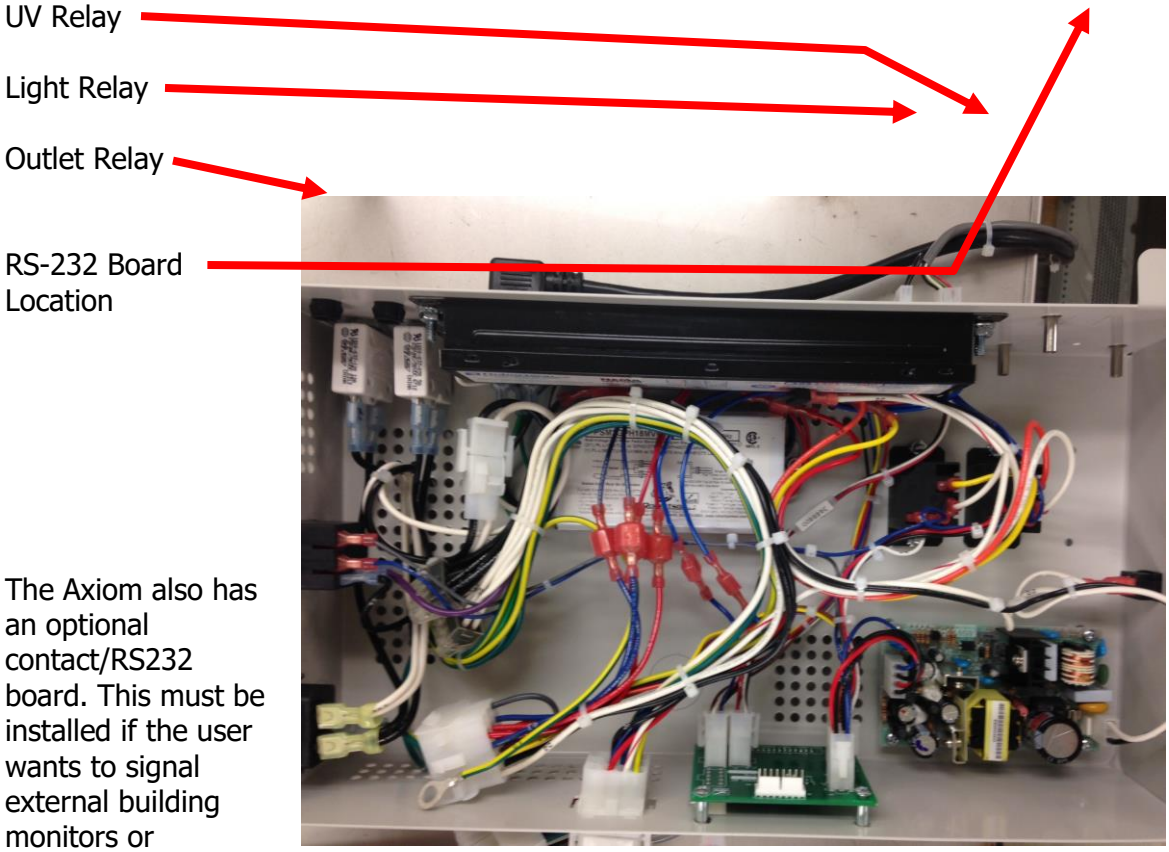
Figure 1-11

The control board assembly (located on the right side wall)



The Axiom has three circuit boards. The ECM microprocessor and power supply board, located in the end of the ECM, the control board on the right side wall, shown in Figure 1-11, and the power supply board assembly, located in the electronics module, as shown in Figure 1-12.

Figure 1-12



The Axiom also has an optional contact/RS232 board. This must be installed if the user wants to signal external building monitors or controllers, or wants the Axiom to output operating information to a data logger. The optional board is located in the electronics module.

Section Two –
Installation Requirements

This section offers an overview of site requirements and how to prepare the unit for operation.

Prerequisites

Before you install the Axiom, you need to prepare the site for installation. Examine the location where you intend to install the cabinet. You must be certain that the area is level and of solid construction. In addition, a dedicated source of electrical power must be located near the installation site.

Carefully read this chapter to learn:

- Location requirements.
- Electrical power requirements.
- Exhaust requirements.
- Service utility requirements.
- Space requirements.

Refer to Section Nine: Miscellaneous, for complete biosafety cabinet electrical and environmental conditions, specifications and requirements.

Space Requirements

The overall dimensions for the 4-foot Axiom are 64.2 inches (163 cm) high, 32 inches (81 cm) deep, and 54.2 inches (138 cm) wide. The overall dimensions for the 6-foot Axiom are 64.2 inches (163 cm) high, 32.6 inches (83 cm) deep, and 78.2 inches (199 cm) wide.

Complete dimensions for the Axiom biosafety cabinets are shown in *Section Nine: Miscellaneous*.

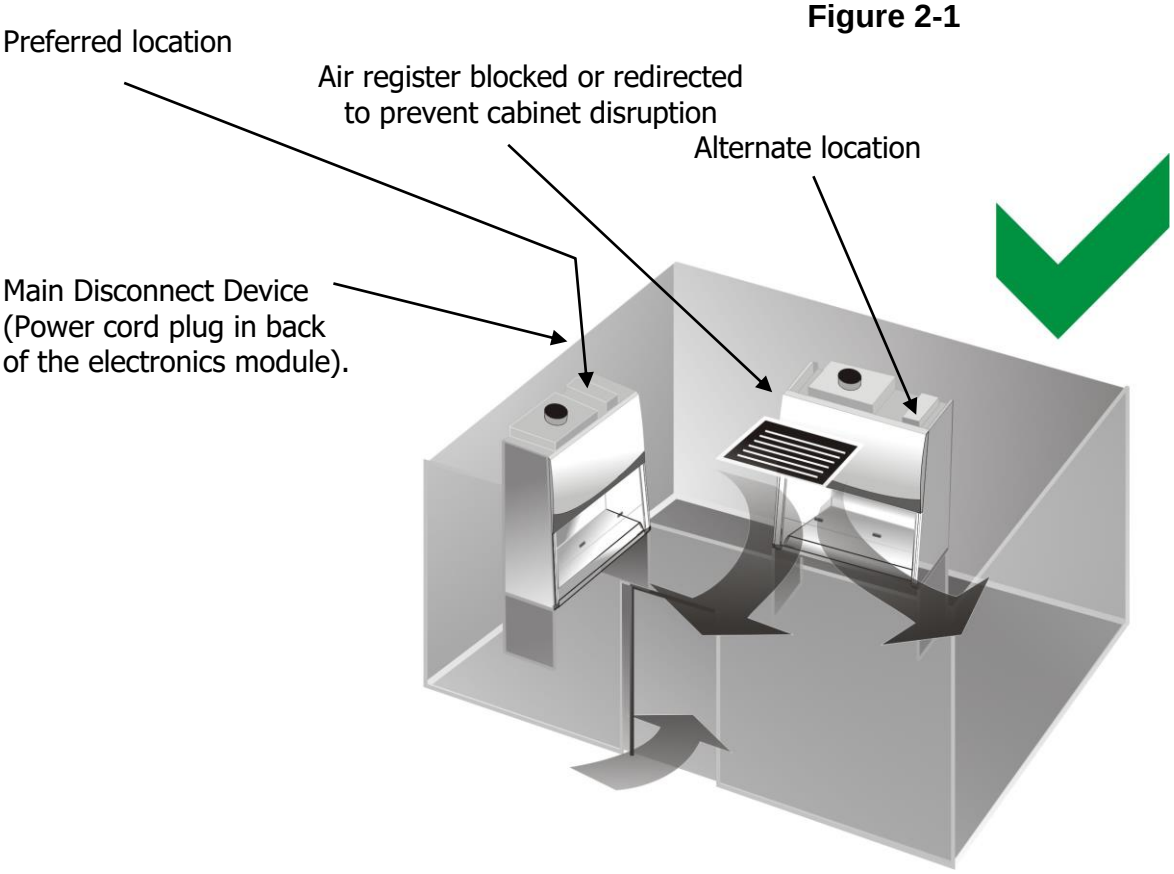
Clearance

A minimum clearance of at least 4 inches (100 mm) is suggested on the top and 6 inches (150mm) on both sides of the cabinet for service.

Location Requirements

Note: The biosafety cabinet should be located away from traffic patterns, doors, fans, ventilation registers, fume hoods and any other air-handling devices that could disrupt its airflow patterns. All windows in the room should remain closed. Figure 2-1 shows the preferred location for the biosafety cabinet.

Figure 2-1



Do not position the unit so that it is difficult to operate the main disconnect device.

Ne placez pas l'appareil de sorte qu'il est difficile de faire fonctionner le dispositif principal de déconnexion.

If You Intend to Connect the Axiom to an Exhaust System:

NOTE: THE EXHAUST BLOWER CANNOT RUN AT ITS NOMINAL FLOW RATE WITH THE SASH COMPLETELY CLOSED. IF YOU CHOOSE TO CLOSE THE SASH COMPLETELY TO USE THE UV LIGHT FOR SURFACE DISINFECTION, THEN THE EXHAUST BLOWER MUST BE SHUT OFF, OR ITS FLOW RATE REDUCED 90% OR MORE FOR PROPER OPERATION. THE AXIOM HAS AN OPTIONAL EN/CONTACT CIRCUIT BOARD THAT HAS DRY CONTACTS THAT CAN BE CONFIGURED TO SIGNAL THE EXHAUST BLOWER TO TURN ON WHEN THE AXIOM's BLOWER IS ON. FOR FURTHER INFORMATION, CONTACT LABCONCO'S PRODUCT SERVICE DEPARTMENT. AS AN ALTERNATIVE, A REMOTE ELECTRICAL SWITCH FOR THE EXHAUST BLOWER CAN BE INSTALLED NEAR THE AXIOM.

Figure 2-1a

NOTE: Only connect the cabinet to a suitable exhaust system, one dedicated to the cabinet itself, or dedicated to exhausting laboratory ventilation equipment. DO NOT connect the unit to the building's HVAC system room exhaust.

Examine the location to ensure that it accommodates the cabinet's exhaust duct. The area directly above the cabinet's exhaust port should be clear of structural elements, water and utility lines, or other fixed obstructions. There should be enough clearance to accommodate a 10-inch diameter duct.

Avoid cabinet locations that require an elbow directly above the cabinet's exhaust connection or an excessive number of elbows in the exhaust system. There should be a straight length 10 duct diameters long between the cabinet and any elbow, and between subsequent elbows.

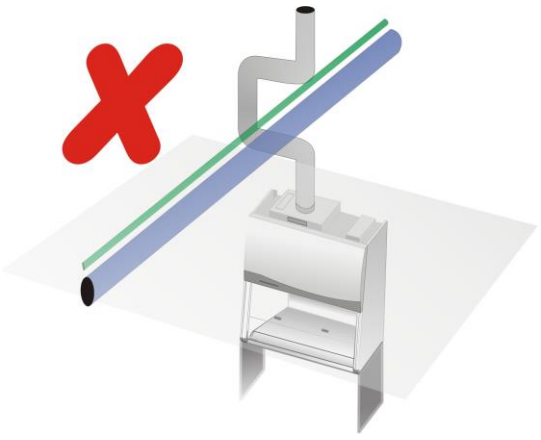
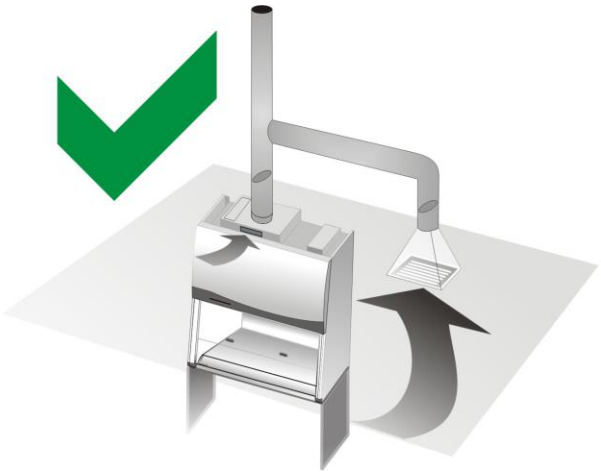


Figure 2-1c

The Inlet Relief Valve located on the top of the cabinet is designed to draw a maximum of 100 CFM (2.83 m^3/m). Attempting to draw additional room air through the valve (room air exhaust), can result in unstable cabinet operation.

Figure 2-1d

If additional room exhaust is needed to be drawn through the exhaust system, install an additional duct and balancing damper downstream of the cabinet's damper. This will allow for proper balancing of the system.



The exhaust system must be capable of moving the following volumes of exhaust air at the negative pressures listed. The **Airflow Volumes** are the values recorded via a direct measurement using a flow hood at the cabinet. The **Concurrent Balance Values** are measured in the exhaust duct via traverse methodology, and will always be higher due to differences in volume measurement methodologies.

Table 2-1

Axiom Type C1 Airflows	Airflow Volume		Concurrent Balance Value		Recommended Duct Vacuum$_1$	
	ft^3/min	m^3/sec	ft^3/min	m^3/sec	WC	Pa
4-foot, 8" Sash	323	0.15	387	0.18	0.30	75
4-foot, 10" Sash	400	0.19	480	0.23	0.30	75
6-foot, 8" Sash	463	0.22	556	0.26	0.30	75
6-foot, 10" Sash	570	0.27	684	0.32	0.30	75

1 – Unlike Type B cabinets, the recommended vacuum will remain constant throughout the life of the Exhaust HEPA filter. Duct vacuums below 0.3 WC (37 Pa), or above 0.5 WC (125 PA) may result in erratic operation.

Electrical Requirements

The biosafety cabinet models have the following electrical requirements:

Table 2-1

Model #	Requirements
3044xxx0x	115 VAC, 60 Hz, 16 Amps
3044xxx2x	100 VAC, 50/60 Hz, 16 Amps
3044xxx-10, 30, 40, 50, 60, 70	230 VAC, 50/60 Hz, 8 Amps
3046xxx0x	115 VAC, 60 Hz, 16 Amps
3046xxx2x	100 VAC, 50/60 Hz, 16 Amps
3046xxx-10, 30, 40, 50, 60, 70	230 VAC, 50/60 Hz, 8 Amps

Note: A dedicated outlet with an appropriate circuit breaker should be located as close as possible to the right rear side of the cabinet, at a height even with, or higher than, the top of the bench or stand. Consult your local electrical codes for properly rated circuit breakers. For safe operation the dedicated outlet must provide the protective earthing ground connection to the cabinet.

Note: On 100 and 115 VAC models, both electrical outlets are protected by a ground fault interrupter circuit (GFIC). Labconco does not recommend plugging the biosafety cabinet into a GFIC outlet.

Electrical outlets in the cabinet are restricted to 5 amps maximum current.

Prises électriques dans l'armoire sont limitées à 5 courant maximum ampères.

The biosafety cabinet models have the following electrical requirements:

Do not use any detachable power cord that is not adequately rated for the unit.

Ne pas utliser un fil électrique amovible qui n'est pas du tension nominale de l'appareil.

Service Line Requirements

All utility service lines should be ¼ inch O.D., brass, copper, or stainless steel, and equipped with an easily accessible shut-off valve. If the service line pressure exceeds 40 PSI, it must be equipped with a pressure regulator to reduce the line pressure.

Note: The use of flammable gases or solvents should be avoided in the biosafety cabinet. Open flame in the cabinet will disrupt the laminar airflow in the cabinet and may damage the HEPA filters. Flammable gases or solvents may reach explosive concentrations in the cabinet or ductwork. If you feel that the procedure requires the use of an open flame or flammable materials, contact the institution's safety office.

The use of air or gases under high pressure should be avoided as they may seriously disrupt the airflow patterns in the cabinet.

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Section Three – Installation

Now that the installation is properly prepared, you are ready to inspect, install, and certify the Axiom biosafety cabinet. This chapter covers how to:

- Unpack and move the biosafety cabinet.
- Install the cabinet.
- Connect the electrical supply source.
- Connect the service lines.
- Connect to an exhaust system (optional for Type As).

Tools required for installation the biosafety cabinet include two 1/2" wrenches, a flat-blade screwdriver, a #2 Phillips screwdriver, and a carpenter's level.

Note: The biosafety cabinet models weigh between 400–700 lbs. (182-318 kg). The shipping pallet allows for lifting with a mechanical lift truck or floor jack. If you must lift the product manually, use at least six (6) persons and follow safe-lifting guidelines.

Unpacking the Biosafety Cabinet

Carefully remove the outer carton and inspect the cabinet for damage that may have occurred in transit. If the biosafety cabinet is damaged, notify the delivery carrier immediately and retain the entire shipment intact for inspection by the carrier.

Note: United States Interstate Commerce Commission rules require that claims be filed with the delivery carrier within fifteen (15) days of delivery.

Do not return goods without the prior authorization of Labconco. Unauthorized returns will not be accepted.

If the cabinet was damaged in transit, you must file a claim directly with the freight carrier. Labconco Corporation and its dealers are not responsible for shipping damages.

Do not discard the carton or packing material for the biosafety cabinet until all of the components have been checked, installed and tested.

The cabinet is secured to the pallet in two places on each side. To access the nuts and bolts, remove the side panels by removing and keeping the two Phillips screws on both panels. Swing the front of each panel away from the cabinet, and lift it straight up to remove the panel from the cabinet.

Note: The side panels must be removed to access the fasteners that secure the biosafety cabinet to the pallet. **DO NOT ATTEMPT TO LIFT THE BIOSAFETY CABINET BY THE SIDE PANELS; DAMAGE WILL OCCUR.**

Preparing the Biosafety Cabinet for Operation

Installation instructions (Labconco P/N 1056801) are attached to the sash of the biosafety cabinet. If these instructions are missing or unclear, contact Product Service at 800-821-5525 or 816-333-8811. The following are located in a box either taped to the top of or underneath the work surface:

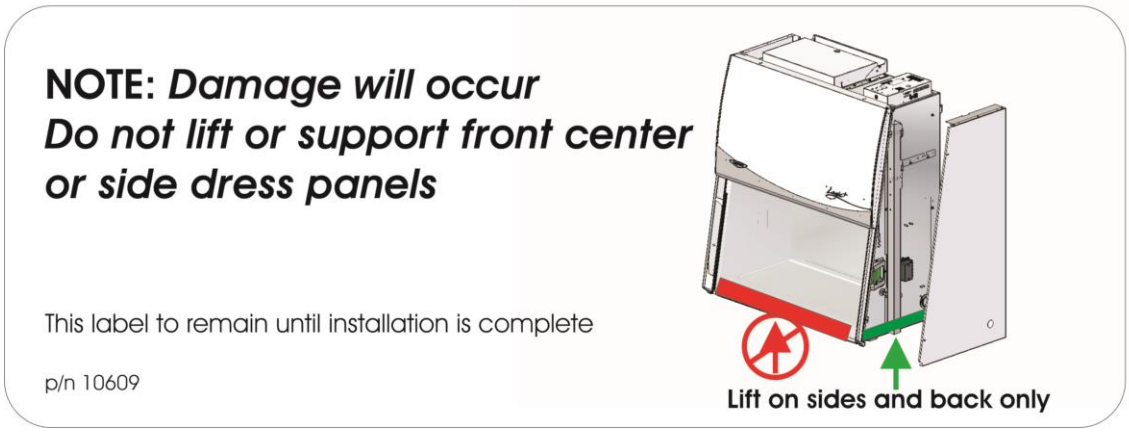
- User's Manual CD
- Drain Valve Assembly and fasteners
- Power Cord
- Product Registration Card
- Vacu-Pass™ Accessories (optional)

If you did not receive one or more of the components listed for the cabinet, or if any of the components are damaged, contact Labconco Corporation immediately for further instructions.

Moving and Lifting the Cabinet

Move the cabinet, attached to its pallet, by using a floor jack, or a furniture dolly underneath the unit. DO NOT move the cabinet by tilting it onto a hand truck.

When lifting the cabinet DO NOT lift the cabinet in the middle front area of the hull. Lifting here may bend or distort the bottom of the cabinet, causing damage to the unit.



Installing the Biosafety Cabinet on an Existing Work Surface

Note: The biosafety cabinet is very top heavy. Use caution when lifting or moving it.

When installing the biosafety cabinet onto an existing work surface or benchtop, ensure that the structure can safely support the combined weight of the cabinet and any related equipment. The work surface should be at least as wide as the cabinet and 31 inches (787 mm) deep to properly support the unit.

A hole or notch may be cut in the supporting surface in the right front corner to accommodate the optional drain valve.

Installing the Cabinet on a Labconco Base Stand

Labconco offers accessory Base Stands in a variety of configurations to suit your particular needs. Stands can be ordered with adjustable telescoping legs or with a manually or electrically adjustable hydraulic lift.

Telescoping Base Stands

These stands are included with some Axiom models, or are available separately. The base stands for each width cabinet are listed in Table 3-1 below. An optional caster wheel kit is available (part # 3730500).

Table 3-1

Width	Base Stand w/Feet Model #
4'	3401004
6'	3401006

Manual or Electric Hydraulic Lift Base Stands

These base stands offer infinitely adjustable height between 25.5 and 33.5 inches (648 to 851 mm), giving a cabinet work surface height of 28.0 to 36.0 inches. The height is adjusted either by a manual (hand crank) or electric pump that drives hydraulic rams in the legs of the stands. All of the hydraulic stands are equipped with fixed feet, but can be converted to caster wheels with the addition of Caster Kit #3784000. The base stands for each cabinet size is listed in Table 3-2 below.

Table 3-2

Width	Manual Lift Stand #	Electric (115V) Lift Stand #	Electric (230V) Lift Stand #
4'	3780201	3780101	3780104
6'	3780202	3780102	3780105

Note: When installing the cabinet on the hydraulic lift base stand, ensure that the hydraulic lines and the electrical cord are clear of any obstructions before installing the cabinet on the stand or operating the lift system.

SoLo™ Electric Hydraulic Lift Base Stands

These base stands permit the Axiom to be lowered enough to be transferred through a standard doorway as low as 78 inches. Casters provide mobility and lock in place. The SoLo Stands for each Purifier Axiom series model is listed below.

Table 3-3

	115V SoLo Stand #	230V SoLo No. America Plug #	230V SoLo UK Plug #	230V SoLo Schuko Plug #	230V SoLo China/Australia Plug #
4'	3780311	3780315	3780331	3780335	3780339
6'	3780313	3780317	3780333	3780337	3780341

Optional Exhaust Connection Requirements

Certain applications such as working with odorous products or volatile toxic materials will require the connection of the biosafety cabinet to an exhaust system.

Note: The Type C1 exhaust connection includes an integral inlet relief valve, which functions as a one-way, or check valve. During operation, the exhaust system draws all of the cabinet's exhaust air, plus a volume of room air through the relief valve into the exhaust duct. The inlet relief valve functions as a "shock absorber" allowing the cabinet to maintain optimal inflow during changes in room air pressure.

Note: Because the Type C1 cabinet has an integral exhaust fan, the vacuum requirements of the exhaust system will be much lower than existing Type B units. Please see the volume and vacuum requirements in Table 2-1, in *If you intend to connect the biosafety cabinet to an exhaust system:* in *Chapter 2: Prerequisites*

Note: If the research involves the use of toxic compounds or volatile materials, contact the facility's safety officer or Labconco to ensure that the biosafety cabinet and its exhaust system are compatible with the materials you will be working with.

Configuring for an Exhaust System Connection

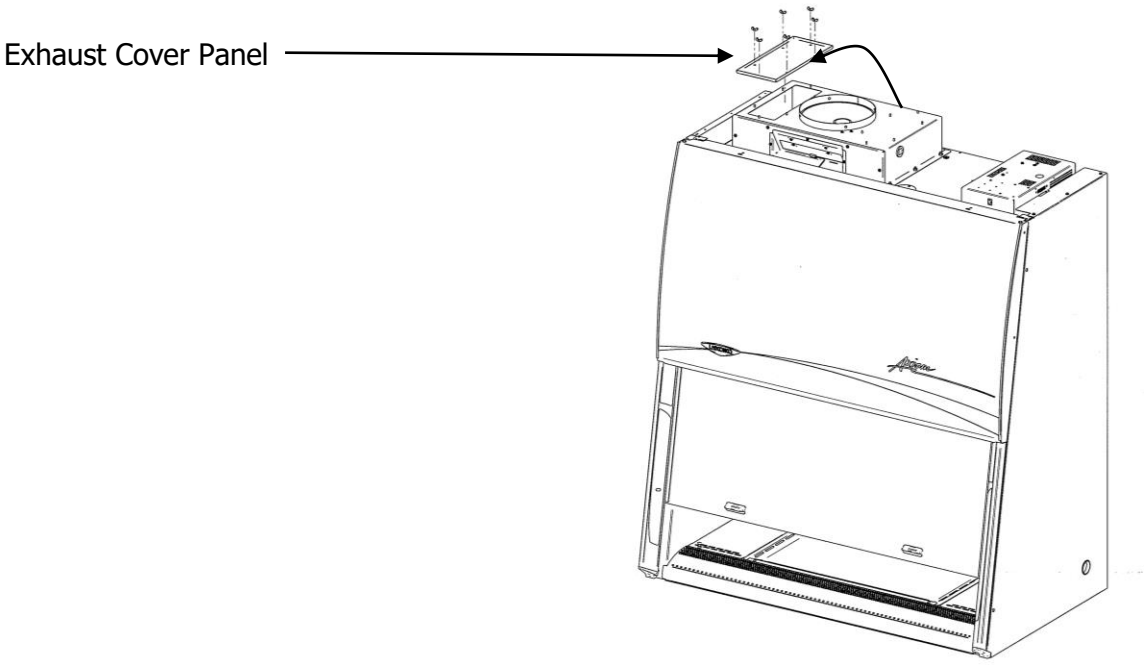
Note: The Type C1 is configured at the factory to operate in recirculating mode (NOT *connected* to an exhaust system). When operating in this mode, the cabinet ignores the inlet relief valve position. **If you intend to connect the Type C1 to an exhaust system, YOU MUST RECONFIGURE IT FOR THIS INSTALLATION.**

Note: If the Type C1 is connected to an exhaust system, and you choose to disconnect it from the exhaust system, to exhaust its HEPA-filtered air back into the laboratory, **YOU MUST RECONFIGURE IT FOR THIS INSTALLATION. These instructions follow.**

a) Mechanical configuration

1. Unplug the Axiom. Using an appropriate ladder or platform, remove the exhaust cover panel on the top right side of the exhaust cover, and install it over the hole on the left side. Hand tighten the wing nuts to secure it, as shown in figure 3-1.
2. Connect the Axiom's connection collar to the exhaust system, ensuring the connection meets all appropriate codes and regulations.

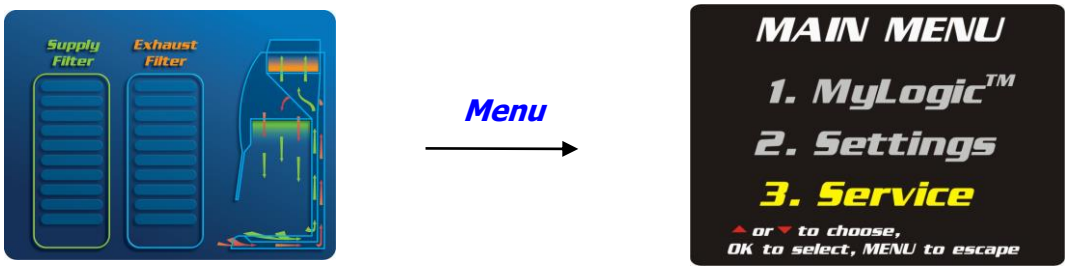
Figure 3-1



b) Electronic configuration

Keypad operations are shown as ***blue bold italic***. Menu screen selections are shown as *green italics*.

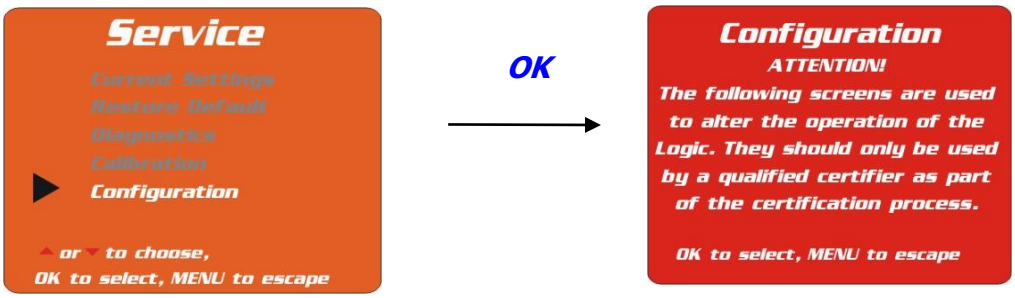
1. With the unit in operation, access the menu by pressing the ***Menu*** button. The display panel will show the first level menu. Select *Service* menu by pressing the ▲ or ▼ buttons until the *Service* is highlighted. Press ***OK*** to accept that option, or press ***Menu*** to return to the previous menu level.



Display Mode Menu Mode

Selecting the Configuration Menu

2. Using the ▲ and ▼ buttons on the touchpad, highlight the *Configuration* option- it will be highlighted when selected. Press ***OK*** and you will get an Attention screen, advising you the following screens may alter the operation of the Axiom. Press ***OK*** to continue:

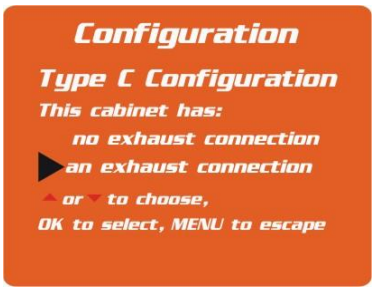


3. The screen will now prompt you for the password; it is:

Light
UV Light
Timer
Timer
OK

Note: Any other key sequence will return you to the Attention screen.

4. The first screen allows you to select whether the Axiom is connected to an exhaust system or not. **IT IS CRITICAL THAT THE *THIS CABINET HAS AN EXHAUST CONNECTION* OPTION IS SELECTED**. Press ***OK*** to continue.



5. The second screen allows you to set how long the blowers in the Axiom will continue to operate in the event of an exhaust system failure. The interval can be programmed from 0-300 seconds.

Note: Consult with your facility's safety officer or Labconco to help establish how long the Axiom should continue to operate after an exhaust system failure.

6. The third screen allows you to set the sash height at either 8 or 10 inches. **IT IS CRITICAL THAT THE YOU LEAVE THE SASH HEIGHT AS IT WAS SET AT THE FACTORY, UNLESS YOU WISH TO RECERTIFY THE CABINET AT ITS NEW SETTING**.

7. The fourth screen allows you to select whether the Axiom has a UV light or not. **IT IS CRITICAL THAT THE YOU LEAVE THE UV LIGHT CONFIGURATION AS IT WAS SET AT THE FACTORY**. Press ***OK*** to return to the first Configuration screen.

The unit is now properly configured for operation connected to an exhaust system. In this mode, the unit will display an exhaust alarm if the inlet relief valve closes during operation.

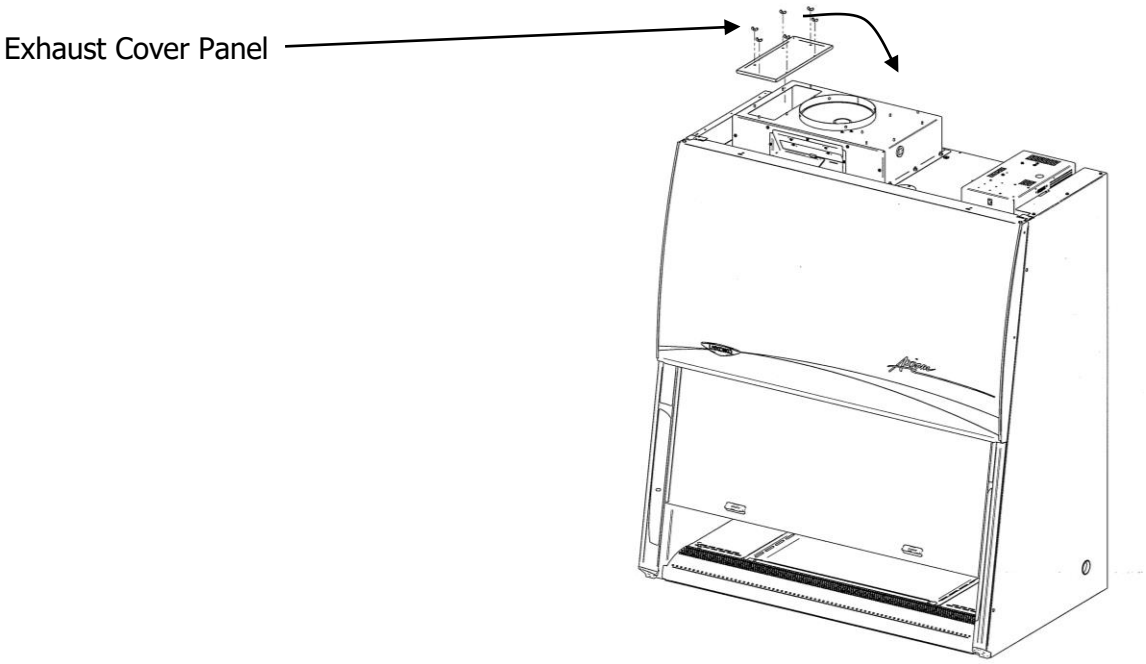
NOTE: If you ever want to disconnect the Axiom from the exhaust system, and use it in a recirculating mode, you must reconfigure it as such.

Disconnecting the Axiom from an Exhaust System Connection to Operate in Reciculation

a) Mechanical configuration

1. Unplug the Axiom. Using an appropriate ladder or platform, remove the exhaust cover panel on the top left side of the exhaust cover, and install it on the studs on the right side. Hand tighten the wing nuts to secure it, as shown in figure 3-1a.
2. Disconnect the Axiom's connection collar from the exhaust system, and cap the building's exhaust connection in a way that meets all appropriate codes and regulations. Leave the Axiom's exhaust collar open to allow for unrestricted airflow out of the unit.

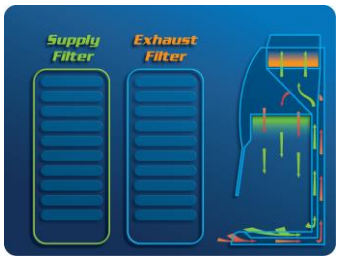
Figure 3-1a



b) Electronic configuration

Keypad operations are shown as ***blue bold italic***. Menu screen selections are shown as *green italics*.

1. With the unit in operation, access the menu by pressing the ***Menu*** button. The display panel will show the first level menu. Select *Service* menu by pressing the ▲ or ▼ buttons until the *Service* is highlighted. Press ***OK*** to accept that option, or press ***Menu*** to return to the previous menu level.



Menu →

Display Mode
Menu Mode

Selecting the Configuration Menu

2. Using the ▲ and ▼ buttons on the touchpad, highlight the *Configuration* option- it will be highlighted when selected. Press ***OK*** and you will get an Attention screen, advising you the following screens may alter the operation of the Axiom. Press ***OK*** to continue:

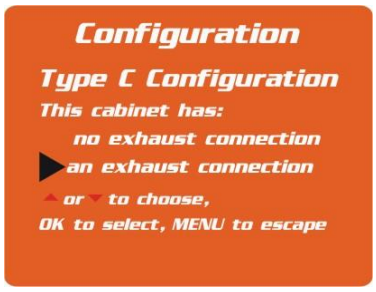
OK →

3. The screen will now prompt you for the password; it is:

Light
UV Light
Timer
Timer
OK

Note: Any other key sequence will return you to the Attention screen.

4. The first screen allows you to select whether the Axiom is connected to an exhaust system or not. **IT IS CRITICAL THAT THE *THIS CABINET HAS NO EXHAUST CONNECTION* OPTION IS SELECTED**. Press ***OK*** to continue.



.

5. The second screen allows you to set the sash height at either 8 or 10 inches. **IT IS CRITICAL THAT THE YOU LEAVE THE SASH HEIGHT AS IT WAS SET AT THE FACTORY, UNLESS YOU WISH TO RECERTIFY THE CABINET AT ITS NEW SETTING**.

6. The third screen allows you to select whether the Axiom has a UV light or not. **IT IS CRITICAL THAT THE YOU LEAVE THE UV LIGHT CONFIGURATION AS IT WAS SET AT THE FACTORY**. Press ***OK*** to return to the first Configuration screen.

The unit is now properly configured for operation recirculating its filtered exhaust air into the room. In this mode, the unit will NOT display an exhaust alarm with the inlet relief valve closed during operation.

NOTE: If you ever want to reconnect the Axiom to the exhaust system, you must reconfigure it as such.

Connecting the Biosafety Cabinet to Utility Service Lines

Note: Some models have a solenoid valve connected to the service valve on the right side, rear position. The solenoid prevents gas from flowing to the service valve when the unit blower is off. It is the only service valve position that can be fitted with a solenoid valve. Connect the gas service to the solenoid valve.

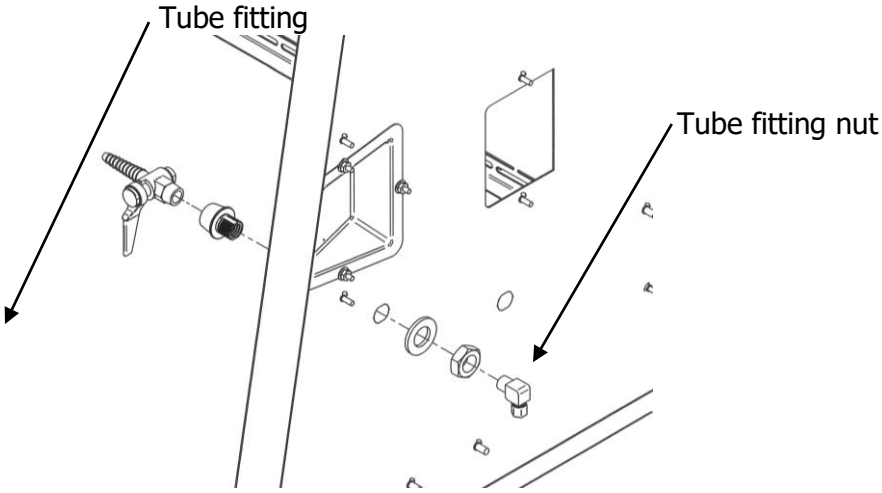
The service lines (if any) should be connected to the tube fitting(s) on the outside of the liner wall as shown in Figure 3-2 To install the tubing, follow these steps:

1. Ensure that the tubing is ¼ inch O.D., soft metal, and that the end has been completely deburred.
2. Route the tubing from the rear of the cabinet, ensuring that it will line up with the slot in the back of the side panel. The slot is located from 8 ¾ to 11 ¼ inches (222 to 288 mm) from the bottom of the cabinet.

Note: Make sure that the tube routing will not contact any electrical wires. DO NOT loop service line tubing within the side panels of the cabinet.

3. Make sure that the nut on the tube fitting is loose, but do not remove it. Look inside the fitting to make sure the tube ferrule is there.
4. Push the tube into the fitting until it is properly seated. The tube will go approximately ¾ inch (19 mm) into the fitting.
5. Tighten the tube fitting nut hand tight and then, using a 7/16-inch wrench, tighten it at least ¾ turn more.
6. Close the service valve in the biosafety cabinet and then slowly open the shutoff valve on the service valve. Test all fittings for leakage. Tighten the tube nut slightly if needed.

Figure 3-2



Optional Vacu-Pass™ Cord & Cable Portal Use

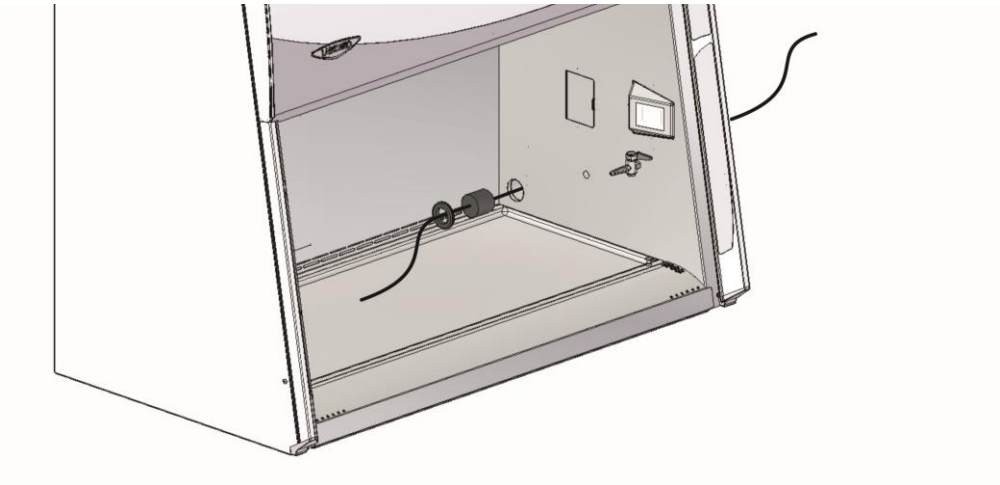
Note: There must be enough clearance to pass the cord or cable between the Axiom's exterior dress panel and any obstruction.

Note: Some Vacu-Pass components and the cord or cable passing through it may become contaminated during use of the cabinet. Ensure all potentially contaminated components are surface decontaminated before handling or removal from the cabinet.

1. Remove the grommet from the liner side wall. Remove the solid sealing plug from the body of the portal by either pressing it through from the outside, or by carefully inserting a spatula or similar device between the sealing plug and the body of the portal, and prying the plug out.
2. Pass the cord or cable through the body of the portal, and then through one of the plugs that has been cut for cord or cable use, then through the grommet, as shown in Figure 3-3.

Note: select a plug with a hole that is slightly smaller than the cord or cable, to create a proper seal. This will also help minimize movement of the cord or cable if it is accidentally pulled during use.

Figure 3-3



3. Position the cord or cable as it will be used in the cabinet, and then push the plug back into the body of the portal until it seats in the portal. Reinstall the grommet.

Drain Valve Installation

In order to prevent damage during shipping, the drain valve assembly has not been installed. If desired, the valve should be installed after the cabinet is in its final location.

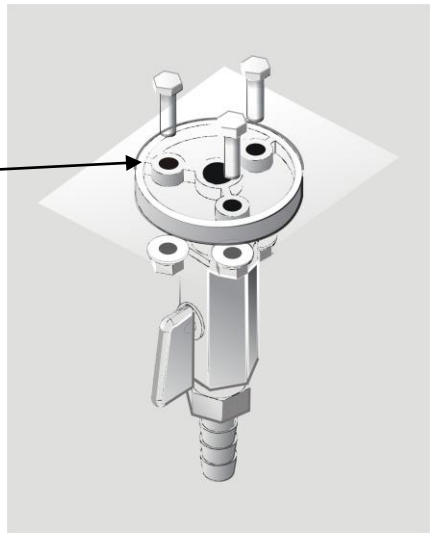
To install the valve assembly, follow these steps:

1. Lift the work surfaces out of the biosafety cabinet by lifting on the knobs at the front of the work surface.
2. Using a putty knife, remove and discard the stainless steel cover that is sealed over the drain mounting holes. Scrape out remaining sealant that is around the holes.
3. Apply a light coating of silicone sealant (user supplied) to the mounting surface of the drain assembly. Attach the drain assembly under the bottom of the cabinet as shown in Figure 3-4. Wipe off any excess sealant from the cabinet bottom. Ensure that the center drain hole is unobstructed.
4. Make sure the drain valve is in the closed position.
5. Reinstall the work surfaces.
6. Allow the silicone sealant to cure for at least eight hours before exposing it to liquid.

NOTE: The drain valve assembly attaches to the underside of the cabinet bottom.

Figure 3-4

Apply a light coat of silicone sealant to this surface of the connector, aligning the three holes in the connector with the three holes in the biosafety cabinet liner.



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Section Four -
Initial Operation of the Axiom

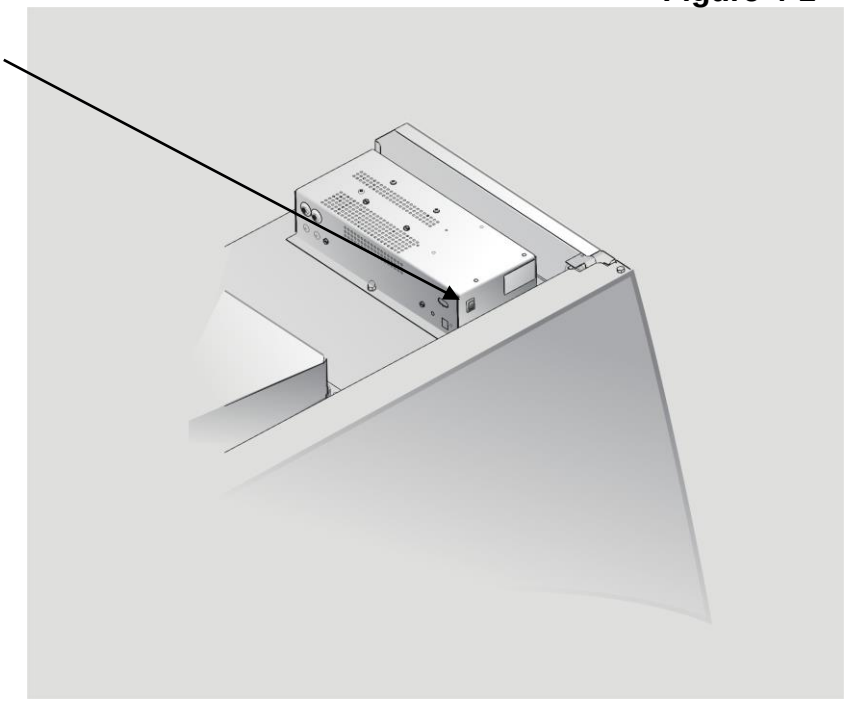
This section will take you through the steps to begin initial operation of the Axiom, with an explanation the controls, display and options, in order to prepare the unit for its initial certification.

System Reset Switch

The biosafety cabinet has a system reset switch for resetting its microprocessors. The switch is located on the front of the electronics module, on top of the cabinet, as shown in Figure 4-1. Ensure that the switch is in the "ON" (up) position before attempting to operate the cabinet.

Figure 4-1

The System Reset Switch



Information Center

The Information Center is an LCD display located on the right side wall at eye level. When the blower is started, if the Axiom is configured to be connected to an exhaust system, Figure 4-2a will appear for 60 seconds while the unit initiates operation.

If the unit is not connected to an exhaust system, screen 4-2b will appear for the first 60 seconds of operation. After 60 seconds, the default display screen will appear. The display provides a clock, the life remaining for both filters, the cabinet's current status, inflow velocities (if equipped with the optional airflow sensor), as shown in Figure 4-3. In the event of an alarm, the Information Center will immediately display a context sensitive display indicating the cause of the alarm, and possible solutions, as shown in Figures 4-4a-f.

The display will enter sleep mode, turning itself off, one minute after the blower is turned off or the sash is closed.

Figure 4-2a

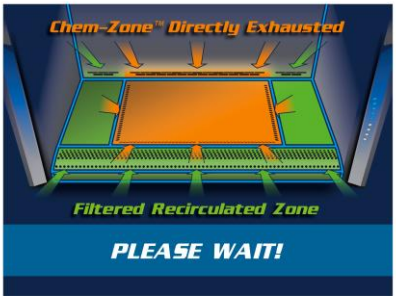
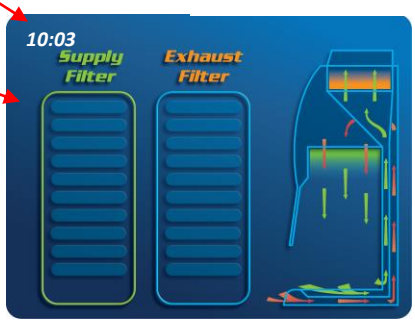


Figure 4-2b

Clock

Filter Life

Figure 4-3



Alarm Screens

Sash is too high

The sash is open too far for safe operation.

Figure 4-4a

Airflow Alerts

The airflow patterns in the cabinet have changed, resulting in a sudden change in either motor speed. This is most likely due to a blockage of the grille or the exhaust filter outlet. It may also be caused by removal of the work surface(s) while the cabinet is in operation.

Figure 4-4b

Exhaust Fan Alarm

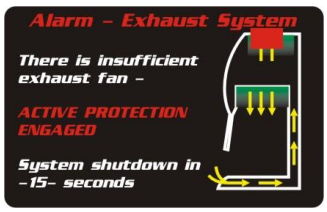
There has been a failure of the exhaust fan, or its communication to the cabinet's control board. DO NOT USE THE CABINET UNTIL THE PROBLEM HAS BEEN CORRECTED.

Figure 4-4c

Exhaust System Alarm-Active Protection Mode

When connected to an exhaust system, and the flow drops below acceptable limits, this screen will appear. When the timer reaches 0, the supply blower will shut off, and the exhaust fan will continue to operate for 10 more seconds, protecting the operator.

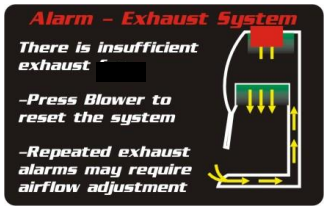
Figure 4-4d



Exhaust System Alarm

After the countdown reaches 0, the exhaust fan will shut off and this screen will be displayed. If this alarm is displayed, the Axiom blower will need to be turned off, and then back on again to reset the alarm. Frequent Exhaust System Alarms indicate unstable or insufficient exhaust flow, and must be corrected.

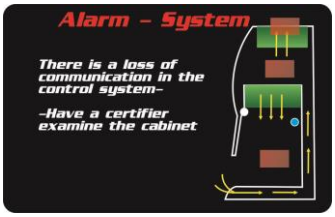
Figure 4-4e



System Error

The motors and display circuit board are not communicating properly. DO NOT USE THE CABINET UNTIL THE PROBLEM HAS BEEN CORRECTED.

Figure 4-4f



Operating the Sliding Sash

The counterbalanced, anti-racking sash mechanism requires only a few pounds of force to move the sash up or down. You can open or close the sash smoothly with one or two hands positioned on either handle.

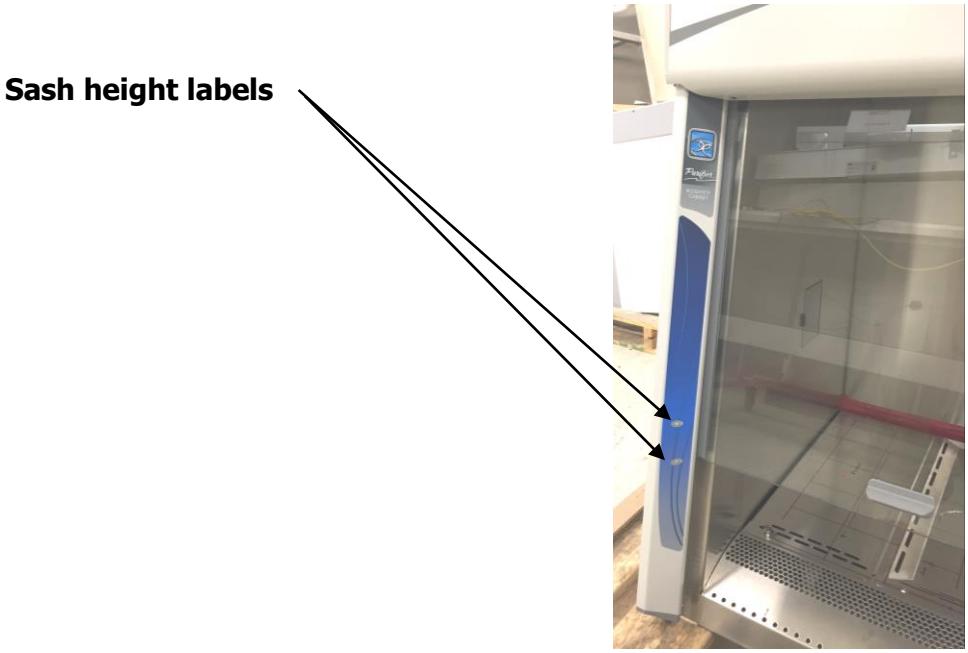
The sash position alarm and safety interlock system senses the sash position and acts appropriately. The biosafety cabinet has been programmed to operate at either an 8- or 10-inch (203-,250- mm) sash opening, depending on model. Raising the sash above its operating height will activate the audible and visual alarms. The audible alarm can be temporarily muted (for approximately five minutes) by depressing and releasing the ***OK/Mute*** button. Closing the sash back to its operating position will reset the alarm and defeat the muting of the alarm. The safety interlock system senses when the sash is closed and allows the optional ultraviolet (UV) lamp to operate only when the sash is closed, to protect the operator from irradiation.

Starting the Biosafety Cabinet

1. To start the biosafety cabinet, raise the sash until its bottom edge aligns with the proper sash height label on the left corner post, as decal is shown in Figure 4-5.
2. Press the blower button to start the unit. The unit will display a standby screen for approximately 60 seconds to allow the cabinet to reach proper operating conditions. If the alarm sounds, recheck the sash position. If the sash is too high, the sash audible alarm and the LCD display will indicate the sash is too high.
3. To turn the UV light on, the sash must be completely closed to prevent the escape of any UV radiation. Push the UV light button to activate the UV light.

Note: The sash must be completely closed for the UV light to activate.

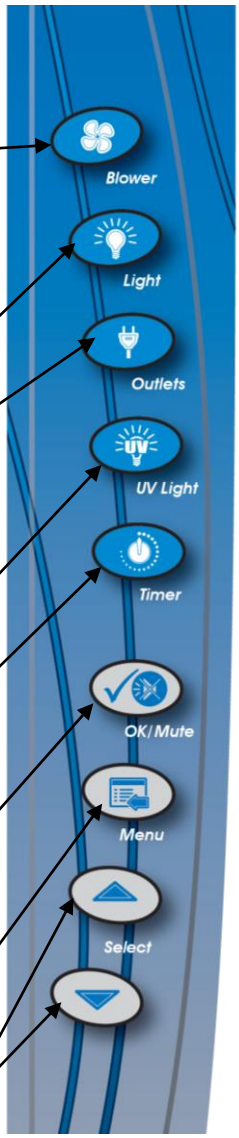
Figure 4-5



The Axiom Touchpad

The touchpad of the Axiom is shown in Figure 4-6. Take a moment to get familiar with the buttons, their locations and functions. Also familiarize yourself with the display located on the right side wall. The display will report system functions, such as filter capacity, timer displays, alarm or error messages, as well as icons that illuminate when cabinet functions such as UV light and blower are operational.

Figure 4-6



Blower Button – Starts or stops the cabinet blower. When the blower is in Smart-Start™ mode, opening the sash from the closed position turns the blower on automatically. When in recirculating mode with Night-Smart™, when the sash is closed, the motor slows to idle to maintain air cleanliness in the work area. When the sash is reopened, the blower resumes normal operation. Pressing this button overrides Smart-Start and Night-Smart operation

Light Button – Turns the fluorescent lamps on or off. Closing the sash automatically turns the lights off. When the lights are in Smart-Start mode, raising the sash turns the lights on automatically.

Outlet Button – Turns the electrical outlets in the work area on or off.

UV Light Button – Turns the UV lamp on or off. When the UV lamp is in Smart-Start mode, closing the sash turns the light on. When the sash is raised, the light turns off automatically.

Timer Button – Allows you to select either a repeating interval timer, or an elapsed timer (stopwatch).

OK/Mute Button – Mutes all audible alarms for approximately 5 minutes, unless there is a system error alarm. When in the Menu mode, this button is used to select an option.

Menu Button – This button toggles the display between the display and menu modes. When in the menu mode, pressing this button returns you to the previous menu level.

Select Buttons – Allow you to choose different options in the menu mode.

Navigating the Axiom Menu Screens

MyLogic™ allows you to use the Smart-Start or Night-Smart features that activate functions automatically when the sash is opened or closed. Night-Smart will only work if the cabinet is not connected to an exhaust system.

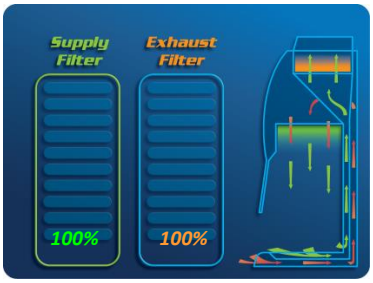
If equipped, the UV lamp can be programmed to operate for a given time interval when the sash is closed, before it shuts off.

NOTE: When you are in the menu mode, if a selection is not made within 30 seconds, the display will reset back to display mode.

Keypad operations are shown as ***blue bold italic***. Menu screen selections are shown as *green italics*.

NOTE: Pressing the appropriate touchpad button will override Smart-Start or Night-Smart selections.

To access the menu, press the ***Menu*** button. The display panel will show the first level menu. To select from the various menu options press the ▲ or ▼ buttons until the selected option is displayed. Press ***OK/Mute*** to accept that option, or press ***Menu*** to return to the previous menu level.



Menu

Display Mode

Menu Mode

Navigating the MyLogic™ Menu Screens

The MyLogic screens will allow you to set the cabinet's clock, and to personalize its operation. Please note all MyLogic screens have a blue background.

Setting the Clock

Using the ▲ and ▼ buttons on the touchpad, highlight the *MyLogic* option-it will turn blue when selected. Press ***OK/MUTE*** to enter the first MyLogic screen:

OK/Mute

Using the ▲ and ▼ buttons on the touchpad, highlight *set the clock* -it will turn white when selected. Press ***OK/MUTE*** to enter the first clock setting screen:

At this screen, select whether you want the clock to display in a 12- or 24-Hour format.
When you have highlighted your choice, press ***OK/MUTE*** to go to the next screen…

Use the ▲ and ▼ buttons to select the hour, and press ***OK/Mute***…

Use the ▲ and ▼ buttons to select the minute, and press ***OK/MUTE*** to return to the first MyLogic screen.

Configuring the Axiom

In the first MyLogic screen, use the ▲ and ▼ buttons on the touchpad to highlight *configure my Logic for use* -it will turn white when selected. Press ***OK/MUTE*** to enter the first configuration screen:

The first screen gives you the option of activating the Smart-Start option for the blower; if you want the cabinet blower to start every time you raise the sash, select *start*, and then press ***OK/Mute***. If *not start* is selected, then the blower must be manually started from the keypad. When ***OK/MUTE*** is pressed, the next configuration screen will appear.

The next screen gives you the option of activating the Smart-Start option for the fluorescent light; if you want the lights to turn on every time you raise the sash, select *turn on*, and then press ***OK/Mute***. If *stay off* is selected, then the lights must be manually turned on from the keypad. When ***OK/MUTE*** is pressed, the next configuration screen will appear.

If you want the cabinet blower to run slowly, maintaining reduced airflows every time you close the sash, select *go into NightSmart mode* and then press ***OK/Mute***. If *stop* is selected, then the blower will stop when the sash is closed. When ***OK/MUTE*** is pressed, the next configuration screen will appear.

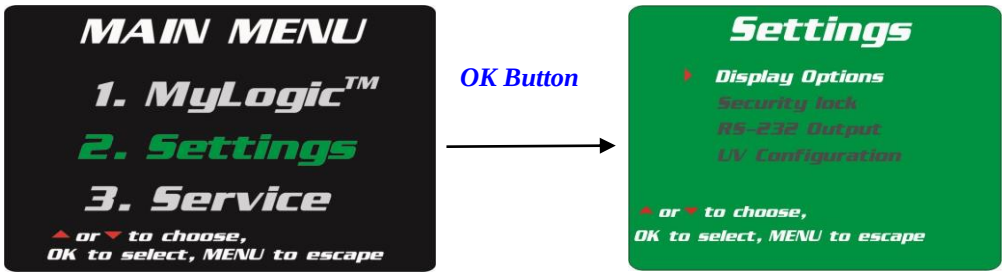
If your Axiom is configured for a UV light, then you will see the next two screens; if you want the UV lamp to turn on every time you close the sash, select *turn on*, and then press ***OK/Mute***. If *stay off* is selected, then the UV light will not turn on when the sash is closed. When ***OK/MUTE*** is pressed, the final configuration screen will appear.

If you choose to use NightSmart option for the UV lamp, this screen allows you to control the time the UV lamp will remain on after the sash is closed. Use the ▲ and ▼ buttons on the touchpad to cycle through the time intervals available, and then press ***OK/MUTE*** to select it. The screen will then return to the first MyLogic screen.

Navigating the Settings Menu Screens

The Settings screens will allow an administrator to set some of the cabinet's operational parameters. Please note all Settings screens have a green background.

Using the ▲ and ▼ buttons on the touchpad, highlight the *Settings* option-it will turn green when selected. Press ***OK*** to enter the first Settings screen:

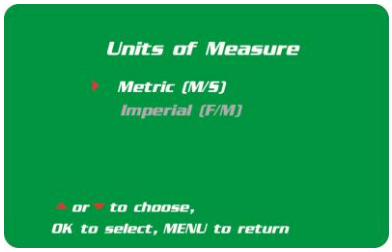


Display Options

Units of Measure

Note: The Units of Measure refers to the display of airflow velocities if the cabinet is equipped with the optional airflow sensor.

Using the ▲ and ▼ buttons on the touchpad, highlight the *Units of Measure* option-it will turn white when selected, and then press ***OK***. Using the ▲ and ▼ buttons on the touchpad, highlight either *metric* or *imperial* units of measure-it will turn white when selected, and then press ***OK***. The screen will then return to the first Settings screen.



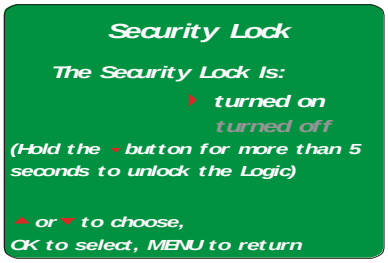
Startup tone

Using the ▲ and ▼ buttons on the touchpad, highlight the *Startup Tone* option-it will turn white when selected, and then press ***OK***. Using the ▲ and ▼ buttons on the touchpad, highlight either *Turned on* or *Turned off* option. When turned on, an audible beep will sound during the first 60 seconds of blower operation to caution the user that the unit is not yet ready for use.

Security Lock

Note: The Security Lock feature "locks" the keypad to prevent unauthorized use of the cabinet. The security lock is unlocked by holding the ▼ button for 5 seconds. The lock deactivates after cabinet is unlocked.

From the Settings menu screen, use the ▲ and ▼ buttons on the touchpad to highlight the *Security Lock* option-it will turn white when selected. Press ***OK/MUTE*** to enter the Security Lock screen. Using the ▲ and ▼ buttons on the touchpad, highlight either *turned on* or *turned off*-it will turn white when selected, press ***OK/Mute***. The screen will then return to the first Settings screen.

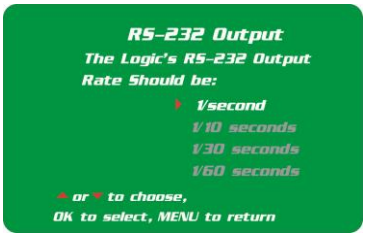


RS-232 Output Rate

Note: This selection will only work if the optional EN/RS-232 board is installed.

This menu option selects the rate that the RS-232 board outputs data. Data can be output at a rate of once per second, once every 10 seconds, once every 30 seconds, or once per minute.

From the Settings menu screen, use the ▲ and ▼ buttons on the touchpad to highlight the *RS-232 output*-it will turn white when selected. Press ***OK/MUTE*** to enter the RS-232 output screen. Using the ▲ and ▼ buttons on the touchpad, highlight either the data output rate preferred. It will turn white when selected, and then press ***OK***. The screen will then return to the first Settings screen.



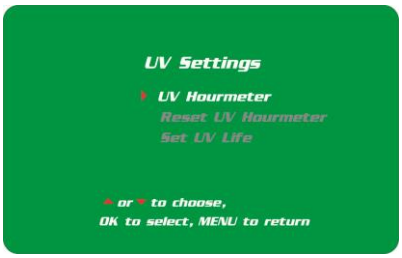
UV Settings

For models equipped with the optional UV light the Axiom has an integral UV light maintenance system. It allows you to define how many hours you want the UV lamp to operate before receiving a reminder to replace it, a way to monitor how many hours the lamp has been on, and the means to reset the UV lamp hourmeter.

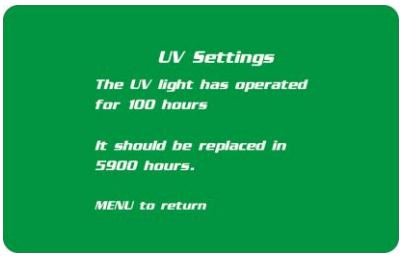
UV Lamp Hourmeter

This display only shows how many hours the UV lamp has been lit, and how many hours remain until you will receive a warning to replace the lamp.

From the Settings menu screen, use the ▲ and ▼ buttons on the touchpad to highlight the *UV Settings* option-it will turn white when selected. Press ***OK/MUTE*** to enter the UV Settings screen. Using the ▲ and ▼ buttons on the touchpad, highlight UV Hourmeter-it will turn white when selected, and then press ***OK/Mute***. The screen will then return to the UV Hourmeter screen.



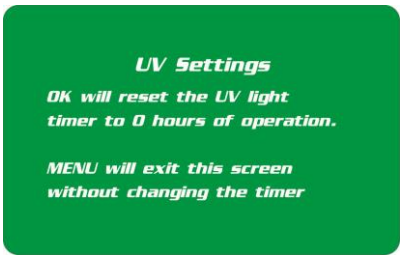
This screen displays how many hours the UV lamp has operated, and how many hours of operation remain before replacement is recommended. When finished with this screen, press ***MENU*** to return to the first UV Settings screen.



Reset UV Lamp Hourmeter

This option lets you reset the UV hourmeter to 0 hours whenever the lamp has been replaced.

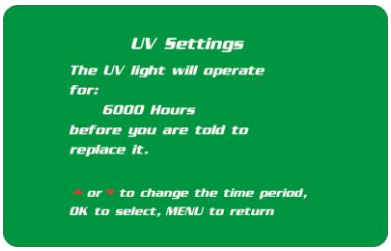
This screen allows you to reset the UV Hourmeter to 0 hours if you press ***OK/Mute***. Pressing ***MENU*** will return you to the first UV Settings screen without resetting the hourmeter.



Change UV Lamp Life

In this screen, you can set the number of operating hours before receiving the replace UV lamp warning. For most UV lamps, the output of UV light decreases at a constant rate. Typically, after 6,000 hours of operation the lamp will output 80%. This option allows you to set operational life of the UV lamp, in 100 hour increments.

From the UV Settings menu screen, use the ▲ and ▼ buttons on the touchpad to highlight the *Set UV Life* option-it will turn white when selected. Press ***OK/MUTE*** to enter the Set UV life screen. Use the ▲ and ▼ buttons to increase or decrease the lamp life in 100 hour increments, until the desired value is displayed, and then press ***OK/Mute***. The screen will then return to the UV Settings screen.



Timer Operation

NOTE: The timer button allows activation of an interval (countdown) or stopwatch (elapsed) timer. The timers cannot be operated simultaneously.

To access the main timer menu, press the ***Timer*** button anytime during normal operation. The main timer menu is shown on the LCD display. Use the ▲ and ▼ buttons to highlight the *Interval* or *Stopwatch* Timer. Press the ***OK/MUTE*** button to select the highlighted timer function.

Interval Timer Operation

1. When selected, the Interval Timer menu is displayed on the LCD. The timer defaults to 0:00:00 (hours:minutes:seconds).
2. Press and hold the ▲ or ▼ buttons to increase or decrease the timer interval.
3. When the proper interval is entered on the display, press the ***OK/MUTE*** button to start the timer.
4. When the timer reaches 0:00:00, an audible alarm will sound, and the timer will reset itself and repeat the countdown.
5. Press the ***OK/MUTE*** button to pause the timer.
6. Press the ***Menu*** button to clear the interval timer and return to the main timer menu.

Stopwatch Timer Operation

1. When selected, the Stopwatch Timer menu is displayed on the LCD. The timer defaults to 0:00:00.
2. Press the ***OK/MUTE*** button to start the timer.
3. Press the ***OK/MUTE*** button again to zero the timer.
4. Press the ***Menu*** button to clear the stopwatch timer and return to the main timer menu.

If An Airflow Alert Activates

The most common causes of an Airflow Alert are:

- Blockage of the inlet grilles or exhaust outlet.
- Removal of the work surface or grille during operation.

Resetting the Airflow Alert System

The Airflow Alert automatically resets to normal operation once the motor speed has stabilized.

Section 5

Certification Procedures for the Axiom

This section will outline test procedures to validate the performance of the Axiom.

Note: These are the only Labconco-approved test procedures for validating the performance of the Axiom Biosafety Cabinet. Other test procedures may yield different or inaccurate test results.

NOTE: In order to properly certify the Axiom, you must obtain an Axiom Certifier Kit, Labconco P/N 3858400. Qualified certifiers can obtain this kit by contacting Labconco Customer Service Department at 800-821-5525.

Note: The ECM motor is programmed by Labconco to deliver a constant volume of air throughout the life of the HEPA filters. Any changes to the blower speed control should be small (less than 5 units).

Accessing the Certifier's Menu

Note: You will need to access this menu to do any of the following:

- **Adjust the blower speed**
- **To reset the filter gauge**
- **To calibrate the optional airflow sensor**

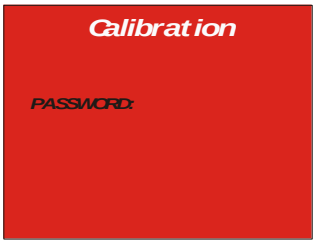
Adjusting the Downflow, Inflow and Filter Life Gauges

1. Press the ***Menu*** button.
2. Press the ▼ button until the *Services* option is highlighted (it will turn yellow).
3. Press ***OK/Mute*** to enter the Services menu screen.

4. Press the ▼ button until the *Calibration* option is highlighted (it will turn white).
5. Press ***OK/Mute*** to start the calibration procedure.

6. You will see a *warning screen* alerting you that you are about to alter the BSC's settings.
7. Press ***OK/Mute*** to input the password.

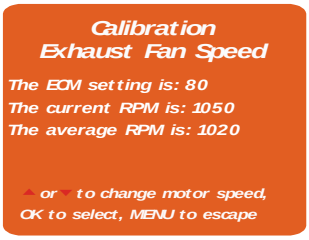
8. When requested for the password press ***Light***, ***UV light***, ***Timer***, ***Timer*** then ***OK/Mute***.



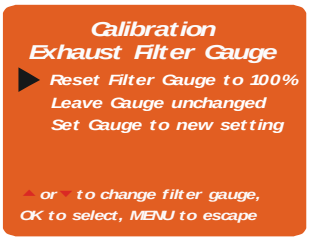
9. If the password is properly entered, the first certification screen will display the supply blower motor's PWM setting. Press the ▲ or ▼ button to increase or decrease the blower speed as needed. When the speed is set properly, press the ***OK/Mute*** button to lock the new blower speed setting, and continue to the filter life screen.

10. If this is an initial certification or a recertification after supply HEPA filter replacement, select *Reset Filter Gauge to 100%*. If this is an annual recertification, select *Leave Gauge unchanged*. If you want to set the filter gauge at a preset value, select *Set Gauge to new setting*. Then press ***OK/Mute***.

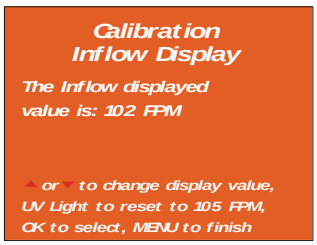
11. The next certification screen will display the exhaust blower motor's PWM setting. Press the ▲ or ▼ button to increase or decrease the blower speed as needed. When the speed is set properly, press the ***OK/Mute*** button to lock the new blower speed setting, and continue to the filter life screen.



12. If this is an initial certification or a recertification after exhaust HEPA filter replacement, select *Reset Filter Gauge to 100%*. If this is an annual recertification, select *Leave Gauge unchanged*. If you want to set the filter gauge at a preset value, select *Set Gauge to new setting*. Then press ***OK/Mute***.



13. If the unit is has no airflow sensor, after the filter gauge option is selected and you press ***OK/Mute***, the Axiom will power down, and then restart with the new settings. If the Unit has an airflow sensor, you will then be asked to calibrate the inflow sensor to match the value you obtained when you measured the inflow. After the inflow is calibrated, and you press ***OK/Mute***, the Axiom will power down, and then restart with the new settings.



Axiom Filter Life Gauge Operation and Resetting for Local Conditions

The filter life gauge calculates the remaining filter life by measuring and comparing the current motor speed to the initial speed noted at the factory during assembly, and the calculated maximum motor speed, using the formula:

100-(100x (<u>current speed-original speed</u>)) = % filter life left
max. speed-original speed

So ***anything*** that changes the motor's current speed, like:

- ✓ Blocking the grille.
- ✓ Raising the air temperature.
- ✓ Lowering the barometric pressure.

will increase the motor's speed, causing the Filter Life Gauge to decrease. Electronic dampening of the gauge will limit the change in readings to approximately 1%/minute.

Axiom Biosafety Cabinets being installed at altitudes or operating at temperatures significantly different from those at the time of manufacture (900 +/- 500 ft above sea level, 75^{o} +/- 5^{o} F) ***must*** have their filter life gauge recalibrated for local conditions. Failure to do so will result in the users noticing a steady drop in Percent (%) Filter Life remaining as the unit operates. Below are the instructions on how to correct the Filter Life Gauge for local conditions.

1. Ensure to correct all measurement equipment for local conditions (temperature, absolute pressure). Anemometers may not have this ability and might have to be done manually; whereas, a ShortRidge™ instrument has a setting to correct for local conditions.
2. As the elevation or the ambient temperature rises, the motor power factor will have to be reduced to compensate. For an initial certification, the motors' speeds should be reduced until it equals the Axiom's "Initial Motor Speed" as reported on the unit's test sheet, plus approximately 10-15 RPM per each additional 1000 feet of elevation.
3. The Axiom MUST be recertified using instruments corrected for local conditions.
4. During recertification the certifier MUST RESET THE FILTER LIFE GAUGE, INDICATING A NEW FILTER HAS BEEN INSTALLED.
5. Only by performing Step #4 AFTER THE UNIT IS READJUSTED AND RECERTIFIED FOR ITS LOCAL CONDITION, will the filter life gauge register 100% (+/- 2%) during operation. As the Filters then load, the filter life gauges will then begin to drop as appropriate.
6. If you do not wish to reset the filter gauge, select the option "Filter not changed", and press "Mute/OK".
7. Either selection will finish the calibration mode, or lead to calibration of inflow and downflow velocities.

HEPA Leak Test Information

All Axiom models were tested to the HEPA Filter Leak Test as described in ANSI/NSF Standard 49:2012.

Note: ensure all internal surfaces of the Axiom have been appropriately decontaminated before proceeding.

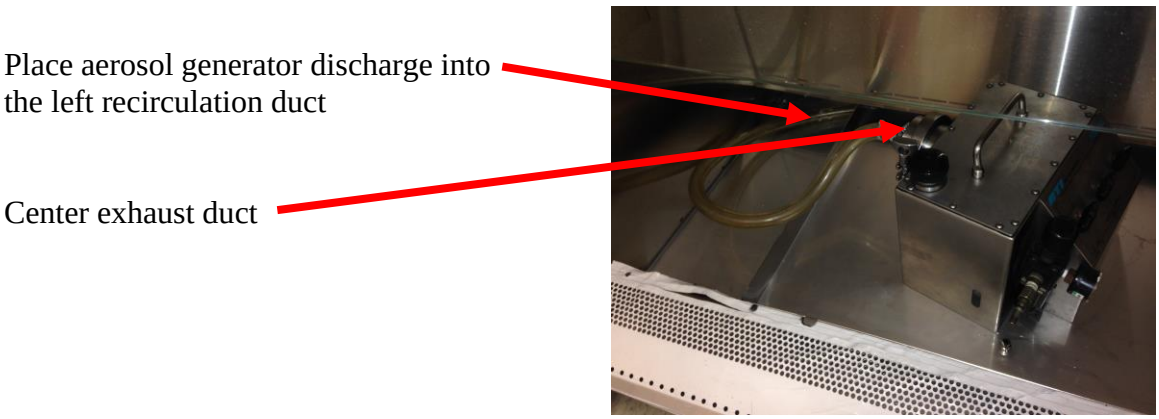
Supply HEPA Filter Leak Test

All Axiom models were tested to the HEPA Filter Leak Test as described in ANSI/NSF Standard 49:2012.

Note: ensure all internal surfaces of the Axiom have been appropriately decontaminated before proceeding.

Note: For all Axiom models, the work surfaces may be removed if desired, and the aerosol generator discharge should be placed to the left of (but <u>NOT</u> in) the center exhaust duct nearby to inject the aerosol as shown in Figure 5-1.

Figure 5-1



If the Axiom is Contaminated
(An upstream concentration cannot be established)

If the Axiom has been used with biohazardous, toxic chemicals, or radioisotopes, the DOP access line cannot be used. The upstream concentration cannot be measured directly. Testing at Labconco has shown the actual concentration varies from the calculated value. Table 5-1 shows the actual vs. calculated concentrations for the Axiom models.

Table 5-1

Supply HEPA Filter Leak Test Specifications

Model	3044-	3046-
Air Displacement (CFM)	520	665
Laskin Nozzles needed	1	1
Theoretical aerosol conc. $(ug/l)_1$	26	20
Actual aerosol conc. $(ug/l)_1$	13	12

1. The calculated concentration was established by the formula:
   Concentration (ug/l) = (# Laskin nozzles @ 20 PSIG x 13,500)/Volume of air displaced
2. Based on Mineral oil

If the Axiom is Uncontaminated
(Establishing an Upstream Concentration)

The Axiom utilizes an aerosol access tube for sampling the upstream concentration of aerosol. If after reading these instructions, you have further questions, please contact Labconco's Product Service Department.

1. Remove the center work surface by lifting the handles on either wing work surface. Pull the center work surface straight out of the Axiom. Repeat for the right wing work surface.
2. Locate the access tube on right side of the rear plenum wall, passing through the towel catch. As shown in Figure 5-2.

Figure 5-2

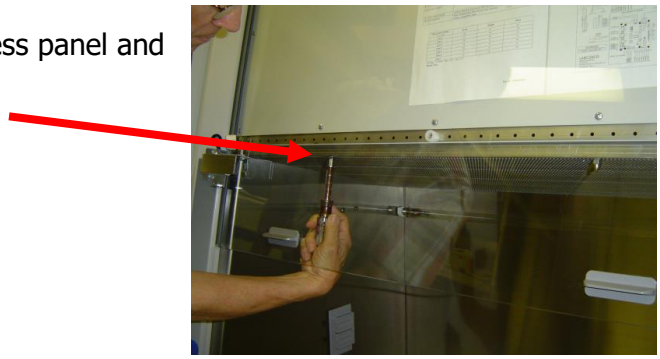
3. Pull the tube toward the front of the unit. Remove the access tube cover.
4. Using an appropriate photometer, connect the unit's upstream line to the access tube.

Note: Keep the photometer sampling tube as short as possible. It should never exceed 6 feet maximum.

1. Turn on the photometer and allow it to operate for a minimum of 5 minutes. Leave the valve in the "CLEAR" setting.
2. Check the oil level of the generator – it must be within 1/8" of the level line when the generator is sitting level.
3. Establish the 100% and 0% concentration levels for the photometer.
4. Turn on the photometer and allow it to operate for a minimum of 5 minutes. Leave the valve in the "CLEAR" setting.
5. Remove the diffuser by raising the sash as high as it will go, and then removing the two acorn nuts with a 7/16" wrench or socket, as shown in Figure 5-3.

Figure 5-3

Removing the diffuser acorn nuts (Dress panel and lamps removed for clarity only).



Note: The diffuser acorn nuts are secured to the studs with a removable thread locking compound to prevent them from vibrating loose during shipment of the Axiom. There may be some resistance the first time the nuts are removed; this is normal. No additional thread locking compound need be applied to these acorn nuts unless the unit is being prepared for shipment.

1. Lower the front edge of the diffuser until it clears the bottom of the sash, and then pull the diffuser straight out of the cabinet, as shown in Figure 5-4.

Figure 5-4

2. The Axiom is now ready for the Supply HEPA Filter Leak Test. Set the photometer sampling valve to "DOWNSTREAM". Ensure there is a proper vacuum at the sampling port of the pistol.
3. Open one Laskin nozzle.
4. Ensure the pressure gauge on the generator is reading 22 +/- 1 PSIG.
5. Scan the downstream side of the HEPA filter by passing the sampling nozzle of the gun in slightly overlapping strokes over the entire surface of both of the filters, with the sampling port not more than 1 inch from the surface of the filter media. Scan the entire periphery of the filters and the gaskets between the filter frame and the Axiom frame. Scanning shall be done at a traverse rate of not more than 2 inches per second.

Figure 5-5

Note: Operation of the photometer may become erratic when testing the front edge of the supply filter frame, due to aspiration of room air into the front of the work area. This problem can be minimized or eliminated by placing the edge of a sheet of rigid plastic or metal at the edge of the filter gasket when scanning this area, as shown in Figure 5-15.

Acceptance

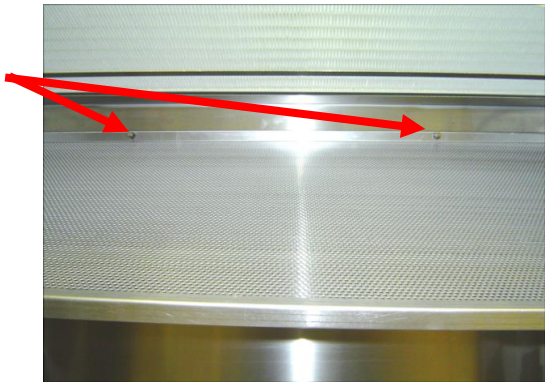
Aerosol penetration shall not exceed 0.01%.

Reassembly

When reinstalling the supply filter diffuser, ensure that the two holes in the back edge of the diffuser engage the diffuser support posts on the rear wall of the work area, as shown in Figure 5-6. Reinstall the prefilter.

Figure 5-6

Diffuser pins engaging the holes in the rear of the diffuser.



Exhaust HEPA Filter Leak Test

All Axiom models were tested to the HEPA Filter Leak Test as described in ANSI/NSF Standard 49:2012.

Note: ensure all internal surfaces of the Axiom have been appropriately decontaminated before proceeding.

Note: For all Axiom models, the work surface may be removed if desired, and the aerosol generator discharge should be placed in the center exhaust duct to inject the aerosol as shown in Figure 5-7.

Figure 5-7

Testing at Labconco has shown the actual concentration varies from the calculated value. Table 5-2 shows the actual vs. calculated concentrations for the models.

Table 5-2

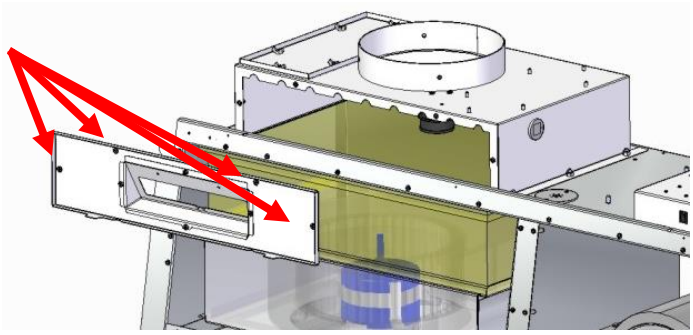
Exhaust HEPA Filter Leak Test Specifications

Model	30441	30448	30461	30468
Air Displacement (CFM)	354	283	529	423
Laskin Nozzles needed	1	1	1	1
Theoretical aerosol conc. (ug/l)[1]	38	48	26	32

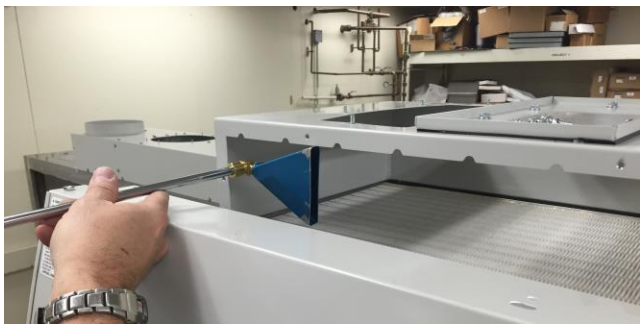
3. The calculated concentration was established by the formula: Concentration (ug/l) = (# Laskin nozzles @ 20 PSIG x 13,500)/Volume of air displaced
4. Based on Mineral oil

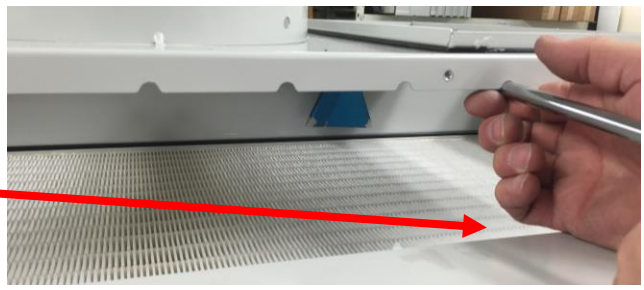
1. Turn on the photometer and allow it to operate for a minimum of 5 minutes. Leave the valve in the "CLEAR" setting.
2. Check the oil level of the generator – it must be within 1/8" of the level line when the generator is sitting level.
3. Establish the 100% and 0% concentration levels for the photometer.

4. If connected to an exhaust system, secure the Inlet Relief Valve in an open position, to keep the cabinet blowers operating, and then remove the screws that secure the front of the exhaust connection to its structure. Place the front panel aside.



5. The Axiom is now ready for the Exhaust HEPA Filter Leak Test. Set the photometer sampling valve to "DOWNSTREAM". Ensure there is a proper vacuum at the sampling tube.
6. Open the Laskin nozzle(s).
7. Ensure the pressure gauge on the generator is reading 22 +/- 1 PSIG.
8. Using a rigid 18" long x 3/8" o.d. tube connected to the photometer probe pickup, Scan the downstream side of the filter, resting the tube in the ridges located on the top of the opening. By resting the tubing in successive ridges, and alternatively pushing the probe in on the first ridge, then shifting the tube to the next ridge, and then pulling it out, you can quickly scan the filter surface in overlapping strokes. By resting your index finger under the tube during scanning, you can accurately control the probe position and height.





9. Observe the average concentration of aerosol downstream.

Acceptance

Average aerosol penetration shall not exceed 0.01%.

Downflow Velocities

All Axiom models, are classified as having uniform downflow, and the average downflow velocity for all 4-foot models is 65+/-5 FPM, and all 6-foot models is 55+/-5 FPM, tested as per ANSI/NSF Standard 49:2012.

All readings should be in a plane 4 inches above the bottom edge of the sash, and the UV Lamp, IV bar and all other accessories must be removed before performing downflow test. The test grid dimensions are outlined in Table 5-3. When taking readings in the back two rows, the anemometer probe should be pointing toward the nearest side wall, as shown in figure 5-8. When reading the front row, the probe should point outward, toward the front of the cabinet, as shown in Figure 5-9. The thermal anemometer's time constant should be set at 10-15 seconds for greater readout stability.

Table 5-3

Downflow Test Specifications

Cabinet Width (Feet)	**4**	**4**	**6**	**6**
Sash Height (inches)	**8**	**10**	**8**	**10**
Nominal Avg. Downflow (FPM)	65+/-5	65+/-5	55+/-5	65+/-5
Downflow test grid # of points	24	24	36	36
Test Grid (# rows x # columns)	3 x 8	3 x 8	3 x 12	3 x 12
Test Grid Data (in inches)				
Grid distance from back & sides	6.0	6.0	6.0	6.0
Distance between rows	5.75	5.55	5.75	5.55
Distance between columns	5.21	5.21	5.50	5.50

Figure 5-8

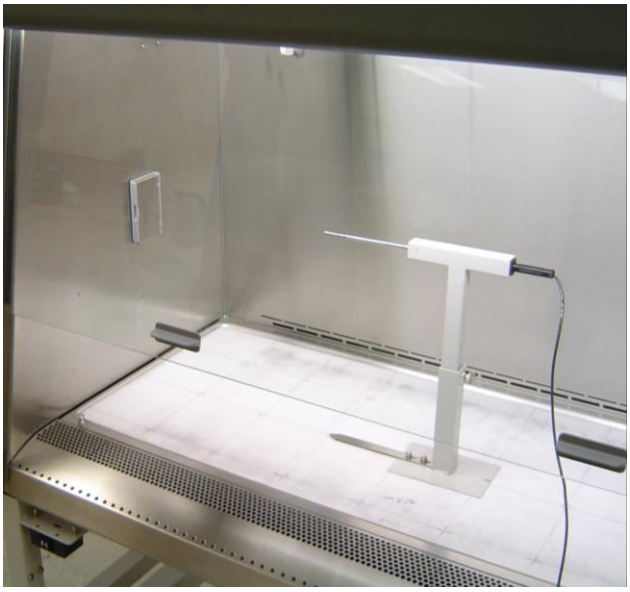


Figure 5-9

Acceptance

Average downflow shall be 65 +/-5 FPM for all 4-foot and 10" 6-foot models, 55 +/-5 FPM for 8" 6-foot models, with all test points being within +/- 16 FPM of the overall average.

Inflow Velocity Calculation - Primary Method

Note: The dress panel MUST be installed on the cabinet to obtain an accurate inflow value.

The average inflow velocity for Axiom models is 105 ±5 FPM. It should be determined by converting the inflow volume to the average inflow velocity. The inflow volume is measured directly by sealing a direct inflow measuring flow meter to the face of the unit. When corrected for local conditions, dividing the inflow volume by the opening area will yield the average inflow velocity.

Table 5-4

Inflow Test Specifications – 8 inch Sash Opening

Width (feet)	**4**	**6**
Nominal Average Inflow (FPM)	105+/-5	105+/-5
Sash Open Area (Sq. Ft)	2.69	4.03
Nominal Avg. Exhaust Vol. (CFM)	283	423
Avg. Exhaust Vol. Range (CFM)	269-296	403-443

Inflow Test Specifications – 10 inch Sash Opening

Width (feet)	**4**	**6**
Nominal Average Inflow (FPM)	105+/-5	105+/-5
Sash Open Area (Sq. Ft)	3.37	5.03
Nominal Avg. Exhaust Vol. (CFM)	354	529
Avg. Exhaust Vol. Range (CFM)	337-371	503-553

Acceptance

Average inflow shall be meet the specified value.

Inflow Velocity Calculation - Secondary Method

If the primary method cannot be performed, the secondary inflow calculation method should be used. The secondary method uses a hot wire thermal anemometer. In this method, the sash is lowered, and a series of velocity readings are taken at the front of the unit.

NOTE: You must use Labconco Certifier Kit, Labconco P/N 3858403 to perform this test properly. Qualified certifiers can obtain this kit by contacting Labconco Customer Service Department at 800-821-5525.

For each model Purifier, the sash should be closed until the appropriate marked template contacts the sash stop and the bottom edge of the sash, as shown below in Figure 5-10.

The thermal anemometer probe should be positioned such that the distance from the bottom of the probe holder to the center of the sensor element equals "Sensor Distance" as shown in Table 5-5. Use the marks on the 6-foot templates, or a scale as shown in Figure 5-11 & 5-12 below.

Figure 5-10

Measuring the restricted access opening height, using the appropriate template. Ensure that the bottom of the template is seated in the sash stop.

Figure 5-11

The Sensor Distance, as described in Table 5-5, using the slots cut in the 6-foot Logic template.

4.00-inch mark
3.25-inch mark

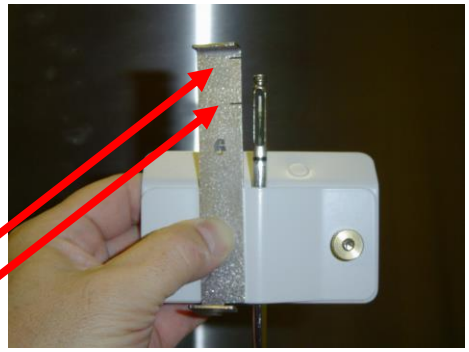


Figure 5-12

The Sensor Distance, as described in Table 5-5, using a scale.

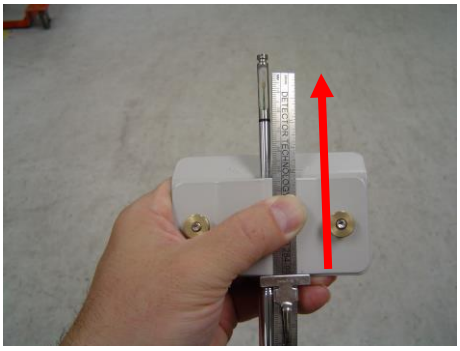


Table 5-5

Secondary Inflow Test Specifications – 8 Inch Sash Opening

Cabinet Width (feet)	**4**	**6**
Sash Opening Template	4+	6+
Sensor distance (inches)	3.25	4
# of Test points	8	12
Test point location	*	*
Avg. Inflow Vel. (FPM) of test points at nominal	262	212
Avg. Inflow Vel. Range (FPM) of test points	249-274	202-222
Correction Factor (CF)	1.08	2
Average Inflow Volume (AIV) = (Avg. velocity x CF)	269-296	403-443
Sash Open Area (Sq. Ft)	2.69	4.03
Inflow Velocity Range (AIV / Sash open area)	100-110	100-110

Secondary Inflow Test Specifications – 10 Inch Sash Opening

Cabinet Width (feet)	**4**	**6**
Sash Opening Template	4+	6+
Sensor distance (inches)	3.25	4
# of Test points	8	12
Test point location	*	*
Avg. Inflow Vel. (FPM) of test points at nominal	328	265
Avg. Inflow Vel. Range (FPM) of test points	312-344	251-27
Correction Factor (CF)	1.08	2
Average Inflow Volume (AIV) = (Avg. velocity x CF)	337-371	503-553
Sash Open Area (Sq. Ft)	3.37	5.03
Inflow Velocity Range (AIV / Sash open area)	100-110	100-110

1. Locate the single row of holes at the front of the grille. Mark the 6th hole from the side wall and subsequent test points every 9 holes until the number of test points marked equals the width of the cabinet in feet (for a 3-foot cabinet, for example, mark the first 3 points). Repeat for the opposite side, as shown in Figure 5-13.
2. Start the Purifier, and let it operate for at least 5 minutes. Establish the necessary correction factor to the thermal anemometer to ensure compliance with its performance in a calibrated wind tunnel. This data should be available from the calibrator of the thermal anemometer.
3. Calculate the manufacturers recommended correction factor(s) to correct for local conditions of temperature, humidity, barometric pressure, altitude, etc.
4. Take a series of inflow velocities by placing the probe holder so that its center mark aligns with the marked test holes. As shown in Figure 5-14.
5. Apply the wind tunnel correction and local condition correction factors to the thermal anemometer readings.
6. Multiply the individual readings by the correction factor shown in Table 5-5.
7. Average the corrected readings.
8. The resulting value is the inflow volume in cubic feet per minute (CFM). In order to convert this value to the average inflow velocity of feet per minute (FPM), divide the volume by the sash open area given in Table 5-5. The resulting value will be the calculated average inflow velocity in FPM.

Figure 5-13

Marking the test point locations.

Mark the 6th hole from either end, then mark every 9th hole until the number of marked points equal the width of the cabinet in feet.

Repeat for the other side of the grille.

Figure 5-14

Measuring the Secondary Inflow Velocity.
Note the center of the probe holder aligns with the test points marked earlier.

Acceptance

Average inflow shall meet the specification in Table 5-5.

Concurrent Balance Values

Axiom Inflow and Inlet Valve flow numbers are established by a direct measurement of air flow. Traditional exhaust system measurements are made using either an anemometer or Pitot traverse methodology. Because of these different methodologies, the total volume of air flowing through the exhaust system will vary.

Table 5-6

Concurrent Balance Volume Specifications

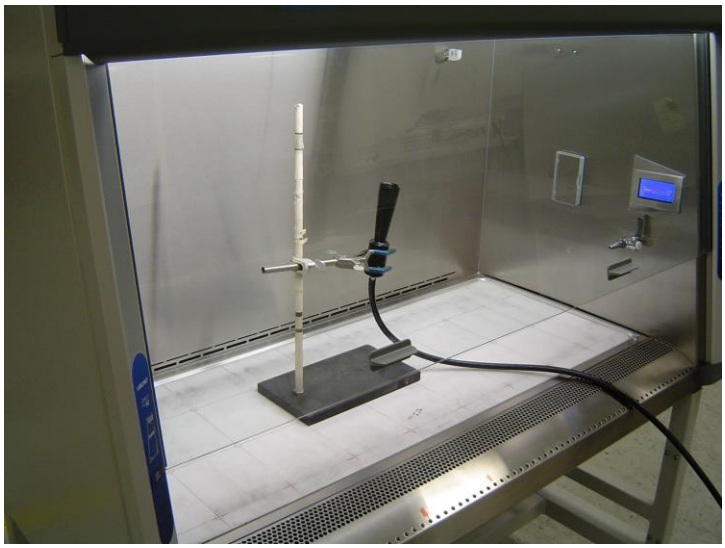
Model	30448	30441	30468	30461
DIM-measured Inflow (CFM)	283	354	423	529
Nominal Inflow through Valve (CFM)	40	40	40	40
Total DIM-measured (CFM)	323	394	473	569
Traverse-measured Exhaust (CFM)	387	480	556	684

Work Area Air Cleanliness Test (optional)

If the customer wants to verify air cleanliness in the work area, use the following procedure:

1. Mark test points at the geometric center of the work surface, and midway between the center test point and each side wall.
2. Place a particle counter pickup on a test point, at a height of 16 inches above the work surface, pointing into the airflow, as shown in Figure 5-15. Take three samples of 1.0 ft^3. Repeat for each test point.
3. Average the results.

Figure 5-15



Acceptance

The average count should be less than 100 particles 0.5um in size per ft^3.

Fluorescent Light Level (optional)

The fluorescent light intensity should be measured as described in ANSI/NSF Standard 49:2012, Annex F.

NOTE: The light meter should be color- and cosign corrected for accurate readings.

1. Test points should be marked along the centerline of the work surface, starting 6 inches from the side wall, with subsequent points 12 inches apart until the center of the work surface is reached. Repeat for the other side of the work area.
2. Take background readings at the test. It should be 15 foot-candles maximum.
3. Turn on the fluorescent lights and let them warm up for at least 5 minutes.
4. Measure the light intensities at the test points.

Acceptance

The average light level should be no less than 45 foot-candles greater than the background level, where maximum background light levels average a maximum of 15 foot-candles.

Most common causes for insufficient light levels are:

a. Malfunctioning lamp(s)
b. Old lamp(s)
c. Dusty/dirty lamp surfaces

Noise Level (optional)

The noise level should be measured as described in ANSI/NSF Standard 49:2012.

1. Noise level should be recorded from a single point, on the centerline of the cabinet, at a position 14 inches above the work surface, and 12 inches from the front of the cabinet.
2. Take a background reading with the cabinet blower off at the test point. It should be less than 55 dBA.
3. Start the cabinet blower, and take a sound reading.

Acceptance

Sound levels should be less than 67 dBA when the cabinet is new, and less than 73 dBA when the filters are loaded.

Vibration (optional)

The vibration level should be measured as described in ANSI/NSF Standard 49:2012.

Note: The vibration meter should have a range of 20-20,000 Hz, and have an output in displacement.

1. Vibration level should be recorded from a single point, on the geometric center of the work surface.
2. Take a background reading with the cabinet blower off at the test point.
3. Start the cabinet blower, and take a displacement reading.

Acceptance

Vibration should be less than 0.0002 inches displacement when the cabinet is new.

UV intensity (optional)

Note: The UV radiometer should measure light at a wavelength of 254nm.

1. UV intensity should be recorded from a single point, on the geometric center of the work surface.
2. Take a background reading with the cabinet blower off at the test point.
3. Close the sash, turn on the UV light, and let it warm up for at least 5 minutes.

Acceptance

The UV intensity should be at least 200 uW-cm^2.

Most common causes for insufficient UV light levels are:

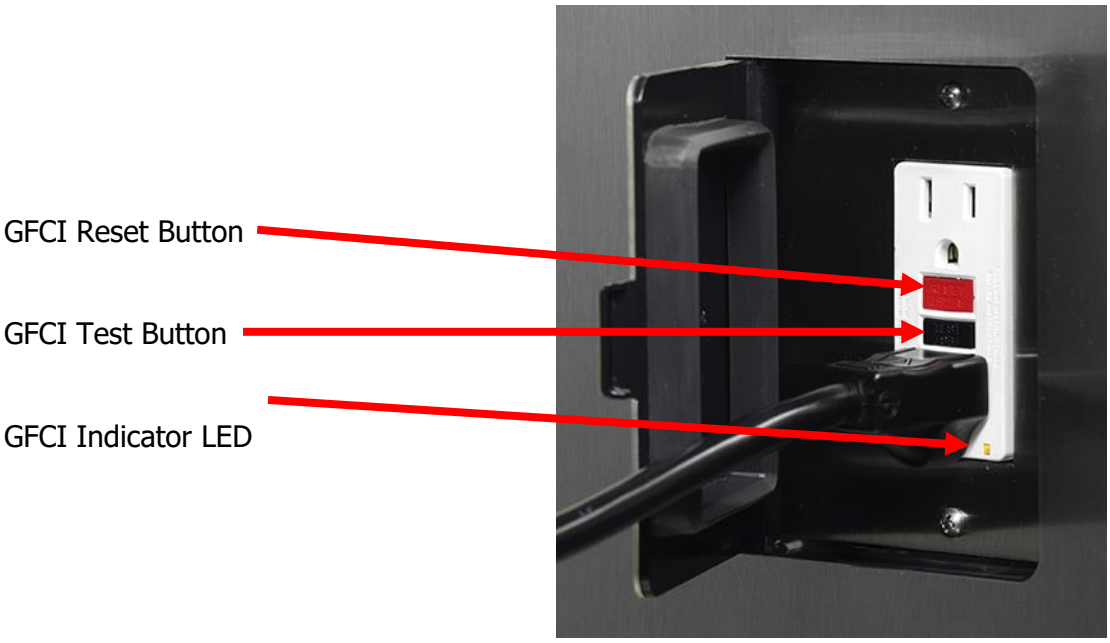
d. Malfunctioning lamp(s)
e. Old lamp(s)
f. Dusty/dirty lamp surfaces

Ground Fault Circuit Interrupter Test
(115/100 Volt models only)

Note: The GFCI tester must be able to simulate a fault of 3mA.

1. Place the tester into any of the Axiom's outlets. The indicator lights of the tester should indicate normal function, and the GFCI's indicator LED should be lit.
2. Press the test button of the tester. The indicator lights should now indicate the circuit is inactive, and the GFCI indicator LED should be off.
3. Reset the GFCI by pressing the RESET button on the right outlet. The tester will again indicate normal operation, and the GFCI indicator LED will illuminate.

Figure 5-16



Acceptance

The GFCI trips during the simulated failure, and the indicator LED turns off. Pressing the Reset button returns the GFCI to normal function.

Section 6

Axiom Service Operations

This section will review the tools needed, and common service operations for the Axiom.

Recommended Tools for Service

The tools needed for most common service operations are:

- ✓ **Certifier Kit, Labconco Part # 3858403**
- ✓ #2 Phillips Screwdriver or long bit for cordless drill
- ✓ ½-inch Socket with extension and ratchet
- ✓ ½-inch nut driver
- ✓ 7/16-inch socket or nut driver
- ✓ 5/16-inch socket or nut driver

Optional tools that may be needed include:

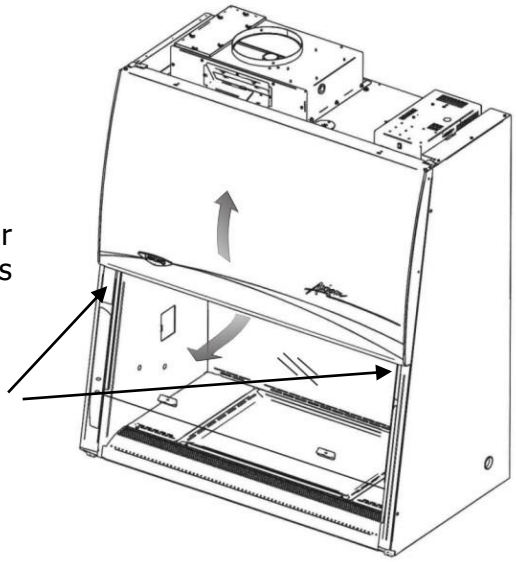
- ✓ Cordless screwdriver/drill
- ✓ Cordless ratchet
- ✓ 3/8-inch nut driver or socket and ratchet
- ✓ Pliers
- ✓ 10-24 Tap
- ✓ 5/16 x 18 Tap

Note: If you use a cordless drill with an adjustable torque setting, set the torque <u>as low as possible</u> to properly drive the screw or bolt.

External Dress Components

Front Dress Panel Removal and Installation

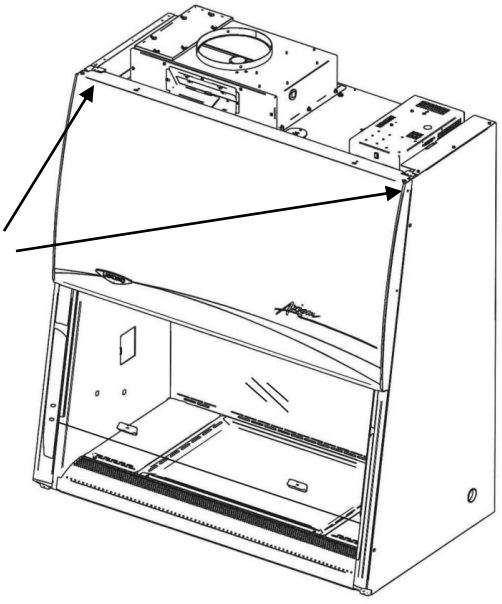
Figure 6-1



1. Locate and remove the two Phillips screws that secure the front panel as shown in Figure 6-1. They are located on the bottom corners of the front dress panel

2. Swing the bottom of the dress panel out to clear the fluorescent light and then lift the front dress panel straight up and away from the cabinet.

Figure 6-2



To reinstall the panel, reverse these steps, ensuring that the plastic pin in the top corners of the dress panel properly engage the corner posts.

Side Panel Removal

Note: The side panel(s) must be taken off to remove the Axiom from its pallet.

1. Remove and save the two Phillips screws on the front edge of the side panel.
2. Pivot the front of the panel away from the cabinet. Lift the panel straight up and pull the panel straight away from the cabinet to release the rear of the side panel from its hinge.

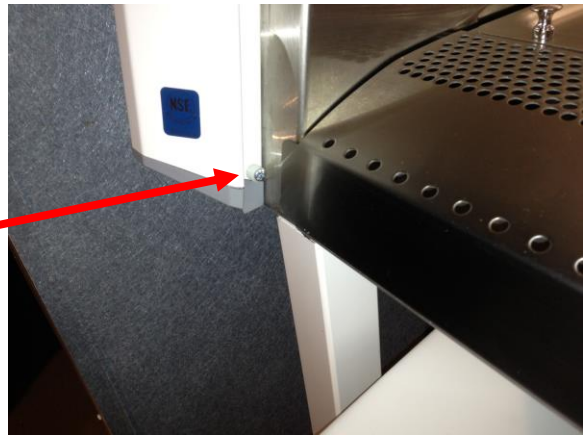
Side Panel Installation

1. Install the side panel by inserting both back panel hooks into the side panel slots.
2. Ensure both panel slots are completely seated on the hooks.
3. Pivot the front of the panel toward the cabinet. Secure the panel by installing and tightening the two Phillips screws.

Corner Post Lower Trim

The corner post lower trim pieces are secured to the corner post by a single machine screw and lock nut. When properly positioned, the trim piece fits tightly against corner post. See Figure 6-3.

Figure 6-3

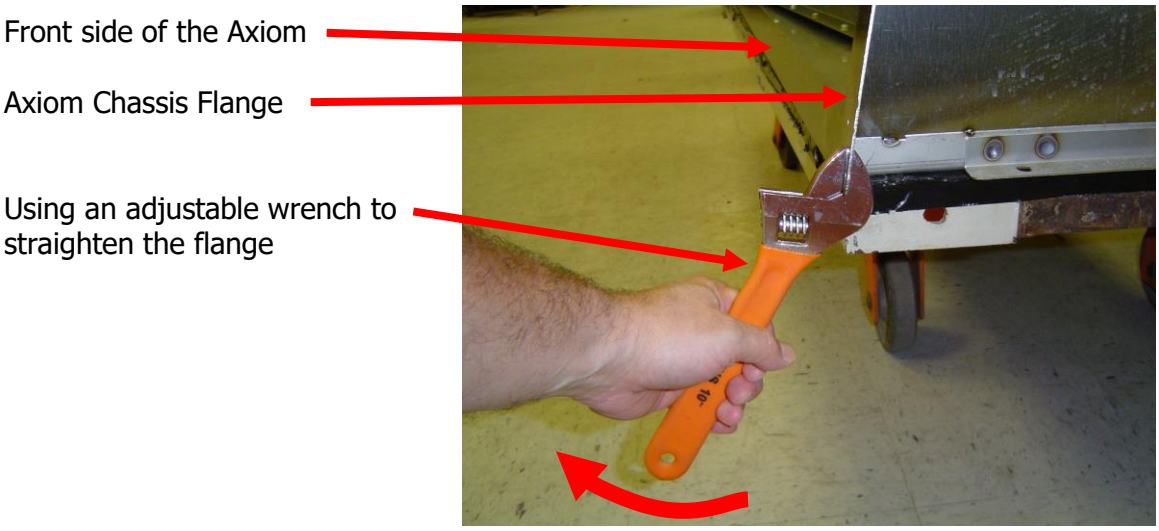


Use a 3/8” wrench and Phillips screwdriver to adjust the corner post screw.

Note: DO NOT over tighten the screw; damage to the trim piece may occur.

If the corner post lower trim pieces do not fit flush to the bottom edge of the metal corner post, examine the front flange of the chassis. The flange should be straight. If it is bent back, it can be straightened by bending the flange forward with an adjustable wrench, as shown in Figure 6-4.

Figure 6-4



Sash

Operation

The Axiom sash uses a deadweight-counterbalanced system. The system consists of two separate weights on either side of the liner. Both weights are synchronized by a locked axle-pulley system, so that both weights must move together, preventing the sash from racking.

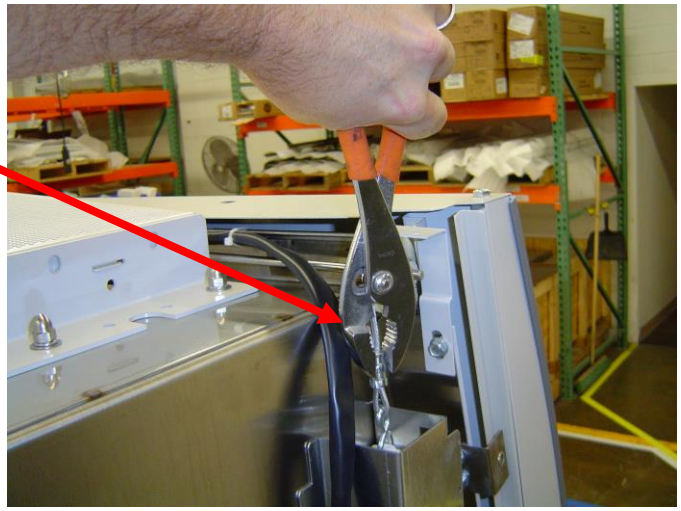
Adjustment

There are no adjustments for the width of the sash track. There should be approximately 1/8-inch lateral play of the sash in its track. If there is no lateral play, examine one or both of the corner posts to ensure that they are not bent inward. If the sash becomes racked, or is closing unevenly, it can be aligned as follows:

1. Close the sash completely, until the lower edge of the sash is contacting the sash stop. If the other end of the sash is not resting on its sash stop, CAREFULLY lift the counterweight on the "high" side of the sash. This will allow the high side of the sash to lower to the sash stop, leveling the sash. See Figure 6-5.

Figure 6-5

Using pliers to lift a sash weight to level the sash.

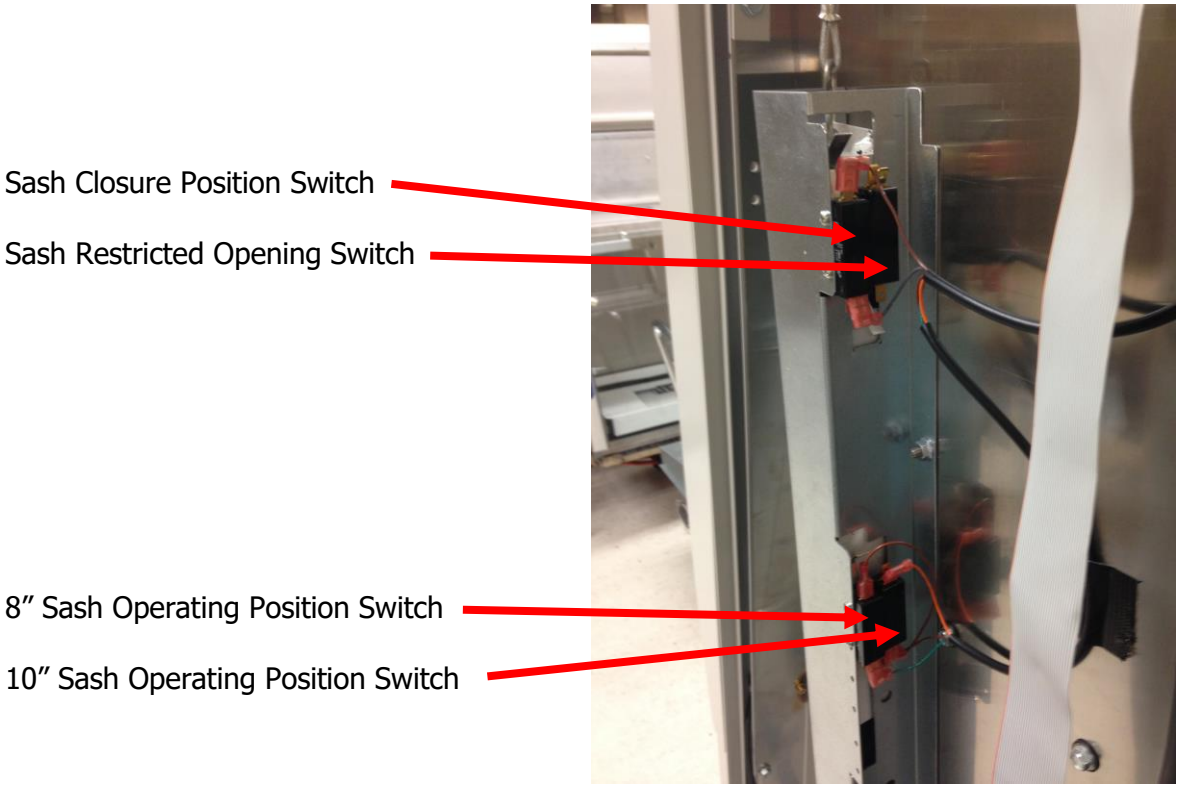


CAUTION: Exercise caution when lifting a counterweight. There is a pinch potential between the sash cable and pulley.

Sash Position Switches

Four microswitches are used to indicate the sash position. The switches are the same, Labconco part # 3832400. A photo of the switches is shown in Figure 6-6.

Figure 6-6



Sash Closure Position Switch

The sash closure position switch signals the display microprocessor that the sash is open or closed allowing proper operation of the Blowers, fluorescent or UV lights. It is wired in the normally open configuration. If the switch does not actuate properly when the sash is within ¼-inch of being fully closed, ensure the switch follower is properly actuating against the weight. See Figure 6-7.

Sash Restricted Opening Switch

The sash restricted opening switch signals the display microprocessor that the sash is about to close. When actuated, the blowers are shut off to prevent the exhaust blower from forming a vacuum when the sash is closed. If the switch does not actuate properly when the sash is within 2 inches of being fully closed, ensure the switch follower is properly actuating against the weight. See Figure 6-7.

8”- and 10” Sash Operating Position Switches

The sash operating position switches signals the display microprocessor that the sash is open too far for proper operation, as shown in Figure 6-8. Both switches are wired in the normally open configuration, and the display microprocessor only responds to the appropriate switch selected during configuration. If the switch does not actuate properly when the sash is within ¼-inch of its operating position, ensure the switch follower is properly actuating against the weight.

Figure 6-7

Sash Closure Position Switch properly actuated against the sash weight

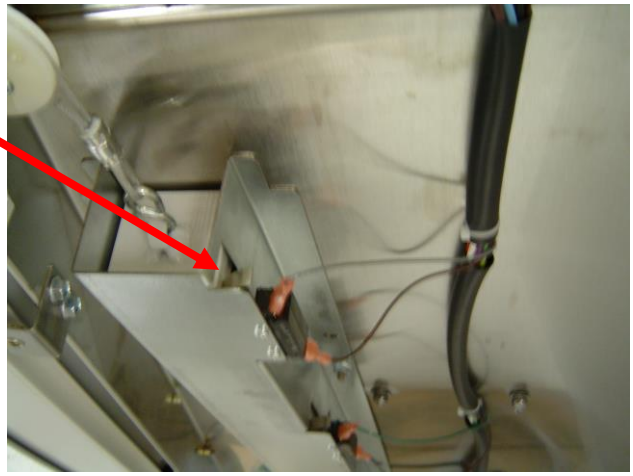
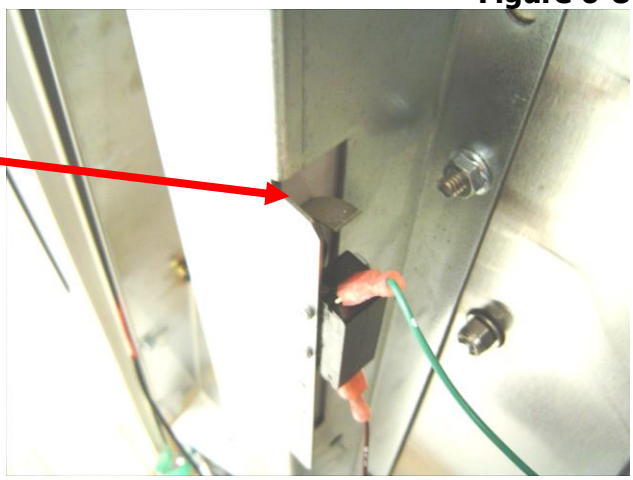


Figure 6-8

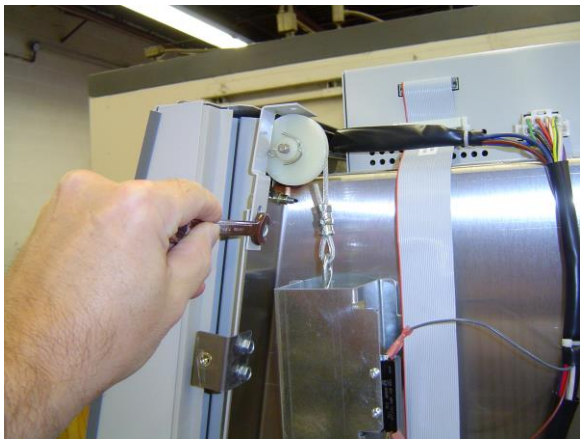
Sash Operating Position Switch properly actuated against the sash weight



Sash Cable Retainer

The sash cable retainers are located at the top of each sash pulley, as shown in Figure 6-9. If the retainer needs adjustment, Use a 3/8-inch wrench to loosen the bolt securing the retainer and adjust it until it there is approximately 1/16" gap between the retainer and the pulley. Retighten the bolt.

Figure 6-9



HEPA Filter Replacement

CAUTION: The cabinet must be properly decontaminated before servicing the exhaust HEPA filter. Following replacement of either HEPA filter, the cabinet must be recertified.

CAUTION: HEPA filters can be awkward to handle and heavy. Use appropriate lifting techniques to remove and handle it. Use two people to remove the larger filters if possible.

1. Unplug the cabinet.
2. Remove the front dress panel as shown in Figure 6-1.

To Remove the Exhaust HEPA Filter:

3. Loosen all of the Phillips screws on the exhaust filter cover.
4. Loosen the four sealed exhaust filter clamp bolts on the top of the cabinet hull, as shown in Figure 6-10. DO NOT remove the bolts; only loosen them until the exhaust HEPA filter is free of the filter frame.
5. Pull the exhaust HEPA filter straight out of the cabinet.

Figure 6-10

Exhaust filter clamp bolts

(two in each side of the exhaust connection)

To Install an Exhaust HEPA Filter:

1. Slide the new exhaust HEPA filter all the way into the pan.
2. Sequentially tighten the four exhaust filter sealing bolts located at each corner of the exhaust filter tray until the exhaust filter gasket is compressed no more than 50%.

The exhaust filter sealing bolts should only be tightened enough to ensure a proper seal of the exhaust HEPA filter. At maximum tightness, the exhaust filter's gasket should be compressed to 50% of its original thickness. NEVER tighten the bolts beyond this setting.

3. Install the exhaust HEPA filter cover, uniformly tightening the screws on the cover until the gasket has formed a proper seal.

To Remove the Supply HEPA Filter:

1. Loosen all of the Phillips screws on the blower/supply filter chamber cover. Remove all of the screws except two screws on the top center of the panel. This will support the panel.
2. Remove the last two screws. Gently rock the cover, slide it to the left or right, and swing it out and away from the unit.

NOTE: During disassembly, the blower plenum cover can rest on the center sash support, as shown in Figure 6-11, to allow repositioning of the panel or your grip on it.

Figure 6-11

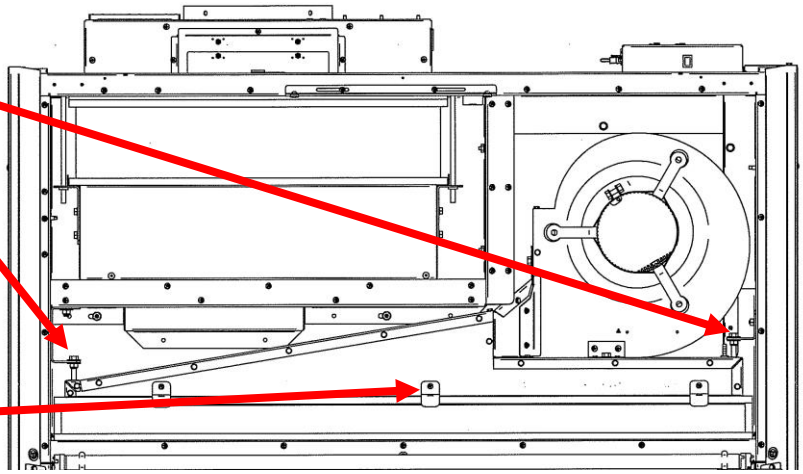
Center Sash Support

3. Use 1/2-inch sockets or wrenches to tighten the three plenum lift bolts located as noted in Figure 6-12. This will lift the plenum off of the supply HEPA filter. Remove the Supply HEPA filter retainers on the front of the plenum, if present.
4. Slide the supply HEPA filter straight out the unit.
5. With the HEPA filters removed, inspect the filter shelf for damage.

Figure 6-12

1/2" Plenum Lift Bolts

Supply HEPA filter retainers (3)



To Install a Supply HEPA Filter:

1. Install a new supply HEPA filter by pushing it straight into the cabinet, ensuring that it is correctly oriented, and that the filter is centered on the filter shelf.
2. Use the 1/2-inch sockets or wrenches to sequentially loosen the three plenum lift bolts located as noted in Figure 6-12. When properly positioned, the plenum box will be aligned with the supply HEPA filter frame. Continue to loosen the bolts until the plenum contacts the HEPA filter and has slightly compressed the filter gasket.

NOTE: The lift bolts should only be tightened enough to ensure a proper seal of the supply HEPA filter. At maximum tightness, the supply filter's gasket should be compressed to less than 50% of its original thickness. NEVER tighten the locking bolts beyond this setting.

Supply Motor/Blower Replacement

Caution: The cabinet must be properly decontaminated before servicing the motor/blower.

The cabinet blower motor's bearings are sealed and require no lubrication. DO NOT attempt to lubricate them.

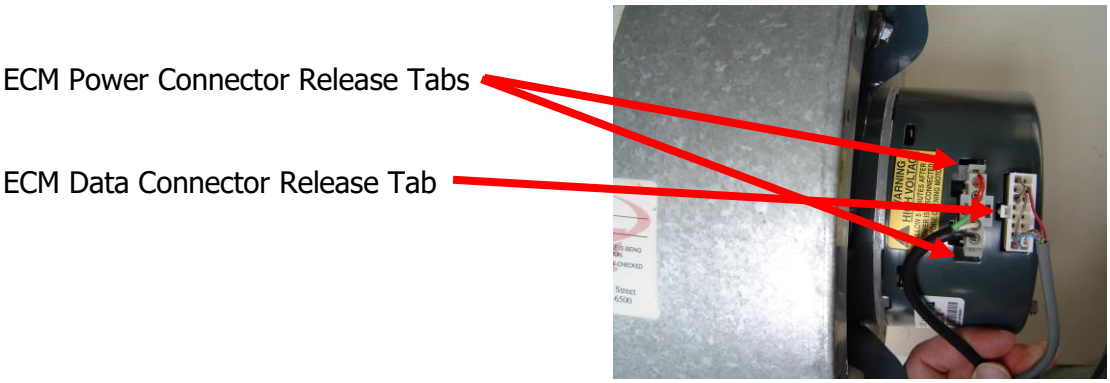
To replace the Motor/Blower:

1. Unplug the cabinet.
2. Remove the front dress panel as shown in Figure 6-1.
3. Loosen all of the Phillips screws on the blower chamber cover. Remove all of the screws except two screws on the top center of the panel. This will support the panel.
4. Remove the last two screws. Gently rock the cover, slide it to the left or right, and swing it out and away from the unit.

NOTE: During disassembly, the blower plenum cover can rest on the central sash support, as shown in Figure 6-11, to allow for repositioning of the panel or your grip on it.

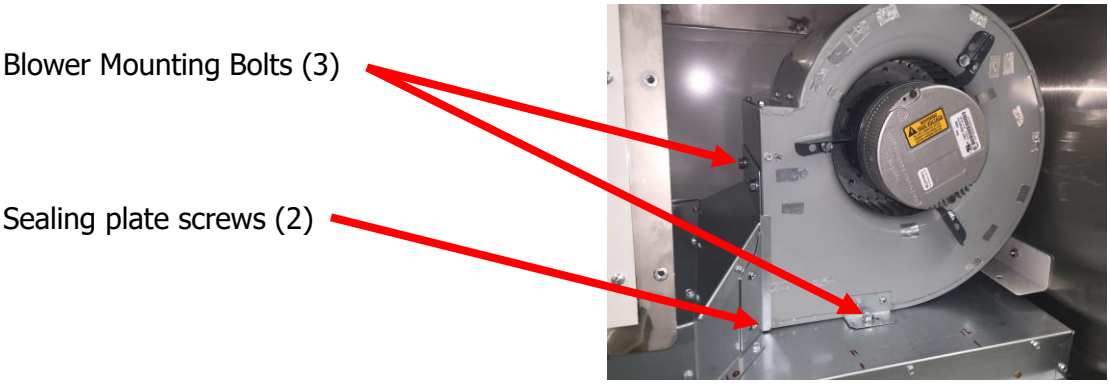
5. Disconnect both motor connectors from the motor. The 5-pin power connector, located closest to the blower, is released by pressing the locking ears on either side of the connector. The 16-pin data connector, located furthest from the blower, is released by pressing the single locking ear located on the inside center surface of the connector body. The connectors are shown in Figure 6-13.

Figure 6-13



6. Use a Phillips screwdriver to remove the two sealing plate screws and the sealing plate. Using a 1/2-inch wrench, remove the three blower mounting bolts, as shown in Figure 6-14.

Figure 6-14



The motor/blower assembly is heavy. Handle with care.

7. While supporting the blower assembly, pull the assembly straight out the plenum, as shown in Figure 6-15.

Figure 6-15

8. To replace the motor/blower assembly, reverse the above procedure.

Note: During reinstallation of the blower assembly, push the blower into position, and loosely install the two blower mounting bolts. Press the sealing plate against the side of the blower to ensure it is properly sealed against the back of the blower mount. Tighten the two sealing plate screws while continuing to press the plate against the blower. This will ensure a tight seal. Now tighten the two blower mounting bolts.

9. Continue the reassembly. Plug in the cabinet and recertify it before use.

Exhaust Motor/Blower/Plenum Replacement

Caution: The cabinet must be properly decontaminated before servicing the assembly.

The cabinet blower motor's bearings are sealed and require no lubrication. DO NOT attempt to lubricate them.

To replace the Motor/Blower/Plenum:

1. Unplug the cabinet.
2. Remove the front dress panel as shown in Figure 6-1.
3. Loosen all of the Phillips screws on the exhaust chamber cover. Remove all of the screws except two screws on the top center of the panel. This will support the panel.
4. Remove the last two screws. Gently pull off the cover.

NOTE: During disassembly, the exhaust chamber cover can rest on the two support posts near the bottom of the panel, to allow for repositioning of the panel or your grip on it.

5. Using a 1/2-inch wrench or socket, loosen the four sealed filter clamp bolts, as shown in Figure 6-16.

Figure 6-16

Exhaust filter clamp bolts

(two in each side of the exhaust connection)

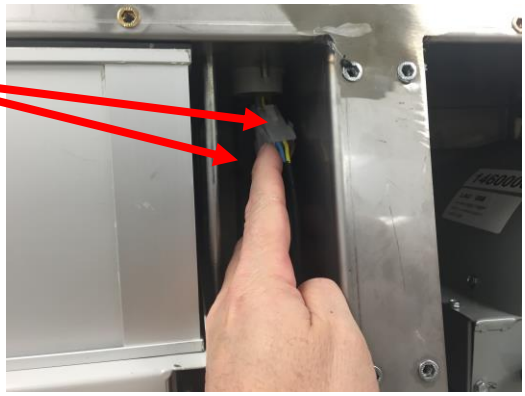
6. Carefully remove the Exhaust HEPA

filter and set it in a safe spot.

7. Disconnect the exhaust motor harness at the pass through near the top of the chamber, as shown in Figure 6-17.

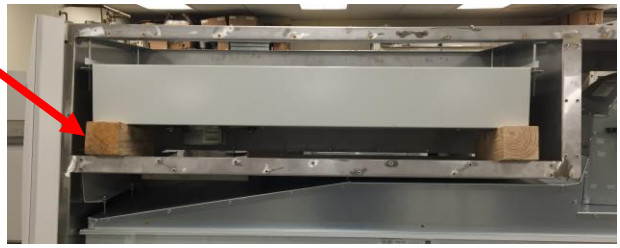
Figure 6-17

Exhaust Motor wiring harness connectors



NOTE: It will ease plenum installation and removal by laying two 2x4 or 4x4 supports under the plenum, and over the filter chamber flange, as shown in Figure 6-18.

Figure 6-18



8. Loosen the filter clamping bolts until the plenum assembly is released.

The motor/blower/plenum assembly is heavy. Handle with care.

9. Slide the plenum out of the cabinet on the wooden supports.
10. Disconnect the exhaust motor wiring harness from the ECM Motor, and install it on the new motor/blower/plenum assembly.
11. Install the new assembly into the Axiom.
12. To complete the replacement, reverse the above procedure.
13. Plug in the cabinet and recertify it before use.

Center Work Surface Removal

Note: The work surface must be thoroughly decontaminated before removing it from the cabinet.

1. Lift either of the wing work surfaces up by grasping the knob handles at either front corner.
2. This will lift up the center work surface. Lift the front edge up, pivoting the work surface on its back edge until the front edge of the work surface engages the catch located on the back wall of the work area.
3. Reinstall the work surface by supporting it while lifting up on the catch to release the work surface. Gently lower the center work surface, being sure to engage the pins on the front corners of the work surface with the holes in the grille, as shown in Figure 6-19.

Wing Work Surfaces Removal

Note: The work surfaces must be thoroughly decontaminated before removing it from the cabinet.

1. Lift the front edge of either wing work surface straight up by grasping the knob handles. This will raise the front edge of the center work surface.
2. Lift the front edge up, pivoting the work surface on its back edge until the front edge of the work surface engages the catch located on the back wall of the work area.
3. Lift and pull both wing work surfaces out.
4. Reinstall the wing work surfaces by engaging the tab on the back corner of the work surface with the slot on the rear wall of the work area. Ensure that the flange on the inside edge of the wing work surface fits *outside* of the center work surface pan, as shown in Figure 6-19. Reinstall the work surface by supporting it while lifting up on the catch to release the work surface. Gently lower the center work surface, being sure to engage the pins on the front corners of the work surface with the holes in the grille, as shown in Figure 6-19a.

Figure 6-19

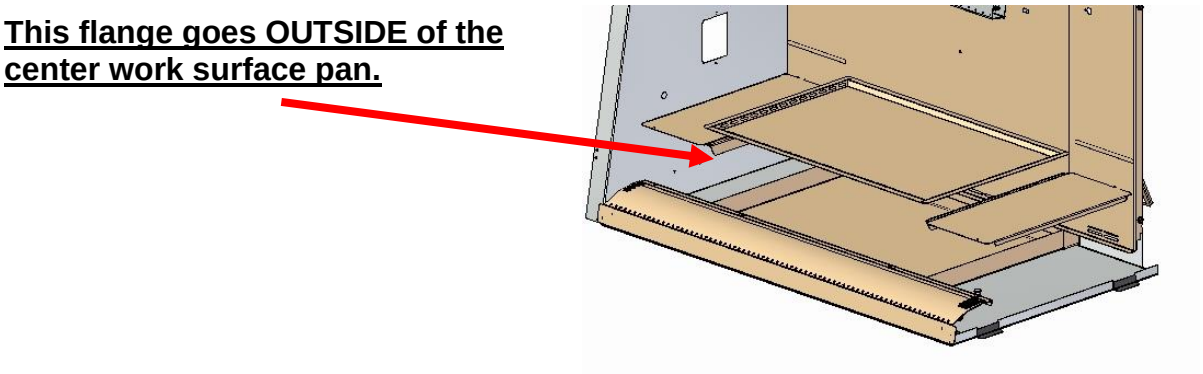
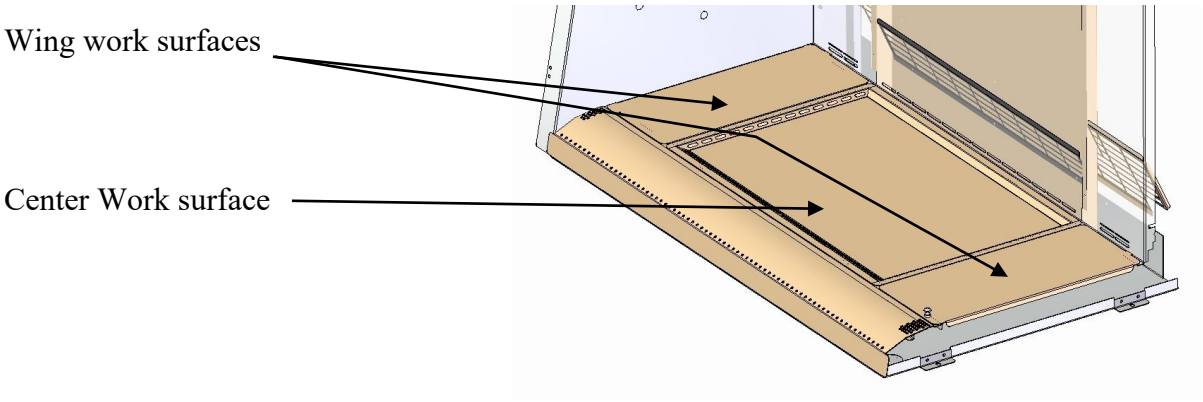


Figure 6-19a

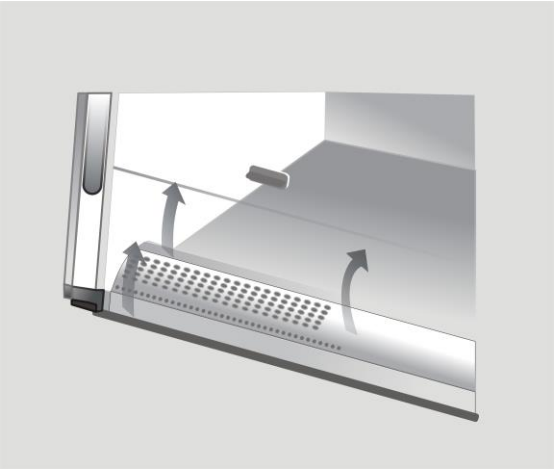


Grille Removal

Note: The grille must be thoroughly decontaminated before removing it.

1. Remove the work surface as described earlier.
2. At one end of the grille, grip the front of grille with one hand, and the back with the other hand. Pivot that end of the grille upward and inward, paralleling the angle of the sash, as shown in Figure 6-20.
3. Pull the other end of the sash up and away from the bottom edge of the cabinet.
4. Reinstall the grille by reversing the above sequence, ensuring that the grille properly engages the bottom edge of the cabinet.

Figure 6-20



Diffuser Removal

Caution: The diffuser should be surface decontaminated before removal.

Note: If an IV bar is in place, it will have to be removed first.

1. Raise the sash to its fully open position.
2. Support the front edge of the diffuser while removing the two 7/16-inch acorn nuts on the front of the diffuser, as shown in Figure 6-21.

Figure 6-21

Removing the diffuser acorn nuts (Dress panel and lamps removed for clarity only).

Note: The diffuser acorn nuts are secured to the studs with a removable thread locking compound to prevent them from vibrating loose during shipment of the Axiom. There may be some resistance the first time the nuts are removed; this is normal. No additional thread locking compound need be applied to these acorn nuts unless the unit is being prepared for shipment.

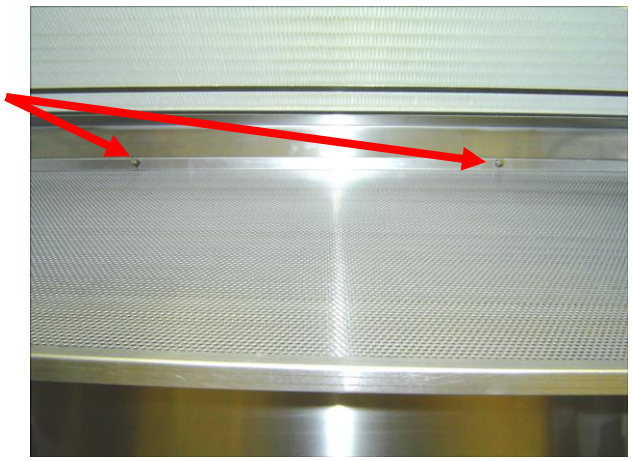
3. Allow the front of the diffuser to drop and pull it straight out of the cabinet, as shown in Figure 6-22.

Figure 6-22

4. To reinstall the diffuser, ensure that the two holes on the back edge of the diffuser align with the diffuser support pins on the rear wall of the work area, as shown in Figure 6-23.

Figure 6-23

Diffuser pins engaging the holes in the rear of the diffuser.



Preparing the Axiom for Gaseous Sterilization

Note: This section only reviews the steps required for preparing the Axiom for Gas Sterilization. Thoroughly understand the sterilization procedures and protocols supplied by the manufacturer of the sterilizing system before attempting this operation.

1. Unplug the Axiom from electrical power.
2. Thoroughly surface decontaminate the working area of the cabinet.

In order to get a complete seal on the front of the cabinet, do the following:

3. Remove the work surfaces after it has been surface decontaminated.
4. Remove the front grille.
5. Place the work surfaces and the grille into the work area for decontamination.
6. Remove the front dress panel.
7. Remove the sash stop bracket, located near the top of the blower plenum cover.
8. Lift the sash up until the bottom edge of the sash clears the bottom edge of the Supply HEPA Filter shelf.
9. Using flexible plastic sheet 5-8 mil thick and duct tape seal the perimeter of the front opening.
10. Using flexible plastic sheet and duct tape seal the Inlet Relief Valve opening.
11. Close the air tight damper in the exhaust system to isolate the Axiom from the rest of the exhaust system.

    Note: If there is no air tight damper in the exhaust system, then the entire exhaust system will have to be sealed, and decontaminated along with the Axiom. Be sure to estimate and include the volume of the exhaust system being decontaminated when calculating the concentration the sterilant.
12. The Axiom is now prepared for gaseous decontamination.

Section Seven –
Electrical System Service Operations

NOTE: In order to properly service the Axiom, you must obtain an Axiom Certifier Kit, Labconco P/N 3858400. Qualified certifiers can obtain this kit by contacting Labconco Customer Service Department at 800-821-5525.

Fluorescent Lamp

Lamp Identification

All Axioms use dual fluorescent lamps. The lamp information is shown in Table 7-1. The code of the lamp part number is as follows:

F25T8 TL741
F = fluorescent lamp
25 = the lamp Wattage
T8 = the lamp mounting configuration
TL741 = the phosphor used in the lamp

Note: The phosphor of the lamp determines the color and intensity of the lamp. Not matching the phosphor may affect the quality and/or color of the light.

Table 7-1

Fluorescent Lamp Specifications

Cabinet Width (feet)	3	4	5	6
Fluorescent Lamps (2 each)	F25T8 TL741	F32T8 TL741	F40T8 SP41	F40T8 SP41
Fluor. Lamp Labconco Part #	9721901	9721900	9721903	9721903
Fluor. Ballast Labconco Part #	3838100	3838100	3838100	3838100
Fluor. Ballast Robertson Part #	ISL332T 8MVW	ISL332T 8MVW	ISL332T 8MVW	ISL332T 8MVW

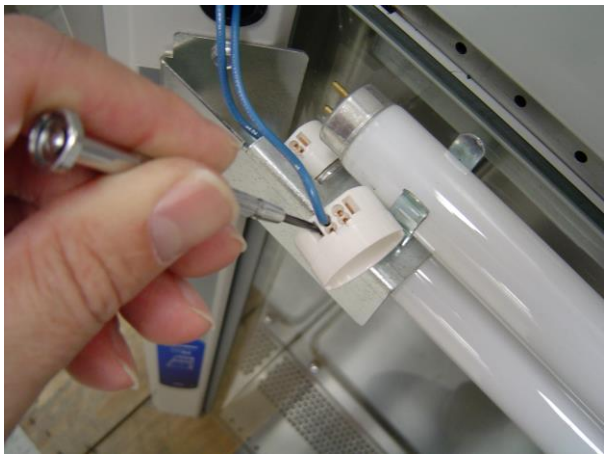
Changing the Fluorescent Lamp

1. Unplug the cabinet or turn the System Reset Switch, located on the top of the cabinet, off.
2. Remove the front dress panel as noted in Figure 6-1.
3. Remove the fluorescent lamps by pulling the lamp sockets straight off each end of the lamp, and releasing both lamps from the spring clips that secure them in place.
4. Install the new lamps by reversing the removal procedure.

Lamp Socket Replacement

1. Unplug the Axiom
2. Remove the dress panel as noted in Figure 6-1
3. Remove the fluorescent lamps from the sockets.
4. To replace a socket, insert a small straight bladed screwdriver into the socket near the lamp wire, as shown in Figure 7-1, and pull the wire out.
5. Press the wire into the new socket.
6. Reassemble the unit.

Figure 7-1



Optional Ultraviolet Lamp

Lamp Identification

All Axioms use a single 30-Watt germicidal lamp. The lamp information is shown below. The code of the lamp part number is as follows:
G30T8
G = germicidal lamp
30 = the lamp Wattage
T8 = the lamp mounting configuration

UV lamp Specifications

- For all models, the UV lamp number is G30T8. The Labconco part number is 1271300.
- For all 115/230 VAC models, the ballast assembly is Labconco part number 3829901. The ballast is Robertson part number PSM2GPH18MVW.
- For all 100 VAC models, the ballast assembly is Labconco part number 3830600. The ballast is Robertson part number RSO1GPH30100.

Changing the UV Lamp

Note: For optimum performance, the UV lamp should be changed on an annual basis.

Caution: The UV lamp and the work area of the cabinet must be thoroughly surface decontaminated before removing the lamp.

1. Unplug the Axiom.
2. Raise the sash to its full open position.
3. Surface decontaminate the UV lamp and the work area of the cabinet.
4. Remove the UV lamp by rotating it 90 degrees and lifting it straight up and out of its sockets.
5. Install new lamp by reversing the removal procedure.

UV Lamp Socket Replacement

Note: The UV lamp sockets are left- and right-handed. They are not interchangeable. The Part number for the right socket assembly is 3742000, and the left is part number 3742001.

1. Unplug the Axiom
2. Raise the sash to its full open position.
3. Surface decontaminate the work area and the UV lamp.
4. Remove the UV lamp by rotating it 90 degrees and lifting it straight up and out of its sockets.
5. To replace a socket, Use a #1 Phillips screwdriver to remove the screw.
6. Pull the socket assembly out of the rear wall.
7. Disconnect the wire connectors, and handle the old socket as contaminated waste.
8. Install the new socket.
9. Reinstall the Phillips screw through the rear wall and capture the lamp socket bracket. Tighten the screw.
10. Reassemble the unit.

Electronics Module Access

The Electronics module is located on the top right side of the cabinet. To access the module, do the following:

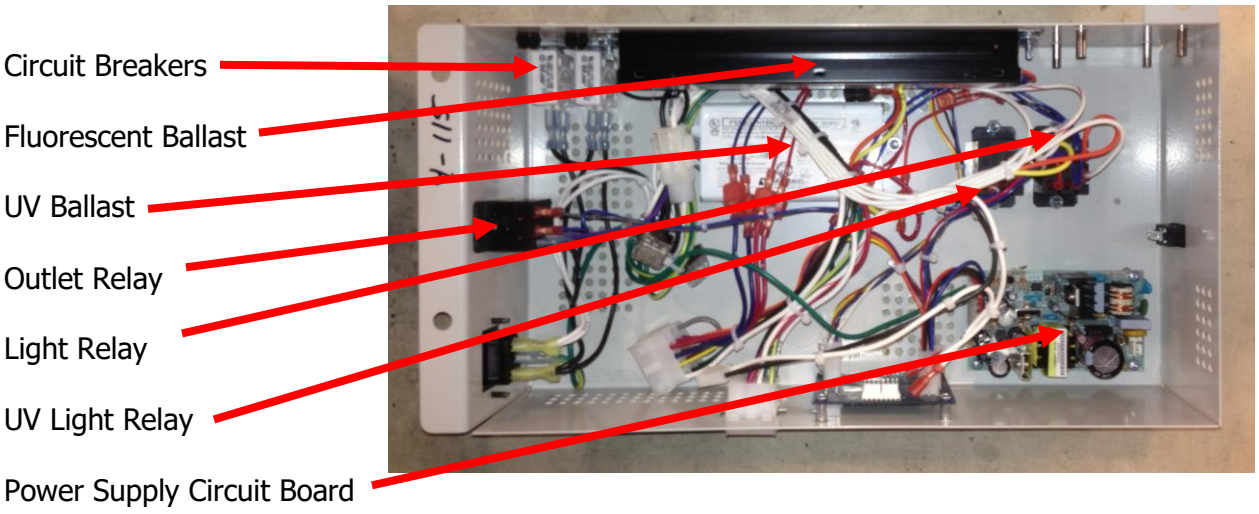
1. Unplug the Axiom, either at the wall, or at the power cord inlet at the back of the electronics module, as shown in Figure 7-2.
2. Remove the three 7/16-inch nuts that secure the module.
3. Tip the module on its side, and secure it so it does not fall.

Figure 7-2

Electronic Module Component Identification

The Electronics module contains the circuit breakers, the relay and power supply boards, the fluorescent and optional UV ballasts, and the optional RS-232 board. These items are shown in Figure 7-3.

Figure 7-3



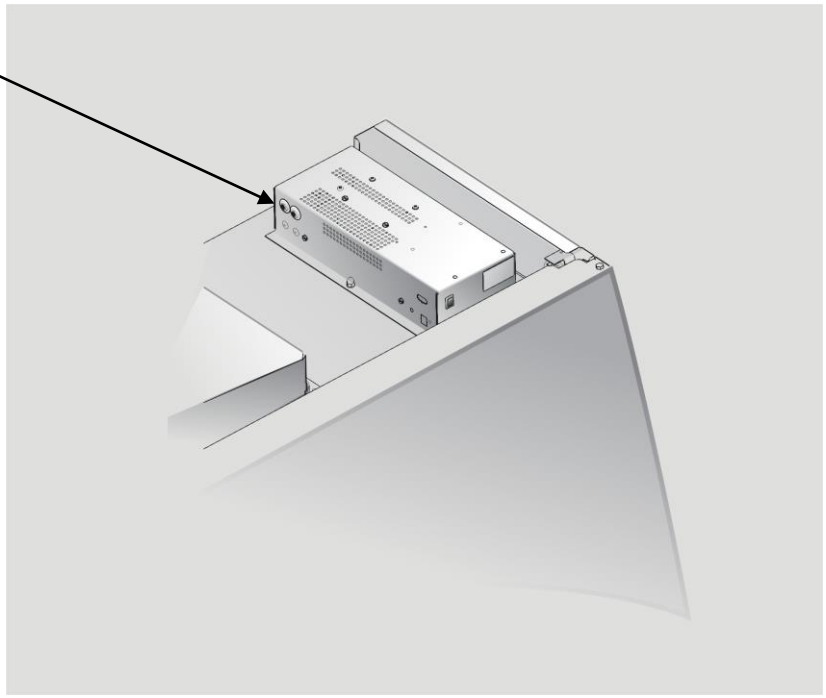
Circuit Breaker

Resetting a circuit breaker

To reset any of the circuit breakers located on the left side of the electronics module, as shown in Figure 7-4, depress the white button until it sets.

Figure 7-4

Circuit Breakers- The front breaker protects the electrical outlets, the rear breaker protects the motor and lights.



Circuit Breaker Specifications

Circuit breaker specifications are shown in Table 7-2, below.

Table 7-2

Circuit Breaker Specifications, 100/115 VAC

Cabinet Width (feet)	4	6
Motor/Light Breaker Rating, Amps	12	12
Motor/Light Breaker, Labconco Part #	1327201	1327201
Motor/Light Breaker, Mechanical Products Part #	1600-062-080-007	1600-062-120-007
Outlet Breaker Rating, Amps	5	5
Outlet Breaker, Labconco Part #	1327204	1327204
Outlet Breaker, Mechanical Products Part #	1600-062-050-007	1600-062-050-007

Circuit Breaker Specifications, 230 VAC

Cabinet Width (feet)	4	6
Motor/Light Breaker Rating, Amps	6	6
Motor/Light Breaker, Labconco Part #	1327203	1327203
Motor/Light Breaker, Mechanical Products Part #	1600-062-060-007	1600-062-060-007
Outlet Breaker Rating, Amps	3	3
Outlet Breaker, Labconco Part #	1327200	1327200
Outlet Breaker, Mechanical Products Part #	1600-062-030-007	1600-062-030-007

Testing a circuit breaker

Note: If the breaker is tripped (white button is extended), press the reset button of the breaker. If it does not reset smoothly, the breaker has failed and must be replaced.

1. With the breaker reset, unplug the Axiom, either at the wall, or at the power cord inlet at the back of the electronics module, as shown in Figure 7-2.
2. Remove the three 7/16-inch nuts that secure the module.
3. Tip the module on its side to access the breakers.
4. Using a continuity meter, check the continuity (resistance) across the terminals of the breaker being tested.
5. The resistance across the breaker should not exceed the resistance noted when the meter probes are connected to each other.

Replacing a circuit breaker

1. Unplug the Axiom, either at the wall, or at the power cord inlet at the back of the electronics module, as shown in Figure 7-2.
2. Remove the three 7/16-inch nuts that secure the module.
3. Tip the module on its side to access the breakers.
4. Disconnect the wires connected to the breaker terminals.
5. Using a pair of pliers, loosen the chrome ring nut outside of the reset button. Remove the ring nut, and pull the breaker out of the electronics module.

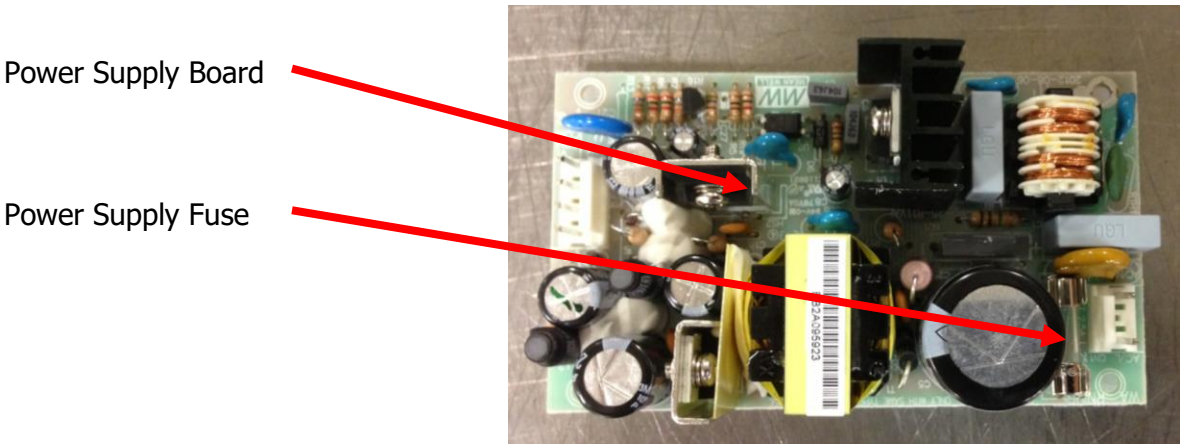
Power Supply Board Service Operations

Fuse Testing & Replacement

The Power Supply Board is protected by an integral 5 x 20mm, fuse, rated at 2.5 Amps at 250 volts, as shown in Figure 7-5.

The fuse is tested with a standard continuity meter. Any resistance across the fuse indicates a defective fuse and should be replaced.

Figure 7-5



Display Board Service Operations

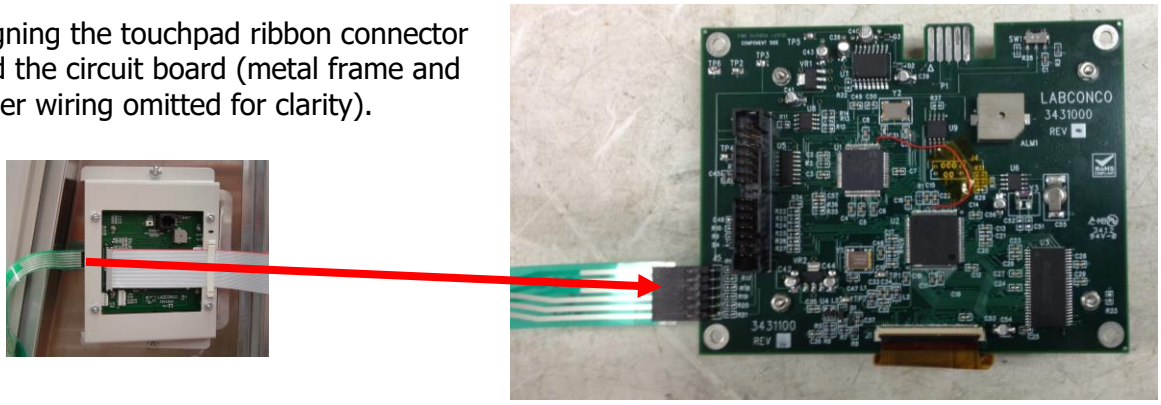
Display Board Diagnostics is addressed in the section on Touchpad Test Operations.

Touchpad Connections

To correctly connect the touchpad to the Display Board, orient the ribbon connector so the metallic side of the connector is away from the side of the Axiom, as shown in Figure 7-6.

Figure 7-6

Aligning the touchpad ribbon connector and the circuit board (metal frame and other wiring omitted for clarity).



Diagnostic Operations

The available diagnostic tests are outlined in the QuickStart section of this manual.

Motor Service Operations

NOTE: Use caution when measuring test voltages to avoid short circuits.

The ECM does not require routine service. The motor bearings are permanently lubricated, and do not require additional lubrication.

Motor Testing

For the ECM to operate properly, the motor must receive:

1. Line voltage across pins 4 (black wire) and 5 (white wire) through the power connector.
2. 12 Volts DC through pin 1 (brown wire circuit common) and 15 (yellow wire) on the data Connector.
3. A pulse width modulation signal through pin 10 (purple wire) on the data connector. This signal is measured with respect to circuit common, which is pin 1 (brown wire).

Note: The above pin numbers and wire colors are described as they exist at the motor connectors. These connectors are located inside the contaminated area, as so you may want to measure these signals as they exit out of the electronics module on top of the BSC, rather than decontaminating the BSC. The instructions below refer to accessing all the necessary motor drive signals as they exit the electronics module.

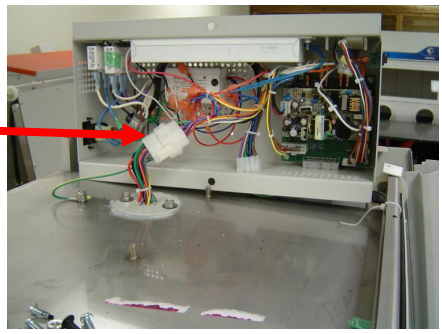
Caution: In order to confirm proper motor operation, the unit must be energized. Use caution when testing electrical components.

NOTE: To properly measure motor line and signal voltages, you should use the pass-thru harness, Labconco Part # 3842601. The harness is part of Labconco Certifier's Kit, Part #3858400. Qualified certifiers can obtain this kit by contacting Labconco Customer Service Department at 800-821-5525.

1. Unplug the Axiom.
2. Access the electronics module as described earlier in "Electronics Module Access", and securing it so it does not fall and damage wire and components.
3. Locate the white-colored, 15 pin connector that connects to the pass-thru harness as shown in Figure 7-7.

Figure 7-7

15 pin connector



4. Disconnect the 15-pin connector, and install the pass-thru harness, as shown in Figure 7-8. Plug the Axiom back in. With the meter set on AC voltage, verify the AC mains line voltage is present within ± 5 VAC when the AC voltage is measured across pin 2 (black wire) and pin 3 (white wire) on the 3-pin connector, as shown in Figure 7-9.

Figure 7-8

Pass-thru Harness installed

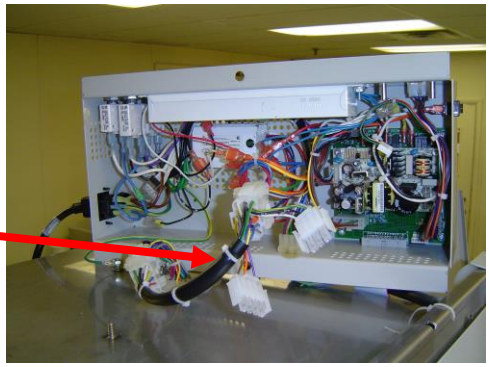
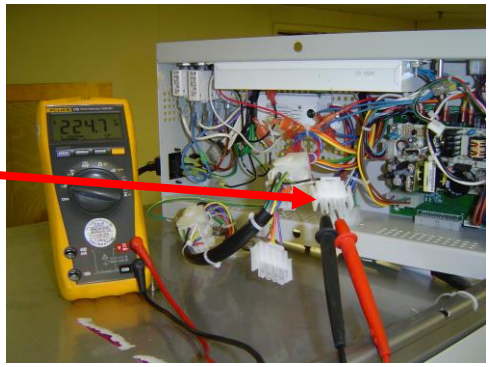


Figure 7-9

Measuring Line voltage

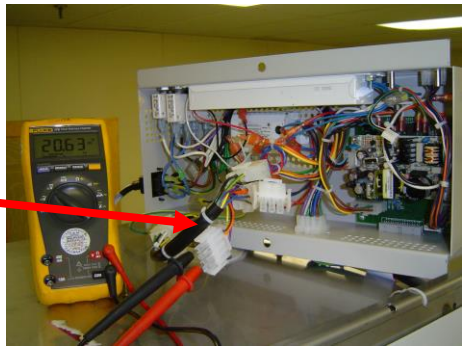


5. Set the meter to read DC voltage and connect the –DC voltage lead to pin 8 (brown wire) on the 4-pin connector. This brown wire is circuit common and will be used for the following low voltage tests.

6. Next, connect the meters + DC voltage lead to pin 6 (yellow wire) and verify there is 12 Volt DC, as shown in Figure 7-10. The presence of 12 Volt DC on this yellow wire tells the motor to start.

Figure 7-10

Measuring 24 VDC voltage



7. Next, move the meter's + DC voltage lead to pin 5 (purple wire) [the meter's lead is still connected to pin 8 (brown wire)]. Note the DC voltage, since the motor's speed is determined by the pulse width modulated signal on this contact. A voltage noted in step 6 signifies 100% pulse width duty cycle, while a DC voltage of 0 volts would indicate a 0% PWM level. Depending on the particular ECM motor, the motor speeds for the 0% PWM levels and 100% PWM levels will differ but the 0% level represents the "night setback" blower speed and the 100% level indicates the max speed ever required by the motor under total filter loading. The actual DC voltage measured will be between 0 V and 24 Volts DC, and that voltage indicates roughly the % duty cycle being sent to the motor at this time. For example:

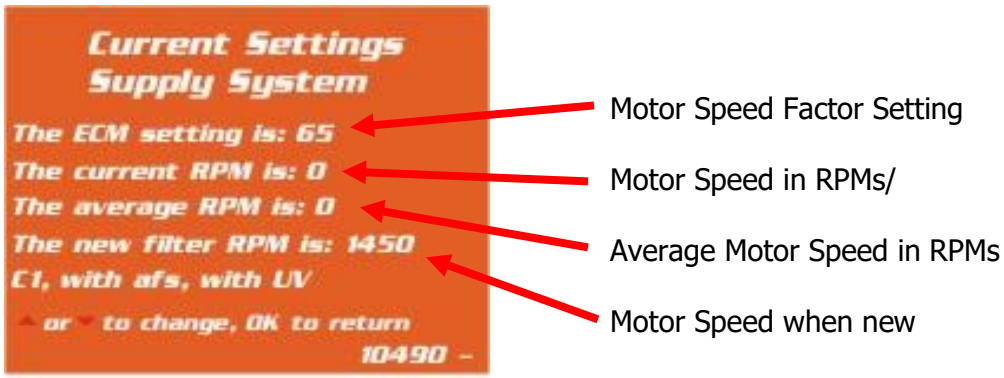
   A total voltage of 12 VDC, and a signal voltage of 8.15 VDC would be:

   8.15 VDC measured/12V DC @ 100% = 68% duty cycle.

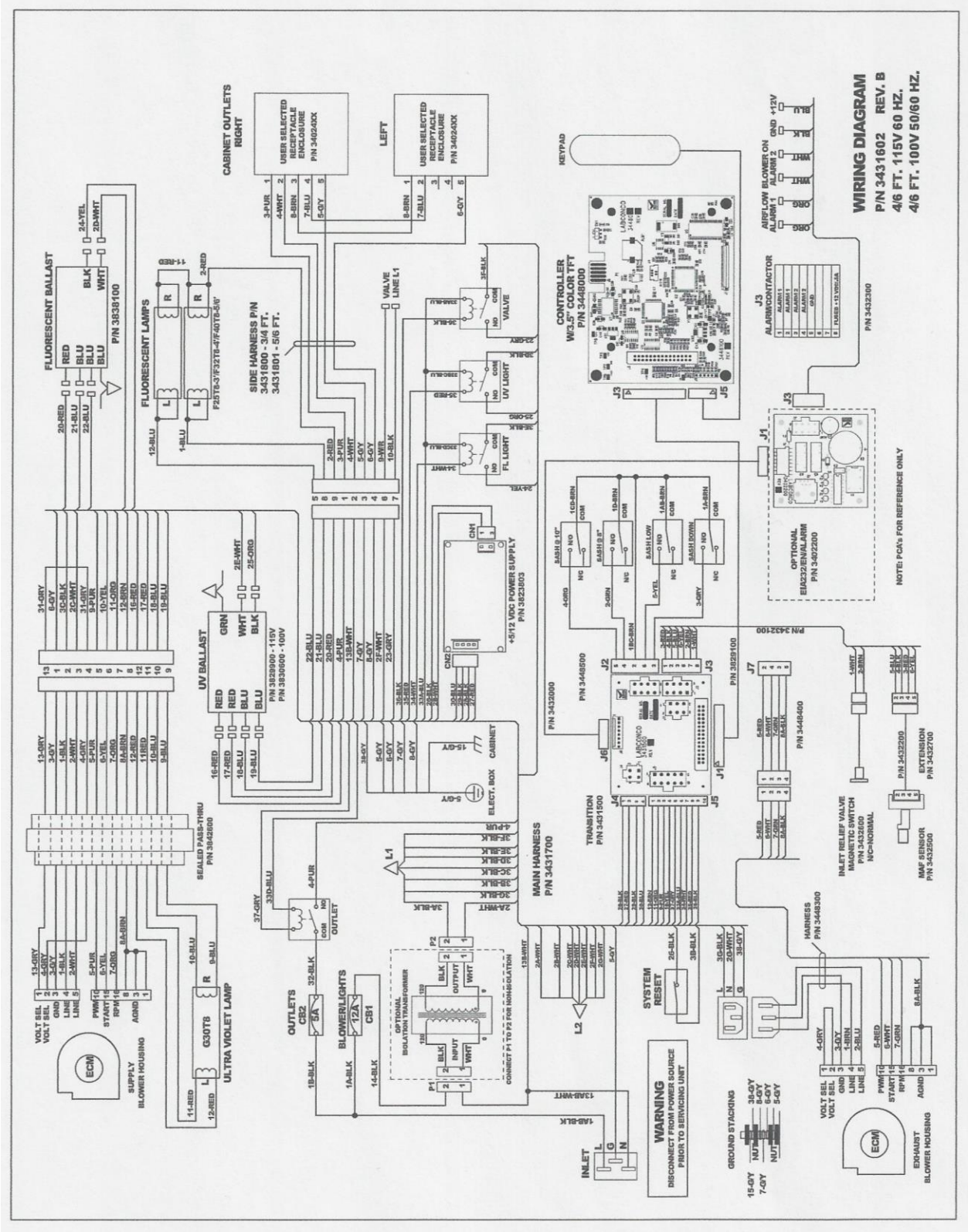
Motor Output Signal Testing

Use the Service Menu's "Current Settings" screen to access the Supply and Exhaust Motors' Speed Factor, Motor RPM, average RPM, and new filter RPM settings. Figure 7-11 shows the LCD screen and the location of these values.

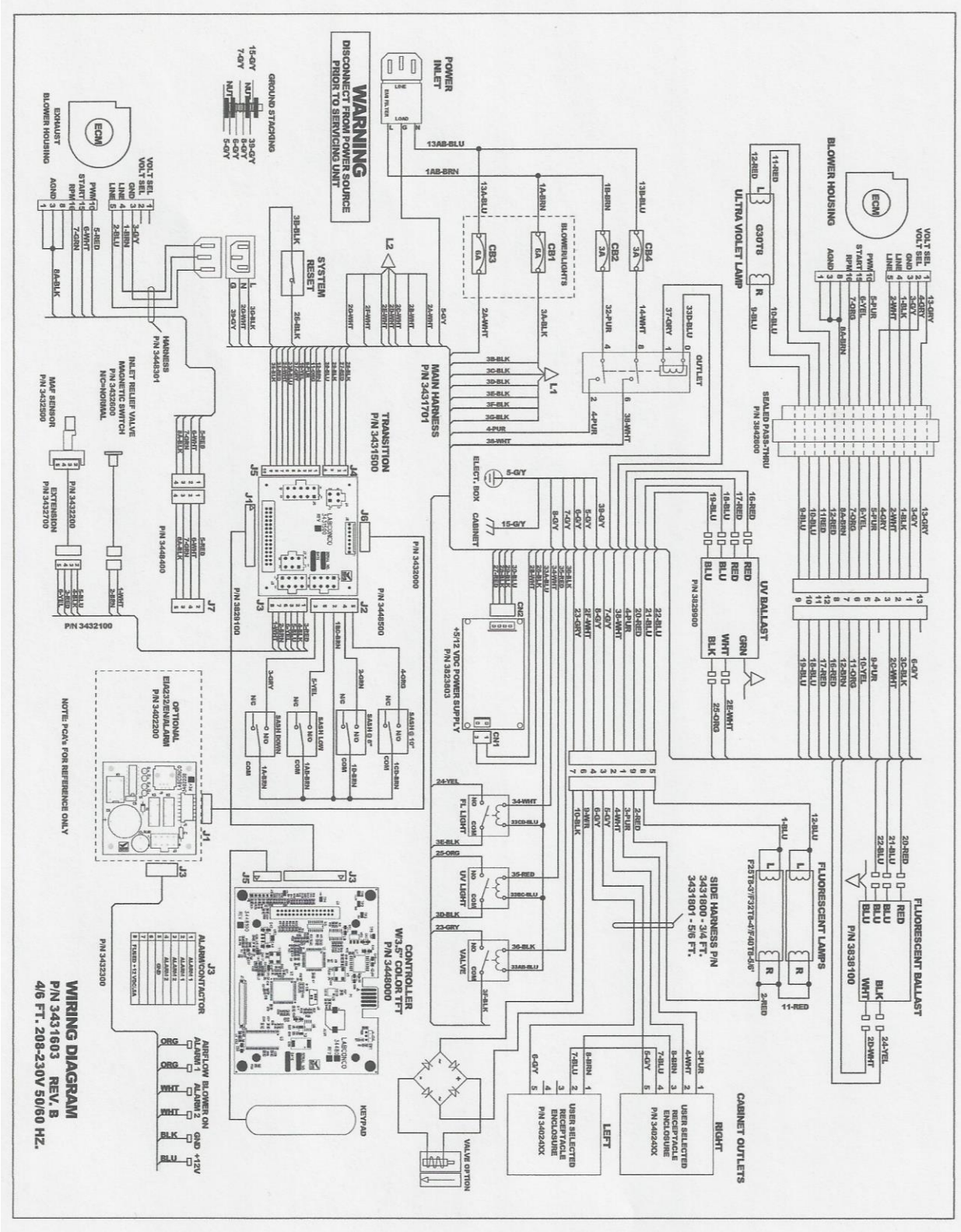
Figure 7-11



Wiring Diagrams -115 VAC Models



Wiring Diagrams -230 VAC Models



Section Eight –

Purifier Axiom Accessories

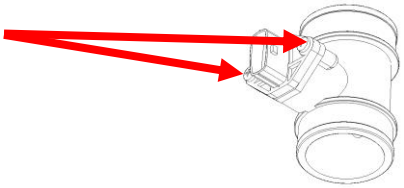
Air Flow Sensor Kit No. 3405500

Note: A qualified certifier must install and calibrate this sensor to obtain accurate operation.
Note: Exercise caution when working on the exhaust filter cover, to prevent damaging the Exhaust HEPA filter.

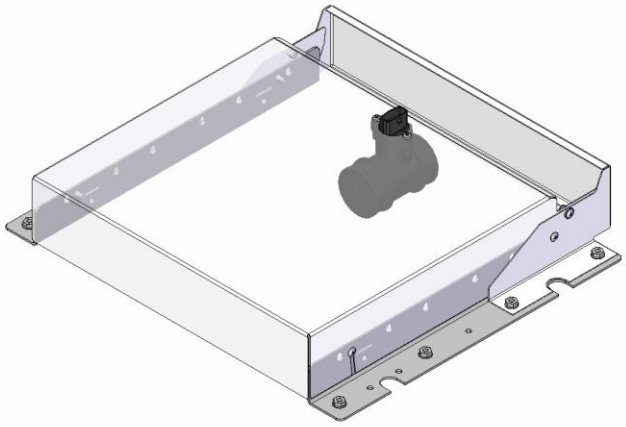
Installation Procedure-Units without the Ventus Canopy Connection

1. Disconnect power to the Biosafety Cabinet.
2. Loosen the two Phillips screws on the front sides of the exhaust cover, as shown

3. Tilt the exhaust cover up to access the underside of the cover.
4. Remove the two screws that hold the airflow sensor into its body, as shown. DO NOT pull the sensor out of the body.



5. Position the sensor so that the screen on the sensor body is oriented towards the front of the cover on the underside of the exhaust cover, as shown. Insert and tighten the screws from the top side of the cover.

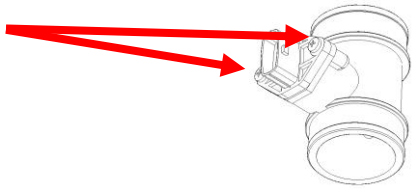


Installation Procedure-

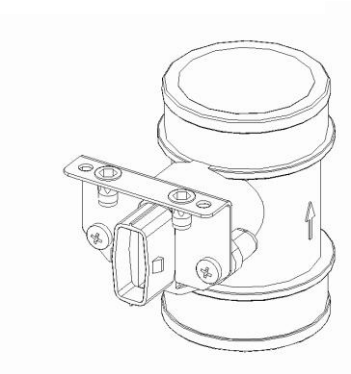
Units with the Ventus Canopy Connection

Axiom Type C1 cabinets

1. Remove the two screws that hold the airflow sensor into its body, as shown. DO NOT pull the sensor out of the body.



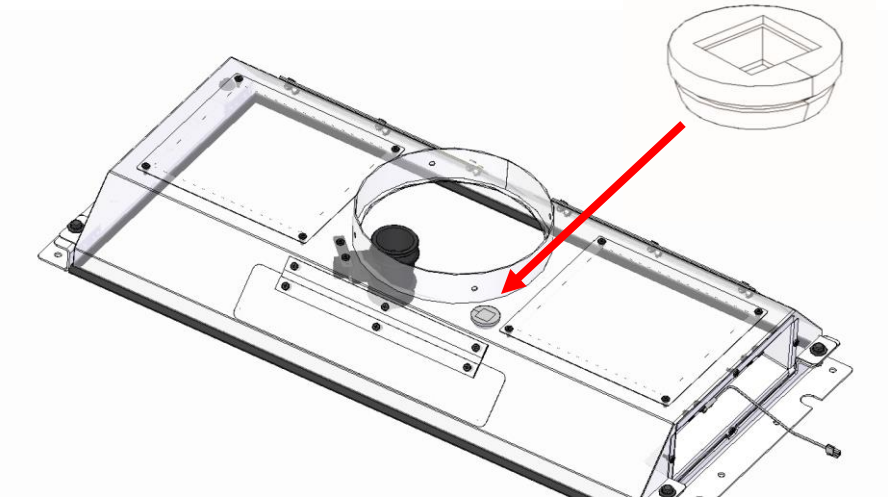
2. If you are installing the canopy airflow sensor into a canopy connection, install the bracket onto the airflow sensor as shown.



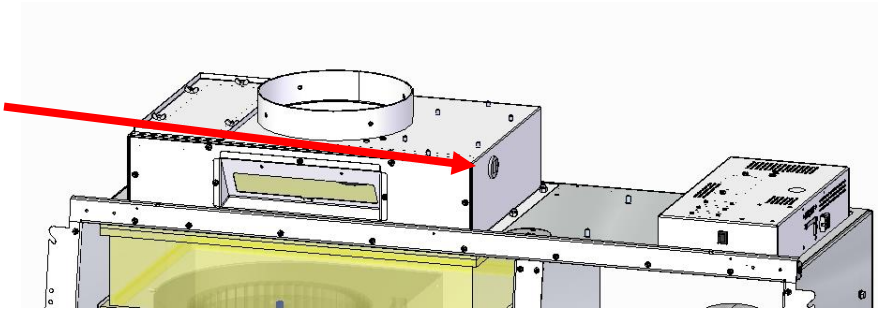
3. Gently remove the Cable Sealing grommet, located on the top of the canopy or the Axiom's exhaust transition. Remove the solid square plug. Locate the replacement plug in the air sensor kit, and push the sensor wiring harness through the slit in the plug.

NOTE: The grommet and plugs are keyed – they only fit together properly when oriented as shown in the illustration. Ensure both the replacement plug and the canopy are oriented properly in the grommet before installation.

4. For the canopy, route the sensor cable from the sensor, through the grommet, and outside of the canopy. Reinstall the grommet. Ensure the cable does not hinder the operation of the front relief valve, and does not touch the surface of the HEPA filter.



5. For the Axiom, route the sensor cable from the sensor, through the grommet, and outside of the exhaust duct. Reinstall the grommet. Ensure the cable does not hinder the operation of the front relief valve.



6. Note the orientation of the sensor harness plug and the sensor; it is a keyed connection-and can only be connected in the correct orientation. Plug the sensor harness into the sensor, and the other end into the multi pin connector on the electronics module.

7. Reconnect the cabinet to electrical service. The unit is now ready for the calibration of the air flow sensor.

Calibration Procedure-

NOTE: YOU MUST FOLLOW THESE INSTRUCTIONS EXACTLY, OR THE SENSOR WILL NOT OPERATE PROPERLY!

Note: You will need to access the certifiers menu to calibrate the airflow sensor.

Note: To properly calibrate the air flow sensor, a qualified certifier must verify the inflow and downflow values.

With the cabinet operating:

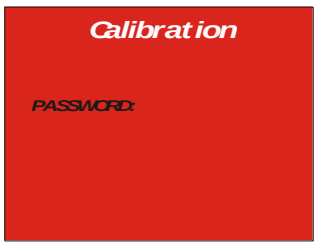
8. Press the ***Menu*** button.
9. Press the ▼ button until the *Services* option is highlighted (it will turn yellow).
10. Press ***OK/Mute*** to enter the Services menu screen.

11. Press the ▼ button until the *Calibration* option is highlighted (it will turn white).
12. Press ***OK/Mute*** to start the calibration procedure.

13. You will see a *warning screen* alerting you that you are about to alter the BSC's settings.
14. Press ***OK/Mute*** to input the password.

NOTE: IF THE UNIT IS CONNECTED TO AN EXHAUST SYSTEM, YOU MUST STOP ALL AIR FLOW OVER THE SENSOR DURING THE INITIAL ZEROING OF THE SENSOR - DO THIS BY SHUTTING OFF THE EXHAUST SYSTEM, OR BLOCKING THE SENSOR INTAKE WITH TAPE.

15. When requested for the password press ***Light***, ***UV light***, ***Timer***, ***Outlets*** then ***OK/Mute***. The cabinet blower(s) will stop.



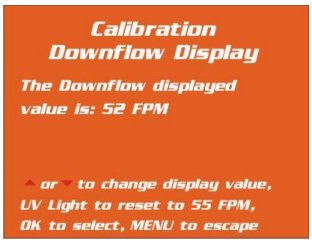
16. If the password is properly entered, the first certification screen will display the blower motor's PWM setting.

17. The unit must sit for approximately 60 seconds with no airflow over the sensor in order to establish the zero point value. After approximately 60 seconds, the cabinet blower(s) will restart, and **then the exhaust flow over the sensor must be reestablished – either open the exhaust valve, or uncover the sensor.**

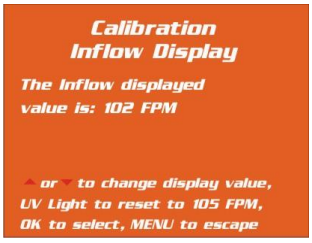
18. When the cabinet blower speed stabilizes, it may be changed if needed to rebalance the unit. When finished, the "wait" will disappear, and the filter life gauge can be set next. Press ***OK/Mute***.

19. If this is an initial certification, or a recertification after HEPA filter replacement, select *Reset Filter Gauge to 100%*. If this is an annual recertification, select *Leave Gauge unchanged*. If you want to set the filter gauge at a preset value, select *Set Gauge to new setting*. Then press ***OK/Mute***.

20. The Type A units with airflow sensor will ask you to now calibrate the average downflow to match the value you obtained when you measured it.
Pressing ***UV Light*** is a shortcut that will change the value to 55FPM in a single press. When the displayed value matches the value obtained during certification, press ***OK/Mute***.



21. You will now have to calibrate the average inflow to match the value you obtained when you measured it.
Pressing ***UV Light*** is a shortcut that will change the value to 105FPM in a single press. When the displayed value matches the value obtained during certification, press ***OK/Mute***.



This will end the calibration mode, and the unit will automatically turn off and then return to the default display.

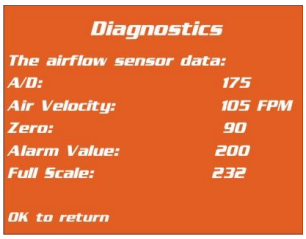
Confirming Calibration Procedure-

With the cabinet operating:

1. Press the ***Menu*** button.
2. Press the ▼ button until the *Services* option is highlighted (it will turn yellow).
3. Press ***OK/Mute*** to enter the Services menu screen.

4. Press the ▼ button until the *Diagnostics* option is highlighted (it will turn white).
5. Press ***OK/Mute*** to enter the Diagnostics submenu screen.

6. Press the ▼ button until the *Airflow Sensor* option is highlighted (it will turn white).
7. Press ***OK/Mute*** to enter the Airflow Sensor submenu screen.



8. The display shows the following values in millivolts -
   a. "Zero" – should be approximately 90-110.
   b. Alarm (approximately 85% of Full scale – calculated by the cabinet)
   c. Full scale - the value for inflow set during calibration.

NOTE: There should be approximately 100 millivolts or higher difference between the zero and operational (full scale) points. Differences significantly lower than 100 mV may result in erratic air velocity values being displayed.

Service Fixture Kit No. 3747500

Completely decontaminate all interior work surfaces of the Purifier before beginning the installation of the service valve.

Additional service fixtures can be installed in any of the four available service fixture holes in the sidewalls. The service fixture kit is Labconco part number 3747500.

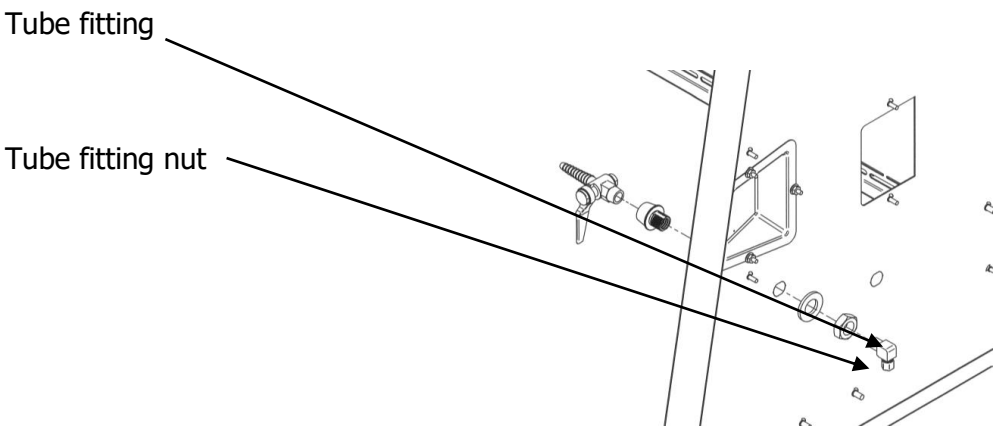
Note: Some models have a solenoid valve connected to the service valve on the right side, rear position. The solenoid prevents gas from flowing to the service valve when the unit blower is off. It is the only service valve position that can be fitted with a solenoid valve. Connect the gas service to the solenoid valve.

The service lines (if any) should be connected to the tube fitting(s) on the outside of the liner wall as shown below. To install the tubing, follow these steps:

1. Decide which of the available locations you want to install the service fixture.
2. Access the exterior surface of the sidewall by removing the two Phillips screws on the front edge of the panel. Swing open and lift off the panel to access the valve hole plug.
3. With a flat blade screwdriver, carefully break the silicone seal on the perimeter of the hole plug (on the outside of the cabinet). Then pry the plug away from the side of the cabinet.
4. Ensure that the tubing is ¼ inch O.D., soft metal, and that the end has been completely deburred.
5. Route the tubing from the rear of the cabinet, ensuring that it will line up with the slot in the back of the side panel. The slot is located from 8 ¾ to 11 ¼ inches (222 to 288 mm) from the bottom of the cabinet.

Note: Make sure that the tube routing will not contact any electrical wires. DO NOT loop service line tubing within the side panels of the cabinet.

6. Make sure that the nut on the tube fitting is loose, but do not remove it. Look inside the fitting to make sure the tube ferrule is there.
7. Push the tube into the fitting until it is properly seated. The tube will go approximately ¾ inch (19 mm) into the fitting.
8. Tighten the tube fitting nut hand tight and then, using a 7/16-inch wrench, tighten it at least ¾ turn more.
9. Close the service valve in the biosafety cabinet and then slowly open the shutoff valve on the service valve. Test all fittings for leakage. Tighten the tube nut slightly if needed.



10. Make sure the service fitting in the Purifier is in the off position before pressurizing the service line. Once pressurized, check the valve body, the coupling, and the tube fitting for leaks. Tighten any leaking joints.
11. Reattach the side panel.

UV Lamp Kit No. 3858500, -01, -02

All Labconco Purifier Axiom Series Biosafety Cabinets are pre-wired for the installation of a UV lamp kit, consisting of the UV lamp, its ballast, and fasteners. The kit is part number 3858500 for 115 Volt models, 3858501 for 100 Volt models, and 3858502 for 230 Volt units.

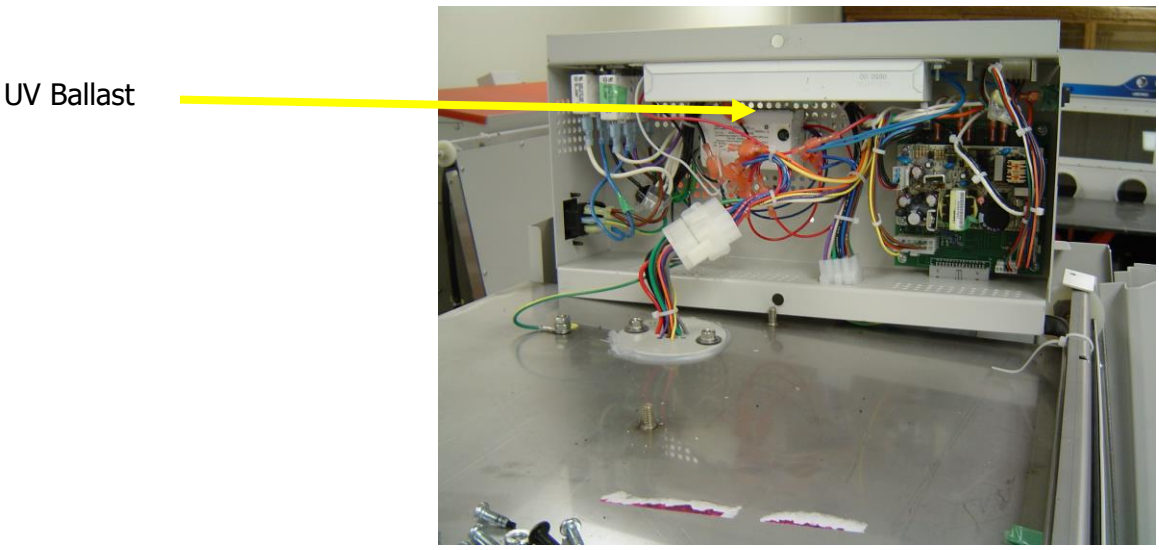
A qualified electrician or certifier should install the UV lamp kit.

Decontaminate all interior work surfaces of the Purifier before beginning the installation of the UV lamp.

Installation Procedure

1. Disconnect power to the unit.
2. Using a 7/16-inch wrench or socket, remove the two acorn nuts that secure the electronics module to the top of the Purifier.
3. Tilt the electronics module on its side to access the underside of the module. Secure the module so that it does not fall and damage the wiring.
4. Locate the fluorescent lamp ballast in the module. The UV lamp ballast mounts next to the fluorescent ballast, as shown in Figure 1.

Figure 1



5. Using the screws, flat washers and locking nuts provided, secure the UV ballast to the top of the electronics module.
6. Wire the UV ballast into the wiring harness, following the wiring diagrams located in Figure 2a-c.
7. Reattach the electronics module to the top of the cabinet before reconnecting the electrical power.
8. Raise the sash, and install the UV lamp by rotating the lamp pins into the sockets.
9. For all Logic Models:

   Lower the sash to fully closed position, plug in the unit, and turn the system power switch to the "UV" position. The UV lamp will illuminate. Refer to the user's manual for further information regarding the proper operation and maintenance of the UV light.

For All Axiom models:

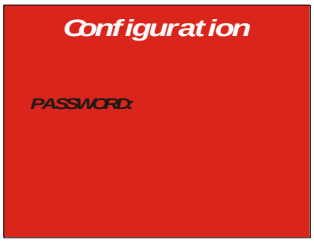
Lower the sash to fully closed position, plug in the unit, and do the following:

1. Press the ***Menu*** button.
2. Press the ▼ button until the *Services* option is highlighted (it will turn yellow).
3. Press ***OK/Mute*** to enter the Services menu screen.

4. Press the ▼ button until the *Configuration* option is highlighted (it will turn white).
5. Press ***OK/Mute*** to alter the configuration.

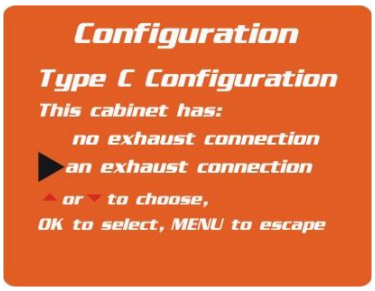
6. You will see a *warning screen* alerting you that you are about to alter the BSC's settings.
7. Press ***OK/Mute*** to input the password.

8. When requested for the password press ***Light***, ***UV light***, ***Timer***, ***Timer*** then ***OK/Mute***.



Note: Any other key sequence will return you to the Attention screen.

9. The first screen allows you to select whether the Axiom is connected to an exhaust system or not. **IT IS CRITICAL THAT THE CABINET MATCHES THE OPTION THAT IS SELECTED**. Press ***OK*** to continue.



10. If connected to an exhaust system, the second screen allows you to set how long the blowers in the Axiom will continue to operate in the event of an exhaust system failure. The interval can be programmed from 0-300 seconds.

Note: Consult with your facility's safety officer or Labconco to help establish how long the Axiom should continue to operate after an exhaust system failure.

11. The third screen allows you to set the sash height at either 8 or 10 inches. **IT IS CRITICAL THAT THE YOU LEAVE THE SASH HEIGHT AS IT WAS SET AT THE FACTORY, UNLESS YOU WISH TO RECERTIFY THE CABINET AT ITS NEW SETTING**.

12. The fourth screen allows you to select whether the Axiom has a UV light or not. **IT IS CRITICAL THAT THE YOU SELECT A UV LIGHT**. Press ***OK*** to return to the first Configuration screen.

The unit is now properly configured for operation with the UV light.

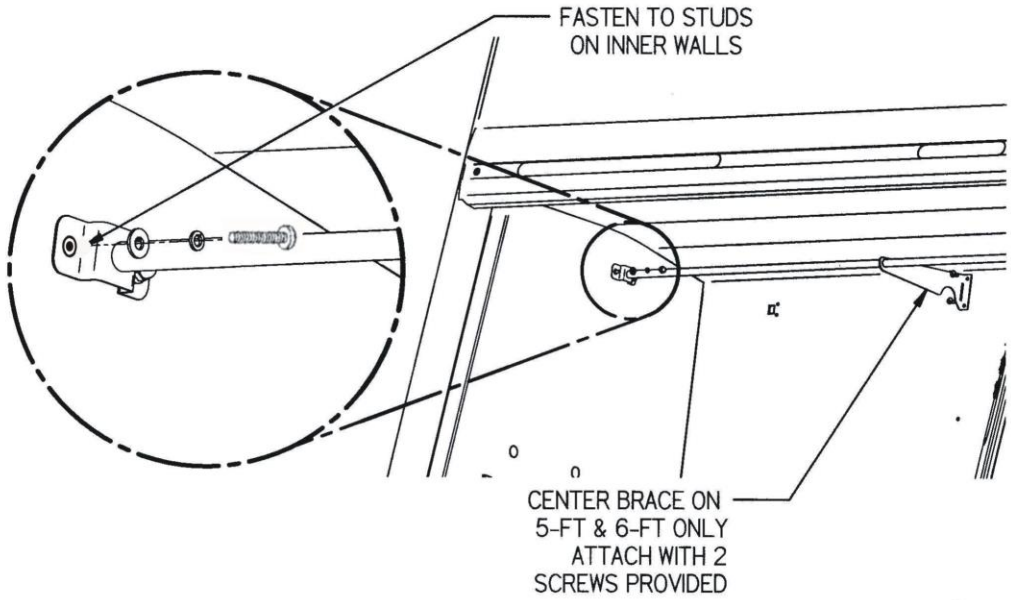
Refer to the user's manual for further information regarding the proper operation and maintenance of the UV light.

IV Bar Kit No. 3858600, -01, -02, -03

Completely decontaminate all interior work surfaces of the Purifier before beginning the installation of the IV bar.

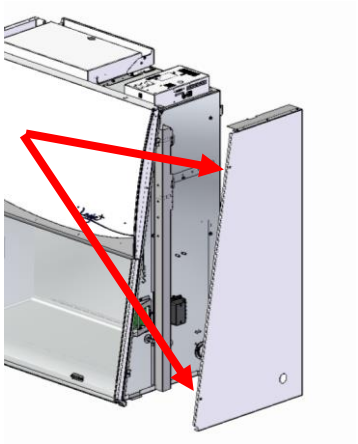
Installation Procedure

1. Disconnect power to the Axiom and raise the sash to the fully open position.
2. Remove the four screws on the sidewalls and save them.
3. Mount one of the IV brackets on either sidewall. Orient and secure the bracket using the flat washers, lock washers and the screws as shown in Figure 1.
4. For the 5' and 6' IV Bars only, insert the center support brace on the IV Bar. Position the center support as shown below while completing Step 5.
5. Slide the other bracket onto the IV bar, and fasten it to the opposite sidewall as done in Step 3.
6. For the 5' and 6' IV Bars only, fasten the center support brace onto the back wall with the two screws provided in the kit.
7. Secure each of the brackets by tightening all of the fasteners.



Vacu-Pass™ Cord & Cable Portal Installation

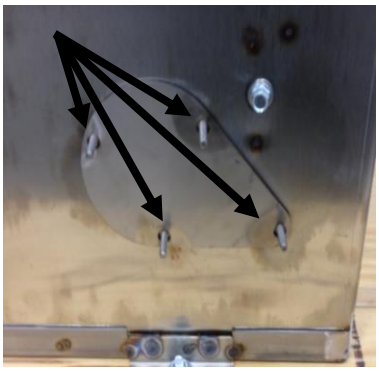
Note: You will need to access the right side of the cabinet in order to install the Portal



Note: There must be enough clearance to pass the cord or cable between the exterior dress panel and any obstruction.

Note: Some Vacu-Pass components and the cord or cable passing through it may become contaminated during use of the cabinet. Ensure all potentially contaminated components are surface decontaminated before handling or removal from the cabinet.

1. Open the right side panel by removing the two Phillips screws on the side panel.
2. Remove the four locknuts that secure the cover panel to the liner. Keep the nuts for future use.
3. Using a putty knife or similar device, carefully pry the cover away from the liner. Leave the sealing gasket in place.
4. Install the body of the portal into the liner, and sequentially tighten the nuts unto a uniform gasket compression is noted.
5. Remove the grommet from the liner side wall. Remove the solid sealing plug from the body of the portal by either pressing it through from the outside, or by carefully inserting a spatula or similar device between the sealing plug and the body of the portal, and prying the plug out.
6. Pass the cord or cable through the body of the portal, and then through one of the plugs that has been cut for cord or cable use, then through the grommet, as shown.



Note: select a plug with a hole that is slightly smaller than the cord or cable, to create a proper seal. This will also help minimize movement of the cord or cable if it is accidentally pulled during use.

7. Position the cord or cable as it will be used in the cabinet, and then push the plug back into the body of the portal until it seats in the portal. Reinstall the grommet.

RS-232 Connection Kits

RS-232 Kit 3858310 (9 Pin), 3858311 (25 Pin)

The kit contains the RS-232 PCB (P/N 3402200), the attaching hardware and connecting cables to install the PCB inside the electrical control box (located on top of the Axiom). Picture 1 shows an electrical control box with the Axiom RS-232 PCB installed.

Picture 1

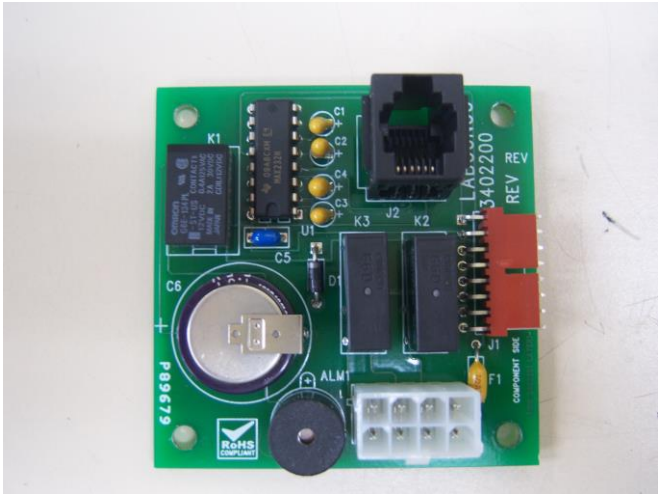
WARNING!! DISCONNECT ALL ELECTRICAL POWER FROM THE UNIT BEFORE BEGINNING THIS PROCEDURE!!!!

To install:

1) Carefully remove the square "knock-outs" shown in picture 2 under the "RS-232 PORT" label and above the "ALARM CONTACT" label.

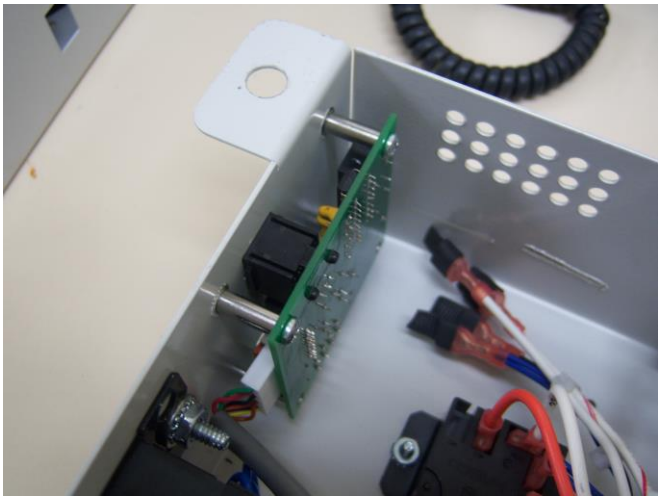
Picture 2

2) Locate the black square connecter labeled as J2 and the white connector labeled as J3 on the RS-232 PCB, see picture 3. These two connectors show through the electrical control box as shown in picture 1. Connector J2 is the RS-232 PORT connector. Connector J3 is the ALARM CONTACT connector. Also note the location of the J1 connector for later use.



Picture 3

3) Install the RS-232 PCB inside the electrical control box as shown in picture 4, being careful to locate the J2 connector (found in step 2) thru the square hole and J3 through the rectangular hole created in step 1. Use the included screws and lockwashers to attach the PCB to the electrical control box.



Picture 4

4) Locate the internal RS-232 cable (P/N 3432000) included in the kit and connect it between the RS-232 PCB J1 and the Transition PCB (P/N 3431500) J6 as shown in picture 5.

Picture 5

5) Re-secure the electrical control box to the top of the Axiom.
6) Connect the computer interface cable (P/N 7537800 – 9 pin or P/N 7537801 – 25 pin) included in the kit to the RS-232 PCB J2 connector, and connect the other end of this cable to a 9-pin or 25 pin serial input of a computer. Proceed to the directions "Using the RS-232 Receptacle".
7) To enable access to the Alarm/Blower contacts connect the alarm/contactor cable (P/N 3432300) included in the kit to the RS-232 PCB J3 connector. J3 is shown above the "ALARM CONTACT" label in picture 1.

Signal	Wire Color	J3
ALARM 1 – Airflow	ORANGE	1
ALARM 1 - Airflow	ORANGE	2
ALARM 2 - Blower	WHITE	3
ALARM 2 - Blower	WHITE	4
GROUND	BLACK	5
+12V	BLUE	8

Using the RS-232 Receptacle

The operation of the Axiom Biological Safety Cabinet (BSC) can be monitored using a computer connected to the RS232 receptacle located on the top electrical box of the Axiom. The computer monitors the Axiom's operation, but cannot control the operation of the Axiom.

Connection for Computer Interface

Check your computer to see which type of RS232 serial port is provided. Use one of the two connecting cables listed below:

1. Computers with a 25-pin D-sub male serial connector should use Connect Cable, Labconco part number 7537801, to connect a computer to the Axiom.
2. Computers with a 9-pin D-sub male serial connector should use Connect Cable, Labconco part number 7537800, to connect a computer to the Axiom.

* Note – If your computer does not have an RS-232 serial port a USB to RS232 adapter can be purchased at most computer stores, discount stores, etc. to allow the Axiom cable to connect to a USB port on your computer.

The purpose of the RS232 interface is to send data to a data logging computer to monitor the state and activity of the Axiom. This data is half duplex data. The data properties are as follows:

1. Data Rate 2400 Baud
2. 8 bit word length
3. 1 Start bit, 1 Stop bit
4. No parity is transmitted
5. Standard ASCII character set

The time between data transmissions may be varied by the user to occur at 1, 10, 30 or 60 second intervals. Using the Axiom control buttons and the menus on the color display, set the data transmission time by pressing the "MENU" button, then select "SETTINGS", then select "RS-232 OUTPUT". From this display screen the data transmission intervals can be selected.

The format of the transmitted message with typical values is as follows:

OPTIONAL AXIOM RS-232 DATA OUTPUT

Here is the RS-232 output for the Axiom. As is standard for all Labconco units, the data is limited to 80 characters, including spaces, etc.

Operating Status: Columns 1-4:

Column 1: UV Light --- U=on, O=off
Column 2: Blower --- B=on, O=off
Column 3: Fluorescent Light --- F=on, O=off
Column 4: Canopy Error, Airflow Alert, Airflow Alarm --- N=normal, C=Error

Column 5: Comma
Column 6: Sash position ---- D=down, N=normal operating position
Column 7: Comma

Alarms: Columns 8-11
Column 8: Sash Alarm --- N=no alarm, Y=alarm condition
Column 9: N
Column 10: Airflow alarm AIRFLOW OUT OF RANGE--- N=no alarm, Y=alarm condition
Column 11: Comma

Supply Blower PWM Duty Cycle, Columns 12-15:
Blower speed ---- three digit 0-100% indicates the duty cycle of the motor speed signal, followed by a comma

Supply Instantaneous Blower RPM, Columns 16 -20
Most recent blower RPM read in from motor, 4 digits, updated every second, followed by a comma

Supply Average Blower RPM, Columns 21 -25
An averaged value, 4 digits, from the last 16 blower RPM readings above; this number is used in all determinations of airflow alert, and filter life calculations; followed by a comma

Airflow Sensor: Columns 26-42

Columns 26-33: RAW Airflow ---- RA=XXXXF, where XXXX = numbers, and F (feet), followed by a comma

Columns 34-42: Scaled Inflow ---- I=XXXXF, where XXXX = inflow velocity, and F = Feet per Minute, followed by a comma

Columns 43-48: Scaled Downflow ---- D=XXXXF, where XXXX = inflow velocity, and F = Feet per Minute, followed by a comma

Exhaust Blower PWM Duty Cycle, Columns 49-50:

Blower speed ---- three digit 0-100% indicates the duty cycle of the motor speed signal, followed by a comma

Exhaust Instantaneous Blower RPM, Columns 51 -55

Most recent blower RPM read in from motor, 4 digits, updated every second, followed by a comma

Exhaust Average Blower RPM, Columns 56 -60

An averaged value, 4 digits, from the last 16 blower RPM readings above; this number is used in all determinations of airflow alert, and filter life calculations; followed by a comma

Output Example:

OBFN, N, NNN, 79, 1021, 1029, RA=683F, I=103F, D=052, 65, 1177, 1179

There are several commercially available software packages, which can read RS232 data and enter the data into a computer program such as a word processor (to create a text file) or spreadsheet (to tabulate and plot the data). Consult your laboratory supply dealer regarding the latest software available.

The following describes how to use an IBM compatible computer with Hyper Terminal™ software (included with Windows® 95, 98, XP or 2000 operating systems) to collect the RS232 data from your Axiom:

* Note – Starting with Windows Vista Microsoft no longer includes HyperTerminal with Windows.

1. Make sure that the Axiom is properly connected to the communication port on the computer.
2. Open Hyper Terminal™ software.

   i) Windows® 95 or 98 use:

   START/PROGRAMS/ACCESSORIES.

   ii) Windows® 2000 or XP use:

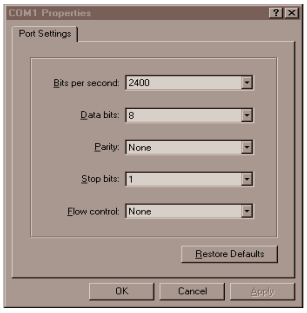
   START/PROGRAMS/ACCESSORIES/COMMUNICATIONS

   The first time Hyper Terminal™ is opened a dialogue box requesting an area code and phone number will appear. Enter the appropriate numbers and continue.

3. The "Connection Description" dialogue box will open. Type in a user defined name and select an icon for the new connection. Press "OK."

4. The "Connect To" dialogue box will open. Using the down arrow selection button, select the communication port to which the cable has been connected. Press "OK."

5. The "Com X Properties" dialogue box will open. Enter the appropriate data properties and press "OK."



6. When the Axiom's main power switch is on, the data will be transmitted and updated at the time intervals selected by the user.

Axiom Relay Contact Outputs:

When equipped with the optional RS-232 contact kit board, Labconco Axiom Biosafety Cabinet (BSC) models are provided with two (2) dry relay contacts to allow connection to an external monitoring system, or to switch other air handling units "on" when the Labconco unit is turned on.

With the optional RS-232 board installed, the Labconco Axiom BSC provides two contacts: One to indicate the internal Labconco blower is on, (so that external blowers may also be energized) and the other to indicate airflow errors. These contacts provided will "short circuit" when the blower is turned on, or when there is an airflow error. This means that the Labconco contacts are isolated from the Labconco equipment, and the user must provide the interface circuitry based on the requirements of the connected equipment.

The dry contacts are accessed at connector J3 of the Axiom Control Box (Labconco harness P/N 3432300 is available for easy connection). This J3 connector is located on the electrical control box on top of the BSC, above the "ALARM CONTACT" label as shown in the picture below:

Generally, the Labconco provided contacts can switch very low amounts of electrical current, so to control high power, line-operated devices, the Labconco contacts must be

used to control yet another set of contacts that are rated for the actual load being switched.

The wiring diagram indicates that the "BLOWER ON" contacts are located at J3 - pins 3 & 4 while the Airflow Alarm contacts are located at J3 - pins 1&2.

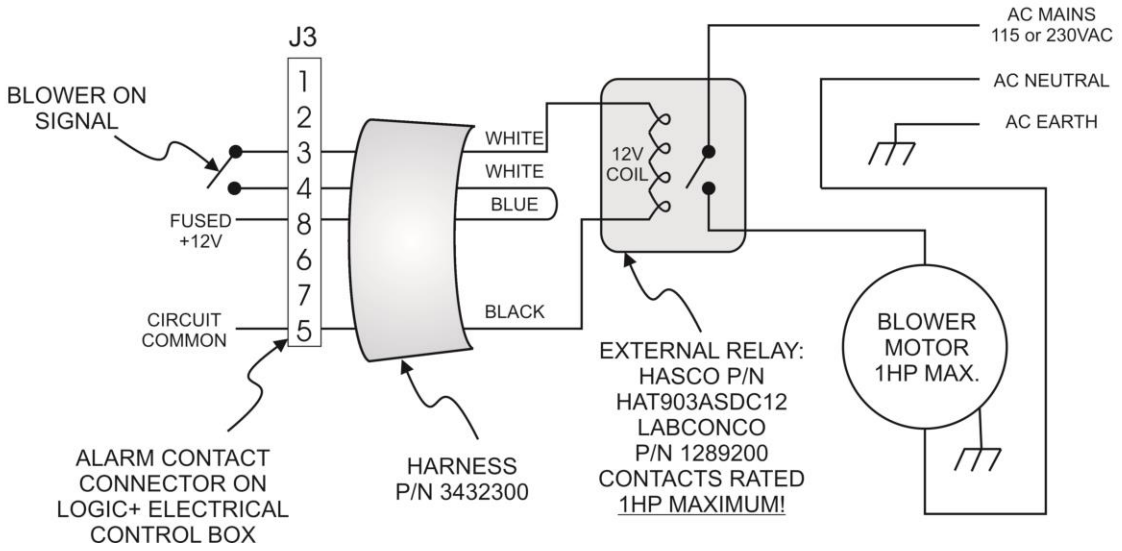
Relay Contact #1 …….the "BLOWER ON" contact

This set of contacts (dry contacts pins 3 & 4 of J3 on the electrical enclosure) will indicate when the BSC's blower is on. On an A2 cabinet, this contact will close/short once the blower key is pressed to turn the blower on.

However, on a B2 cabinet, the contacts will close on the initial blower turn-on, but then these contacts must follow the blower action based on the exhaust airflow sensor, since low airflow will cause the internal blower to shut off.

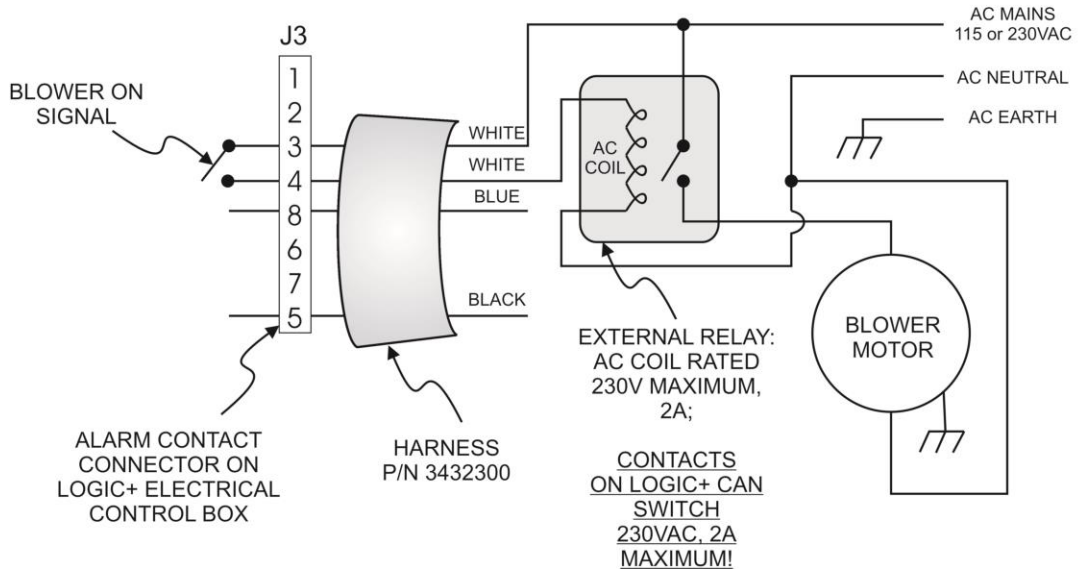
The generalized circuit shown below indicates how to interface the Labconco contacts to power a high power device. Note that the Labconco contacts are used to power the low-power coil of an added external power style relay/contactor—in this case the relay is a Hasco HAT903ASDC12, and the 12V coil draws only .08Amps (the Labconco +12V is fused at .5amps, so choose a max. 5 watts coil)

CONNECTING AN EXTERNAL AC BLOWER TO THE LOGIC+ USING A 12VDC RELAY



The next diagram shows an example of using an AC powered coil, so the +12V supply from the Axiom is not used. The Hasco HAT 903 relay series offers a 120VAC coil that requires only 16mA AC current as well as a 230VAC coil that draws only 9mA. The alternate circuit that uses an AC mains rated coil voltage is shown below – it does not utilize the FUSED+12V and CIRCUIT COMMON from the Labconco Axiom.

CONNECTING AN EXTERNAL AC BLOWER TO THE LOGIC+

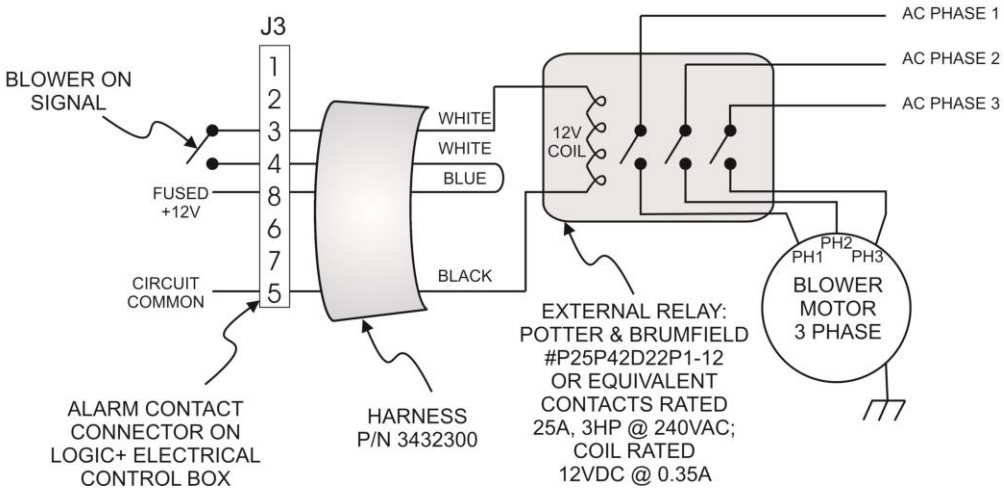


Note: A W199 Magnacraft Series relay can switch up to 300Vac @ 40 Amps…….it's coil is rated for 12 Vdc, 171mA, or approx. 2 watt coil……..

Also an Omron G7Z has a 12VDC coil rated 3.7 watts, and can switch 440VAC at 25 amps…

The final diagram shows a connection for a 3-phase powered blower. In this case, a 12 VDC relay coil is used, and it gets its power from the Axiom.

CONNECTING AN EXTERNAL 3 PHASE BLOWER TO THE LOGIC+



Relay Contact #2……the "airflow error" contact

This set of contacts (dry contacts pins 1 & 2 of J3 on the electrical enclosure, and the ORANGE wires on Labconco harness P/N 3432300) will indicate when the Axiom has detected an airflow error, as described by the conditions below:

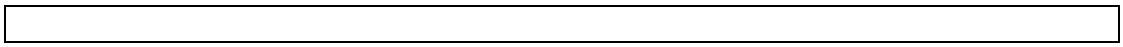
Type of Axiom unit	**Alarm Condition**	**LCD display message**	**Airflow Error dry contacts**	**Comments**
All Labconco Axiom Cabinets	Sash out of position	SASH TOO HIGH	No Response	
	Motor RPM has shifted abruptly	AIRFLOW ALERT	Contacts shorted	
	HEPA Filter approaching end of life—20%	CHECK FILTER (Filter life indicator at 20% or less)	No response	
	HEPA Filter approaching end of life-10%	CHECK FILTER (Filter life indicator at 10% or less)	Contacts shorted	
	HEPA Filter end of life- 0%	CHECK FILTER (Filter life indicator at 0%)	Contacts shorted	Unit beeps approximately every 15 seconds
**Note all specialty Axiom BSC's below will have all the alarm conditions listed above, plus specific alarms listed below"				
A2 BSC with canopy sensor** (see above)	Canopy Airflow incorrect	CANOPY ERROR	Contacts shorted	
A2 BSC with airflow sensor**(see above)	Downflow Airflow incorrect	Alarm - Airflow	Contacts shorted	
B2 BSC**(see above)	Exhaust airflow not correct	Alarm - Inflow	Contacts shorted	

Section Nine –
Miscellaneous

Troubleshooting

Refer to the following table if the Biosafety Cabinet fails to operate properly. If the suggested corrective actions do not solve the problem, contact Labconco for additional assistance.

PROBLEM	CAUSE	CORRECTIVE ACTION
Cabinet blower and lights won't turn on	Unit not plugged into outlet	Plug the Biosafety Cabinet into appropriate electrical service.
	System Reset Switch is Off	Turn on the System Reset Switch.
	Circuit breaker(s) tripped	Reset circuit breakers.
	Keypad disconnected or defective	Run switch diagnostics and check connections.
	Sash closed-unit is in Night-Smart Mode	Raise sash.
	Sash Closure Switch is disconnected or defective	Run switch diagnostics and check connections.
Blower does not run or only runs at low speed, but lights work	Sash Restricted opening Switch is disconnected or defective	Run switch diagnostics and check connections.
	Motor signal wires damaged or disconnected	Measure motor output signal voltage. Inspect signal wiring and connections
	Power Supply Board misconnected or defective	Test output voltages on the Power Supply board.



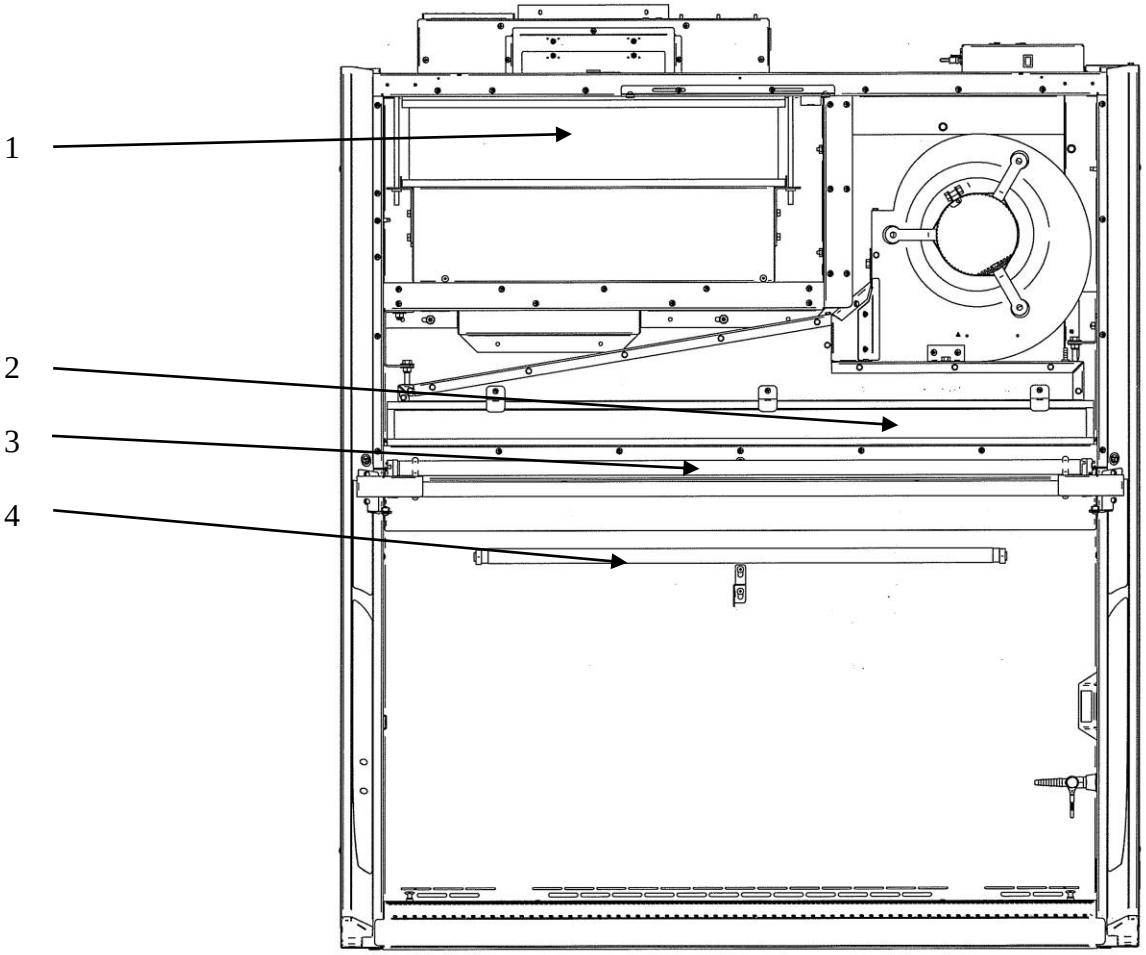
PROBLEM	CAUSE	CORRECTIVE ACTION
Blower runs slower than normal; speed control has little effect on blower speed. Blower may take more than 5 seconds to start.	Motor signal wires damaged or disconnected	Measure motor output signal voltage. Inspect signal wiring and connections
	Power Supply Board misconnected or defective	Test output voltages on the Power Supply board.
	Motor jumper wire is damaged/ disconnected (115/100 Volt models only)	Inspect grey wire #31 on 15 pin connector for continuity.
	Blower motor is defective	Replace blower motor.
	Keypad disconnected or defective	Run keypad diagnostics and check connections.
Fluorescent light not working	Sash is closed	Open sash – Fluorescent lights will not work with the sash closed.
	Lamp(s) are defective	Replace defective lamp(s)
	Lamp wiring is disconnected	Inspect lamp wiring.
	Defective lamp ballasts	Replace lamp ballasts.
	Keypad disconnected or defective	Run keypad diagnostics and check connections.

PROBLEM	CAUSE	CORRECTIVE ACTION
Fluorescent light is dim or flickering	Lamp(s) are defective	Replace defective lamp(s)
	Lamp wiring is disconnected	Inspect lamp wiring.
	Defective lamp ballast	Replace lamp ballast.
UV light not working	Sash is open	Close sash – UV light will not work with the sash open.
	Lamp is defective	Replace defective lamp.
	Lamp wiring is disconnected.	Inspect lamp wiring.
	Defective lamp ballast	Replace lamp ballast.
	Keypad disconnected or defective	Run keypad diagnostics and check connections.
UV light is dim or flickering	Lamp is defective or is at end of operating lifetime.	Replace defective or worn out lamp.
	Lamp wiring is disconnected	Inspect lamp wiring.
	Defective lamp ballast	Replace lamp ballast.
Airflow Alert goes off and/or there is a slight decrease in filter life remaining gauge	HEPA filter loading	The gauge reading steadily decreases as the Cabinet is used.
	Blockage of the return air slots or grille	Check all return air slots and grilles to ensure that they are not blocked or restricted.
	Blockage of the	Ensure that the exhaust outlet is

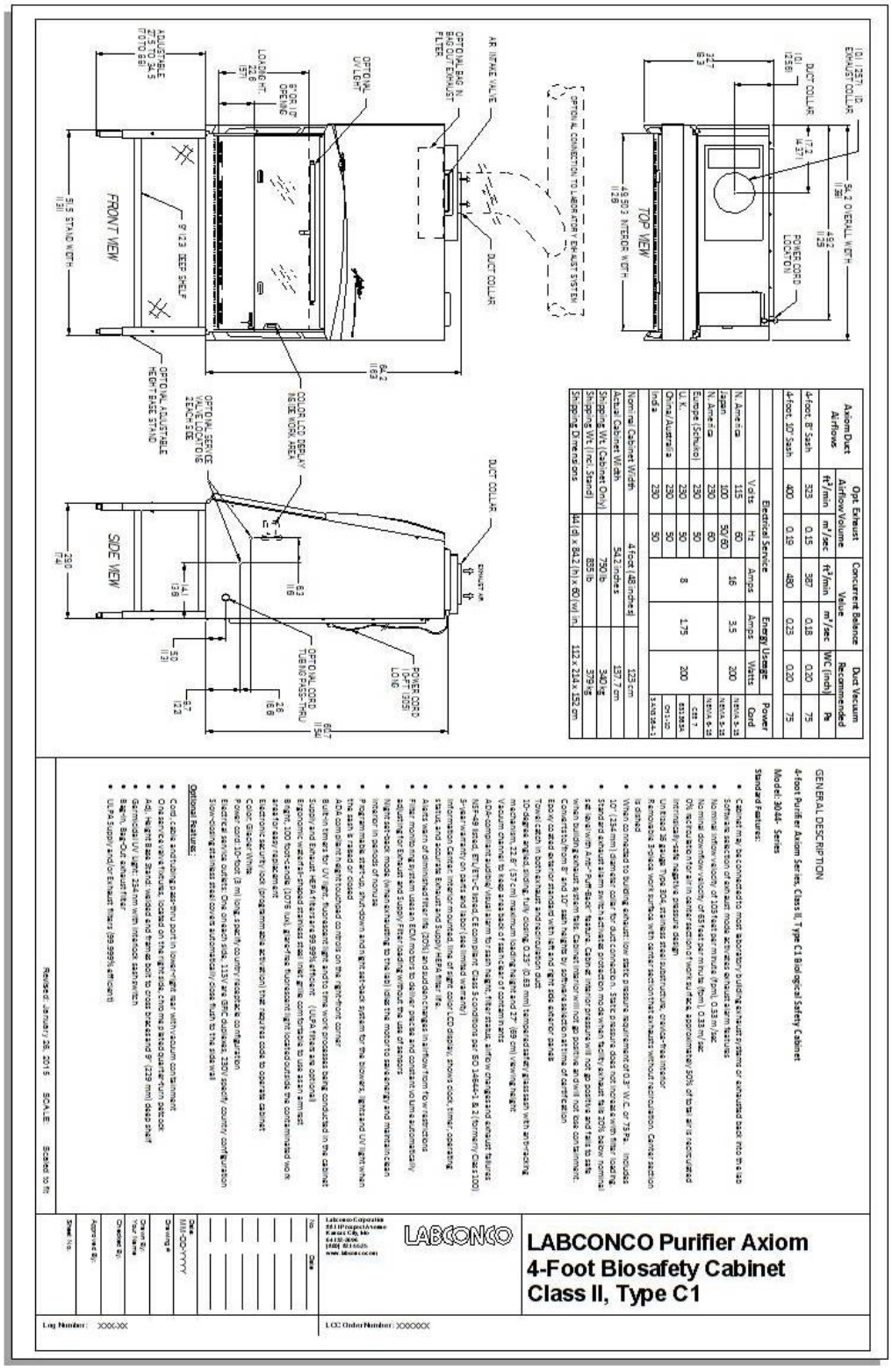
	exhaust outlet	not blocked or restricted.
	Blockage or restriction under the work surface	Ensure that the towel catch and plenum beneath the work surface are unobstructed.
Contamination of work in the cabinet	Improper technique or procedure for the Biosafety Cabinet	See "Use of the Cabinet" section in the manual.
	Restriction of the return air slots or grille – blockage of the exhaust outlet	Ensure that all return air slots, grilles and the exhaust outlet are unobstructed.
	External factors are disrupting the cabinet airflow patterns or acting as a source of contamination	See "Installation" section of this manual.
	Cabinet is out of adjustment/HEPA filter(s) are defective	Have cabinet recertified.

Axiom Biosafety Cabinet Replacement Parts

Item	Quantity	Part No.	Description
1	1	3838511	Exhaust HEPA Filter 4-ft
1A	1	3838513	Exhaust HEPA Filter 6-ft
2	1	3838401	Supply HEPA Filter 4-ft
2A	1	3838403	Supply HEPA Filter 6-ft
3	2	9721900	Lamp, Fluorescent, 4-ft
3A	2	9721903	Lamp, Fluorescent, 6-ft
4	1	1271300	Lamp, UV (models with UV light only)



Dimensions – 4 Foot Models



Axiom Duct Airflows		Opt Exhaust Airflow Volume		Concurrent Balance Value		Duct Vacuum Recommended
		ft³/min	m³/sec	ft³/min	m³/sec	WC (inch)
4-foot 8" Sash		323	0.15	387	0.18	0.20
4-foot 10" Sash		400	0.19	480	0.23	0.20

	Electrical Service			Energy Usage		Power Cord
	Volts	Hz	Amps	Amps	Watts	
N. America	115	60	16	3.5	200	Hubbell 5-15
Japan	100	50/60				Hubbell 5-15
N. America	230	60	8	1.75		Hubbell 6-15
Europe (Schuko)	230	50				cee 7
U.K.	230	50				bs1363a
China/Australia	230	50				cei-23
India	230	50				sans164-1

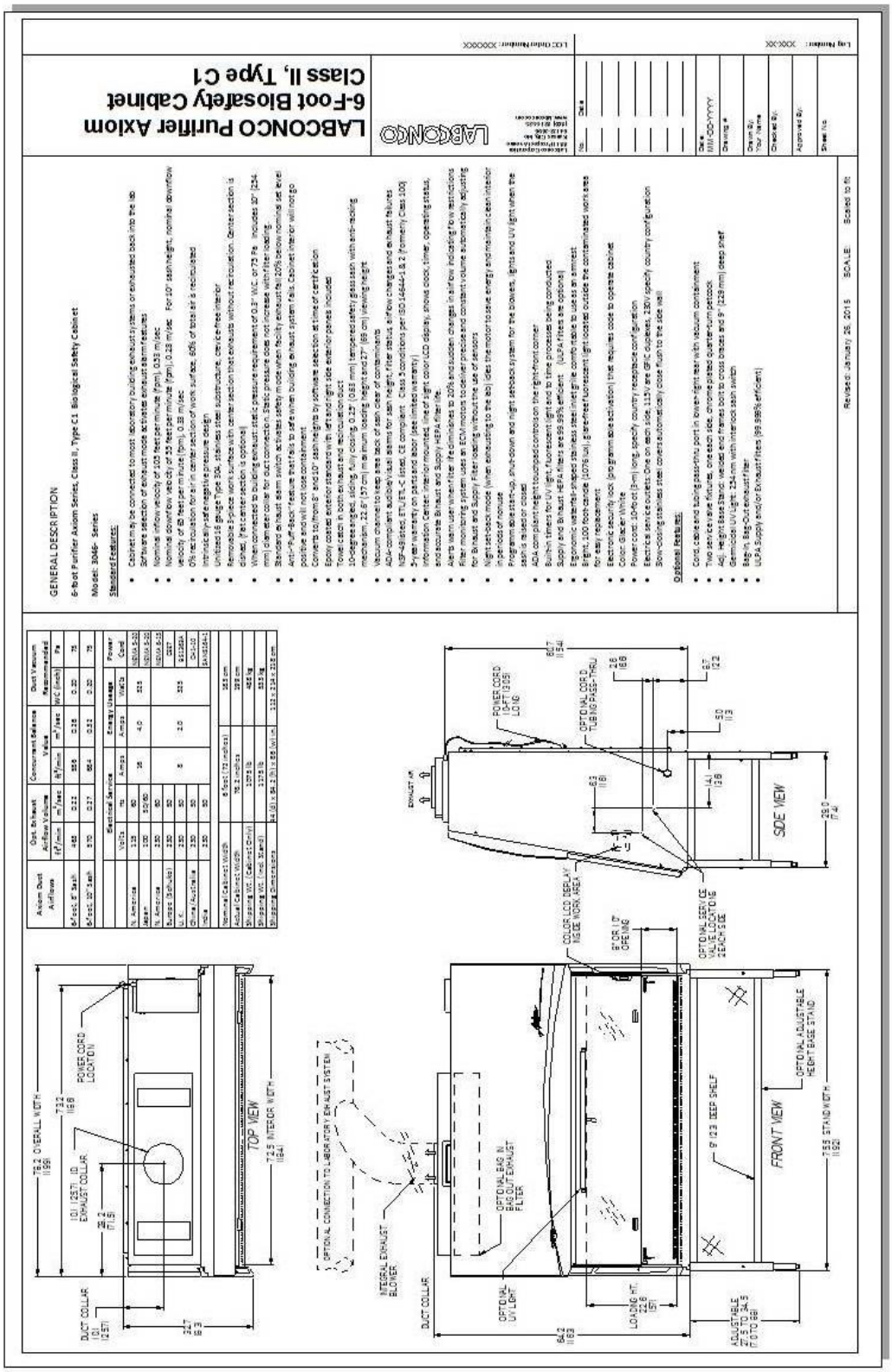
Nominal Cabinet Width	4 foot (48 inches)
Actual Cabinet Width	123 cm
Shipping Wt (Cabinet Only)	542 inches
Shipping Wt (Inc. Stand)	137.7 cm
Shipping Dimensions	750 lb
	340 kg
	895 lb
	379 kg
	44 (d) x 84.2 (h) x 60 (w) in
	112 x 214 x 152 cm

Labconco Corporation
8811 Prospect Avenue
Kansas City, MO
64132-2696
(816) 333-8811
(816) 363-0625
www.labconco.com

Log Number: XXXXX
LCC Order Number: XXXXXX

Drawing #
Drawn By:
Your Name
Checked By:
Approved By:
Sheet No.

Dimensions – 6 Foot Models



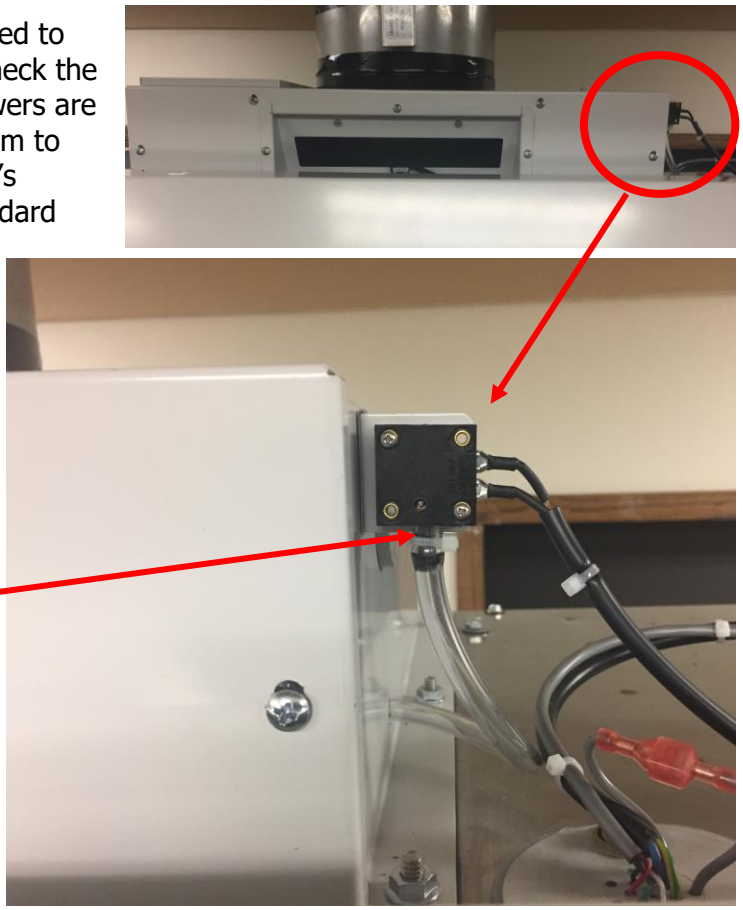
Section Ten –

Vacuum Start Switch (VSS)

Background

The VSS is a single pole vacuum switch, added to all Axiom models with serial numbers higher than 1709xxxxx. It is attached to the exhaust connection of the Axiom, as shown in Figure 10-1a and b.

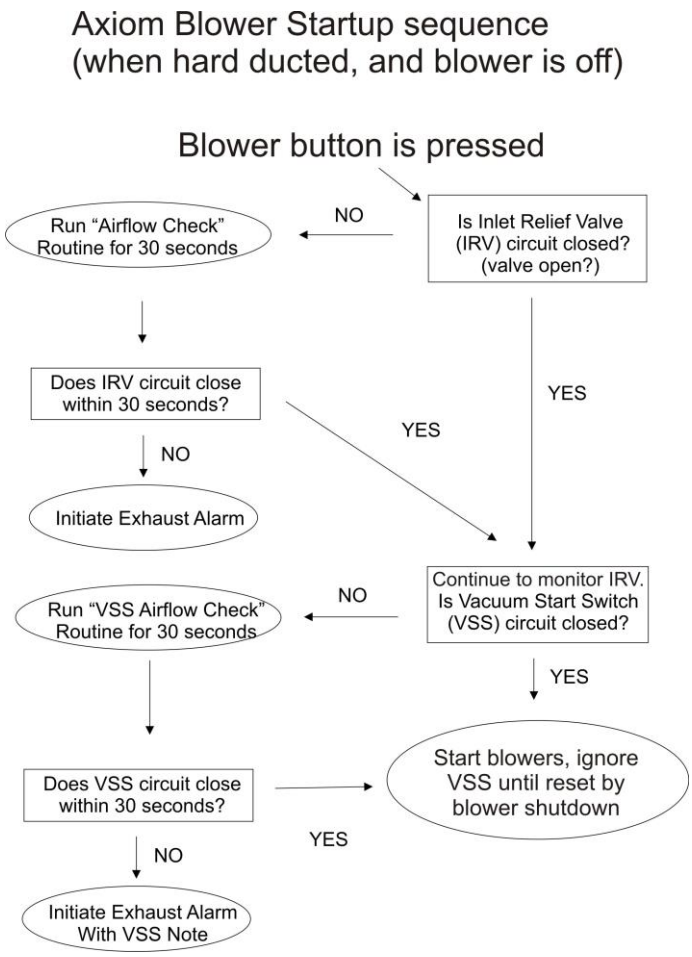
Figure 10-1a & b



It is only functional on Axioms connected to an exhaust system; its purpose is to check the exhaust system vacuum when the blowers are turned on. If there is insufficient vacuum to close the switch, it prevents the Axiom's blowers from starting, as per NSF Standard 49:2016 requirements. The VSS only checks the exhaust vacuum at blower startup; once the blowers have started, the Axiom ignores the switch until its blowers are shut off, and the unit is restarted.

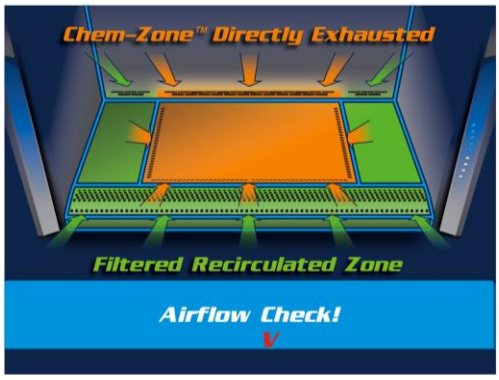
The operational logic of the VSS is shown in Figure 10-2.

Figure 10-2



VSS Diagnostic Screens

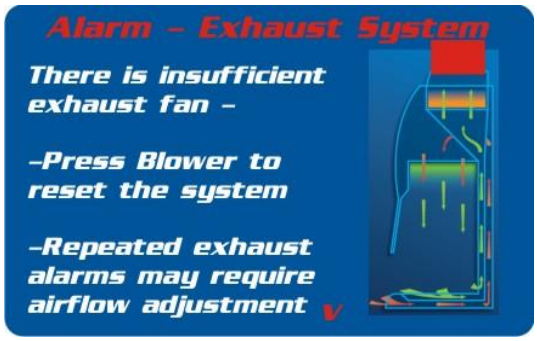
Figure 10-3



If the VSS sees insufficient vacuum at startup, the VSS Airflow check screen will be shown when the "Blower" button is pressed, as shown in Figure 10-3. The Axiom will allow the exhaust system 30 seconds to develop enough vacuum for proper operation.

If there is no red "V" on this screen during startup, then there is insufficient airflow to open the IRV. If the red "V" appears as shown, then there is insufficient exhaust system vacuum to close the VSS to allow the unit to properly start.

Figure 10-4



If, after 30 seconds, the VSS still sees insufficient vacuum, the exhaust alarm screen is activated, and the alarm locks out, requiring the blower button be pressed again to attempt a blower restart. The screen is shown in Figure 10-4.

If there is no red "V" on the alarm screen, then there was insufficient airflow to open the IRV. If the red "V" appears as shown, then there was insufficient exhaust system vacuum to close the VSS to allow the unit to properly start.

VSS Calibration

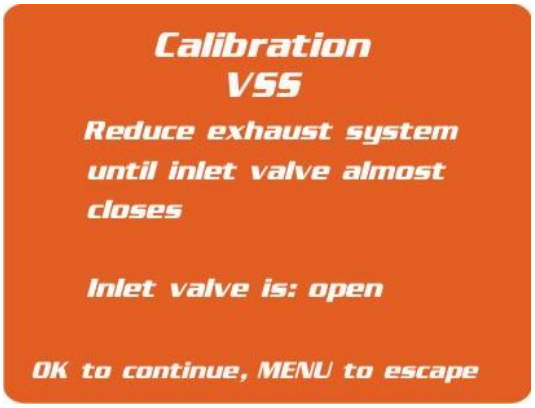
VSS is calibrated during production. If recalibration is required, however, follow these steps:

Figure 10-5

1) Access the Calibration menu. The first screen displayed after entering the password will be the menu selecting whether to adjust airflows and filter life gauges, or adjust the VSS. Press the up or down button to highlight this option, and press "OK/Mute".

Figure 10-6 a & b

2) The first screen asks you to reduce the exhaust system airflow until the IRV is open approximately ¼-1/2 inch. This is the minimum exhaust flow for the axiom to start properly. When the system is adjusted properly, press the "OK/Mute" button.



Note IRV nearly closed

Figure 10-7

3) The second VSS calibration screen will stop the Axiom's blowers. **It is critical you allow the Axiom 10-15 seconds for all blower movement to stop; this will be required for proper calibration**. When the VSS is closed, the Axiom's speaker will repeatedly beep.

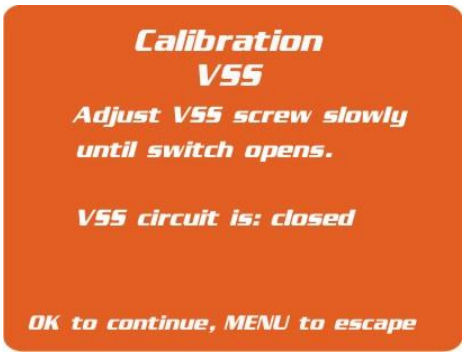


Figure 10-8

If the speaker is beeping, use a small straight bladed screwdriver to ***slowly*** turn the adjustment screw counterclockwise until the beeping stops completely for at least 10 seconds, as shown in figure 10-8. If the unit is not beeping, ***slowly*** turn the adjusting screw clockwise until the Axiom begins to beep, and then ***slowly*** turn the adjustment screw counterclockwise until the beeping stops completely for at least 10 seconds.

4) Press "OK/Mute" button, and then press the "Menu" button several times until the default display is shown. Return the exhaust system to normal operation. The Axiom is now ready for use.