Germfree

EXPERT ENVIRONMENTS

SEA

Standard Class III Biological Safety Cabinet

User Manual

Models SEA-3 / SEA-4 / SEA-6

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Creating Environments that Serve Life Science Innovation and Advance Global Health

Contents

Introduction

Read all the instructions in this manual before attempting to operate the SEA Class III Biological Safety Cabinet (BSC). Class III BSCs represent the safest type of primary barrier providing a significant reduction in personnel and environmental risk. This high level of safety is provided by keeping potentially hazardous agents contained, while working with the agents from outside the barrier through protective gloves.

According to Bio-safety in Microbiological and Biomedical Laboratories - BMBL 5th Edition, a Class III BSC is defined as:

a gas-tight enclosure with a non-opening view window. Access for passage of materials into the cabinet is through a dunk tank, that is accessible through the cabinet floor, or double-door pass-through box (e.g., an autoclave) that can be decontaminated between uses. Reversing that process allows materials to be removed from the Class III BSC safely. Both supply and exhaust air are HEPA filtered on a Class III cabinet. Exhaust air must pass through two HEPA filters, or a HEPA filter and an air incinerator, before discharge to the outdoors. Airflow is maintained by a dedicated, independent exhaust system exterior to the cabinet, which keeps the cabinet under negative pressure (minimum of 0.5" H2O).

Facility Considerations

While the BMBL 5th Edition states that Class III BSCs must be directly (hard) connected through the second exhaust HEPA filter of the cabinet to an independent building exhaust, over the past decades there have been increasing numbers of non-hard ducted Class III BSCs being used in laboratories in the U.S. and worldwide. The use of non-hard ducted Class III BSCs is based on a risk assessment and driven by operational needs (e.g. infected animal transfer; movement of suspicious or HAZMAT packages from the loading dock to the analytical lab; flexibility to use a Class III BSC in different laboratories).

In animal research, mobile UPS powered Class III BSCs are now used to move animals from holding rooms to testing or procedure rooms. The mobile containment system reduces personnel and environmental exposure and reduces the time the animal must be handled and anesthetized. The mobile systems meet all specifications for Class III BSCs except for the recommendation to be ducted to the outside.

Transport Class III BSCs are also used in public health laboratories for the receipt of unknown hazards associated with chemical and biological agents. Operators use the transport cabinets to move unknown hazardous sample from the loading dock area to the containment lab without risking contamination of non-contained and public areas as well as the containment lab itself.

The advent of the transportable Class III BSCs provides a significantly safer way of moving and handling infected animals or unknown samples than has been provided by any past capability, but a thorough and documented risk assessment with considerations to the facility is required.

All Class III BSC exhaust fans must be sized carefully with full consideration given to volumetric airflow, static pressure, and total required capacity for the system.

Potential events and emergency situations should be reviewed and tested. The dampers (actuating and manual), duct system, exhaust connection, external alarms, and room/facility balance should also be tested.

Class III BSC Safety Practices

The laboratory Safety Officer and Laboratory Director should make Standard Operating Procedures (SOPs) readily available to all personnel. Professional training prior to commencing work inside a Class III BSC is highly recommended.

Advance Planning & Good Technique

The successful use of the Class III BSC as a safety tool depends on two factors: advance planning and good operational practices. Even the most sophisticated and elaborate systems are unsafe if proper technique is not employed. It is, therefore, the responsibility of the safety officer or head of the particular project to train the personnel who will use the unit and to ensure good technique is maintained.

Planning is a critical part of laboratory safety. To achieve maximum safety and utility of the Class III BSC take into account all equipment and materials necessary for the proposed operation and outline the procedural details in advance. The best way to accomplish this is by the use of a checklist and/or protocol that includes the equipment, apparatus, tools, supplies, and other details necessary for the successful completion of the proposed operation. Every process, procedure, and item involved in an experiment must be carefully out-lined and planned for.

The order of events should also be clearly listed, with the sequence in which materials must be passed into or out of the Class III BSC particularly well detailed, especially if cross-contamination is a concern.

Gloves

Gloves are the most susceptible component of the Class III BSC system. If there is a containment breach, more often than not, it is due to a glove leak. For this reason, it is important to inspect gloves regularly; before and following each use of the Class III BSC. A quick pressure test will indicate if there is a glove leak. It is also important to have spare gloves readily available.

All operators should be practiced in glove replacement. Furthermore, laboratory personnel should understand protocol in the event of a glove leak.

Personal Protective Equipment (PPE)

Laboratory personnel should always wear appropriate Personal Protective Equipment (PPE) when using this equipment (e.g. protective clothing, eye protection, etc.). Appropriate PPE should be specified in the recommended safety procedures corresponding to the work being performed in the Class III BSC.

Equipment Construction & Operation

Stainless Steel

The Class III BSC system is constructed of all welded 10-16ga. type 304 and 316L (2.46 mm thick ISO 3406 Type A4) stainless steel (SS). with interior coved corners and all bends are completed using a radius. Sharp edges of the Class III BSC have been rounded to prevent injury and puncturing PPE. Care should still be taken, especially during disassembly/reassembly operations, changing clamps, contact with HEPA filters, etc.

The Stainless Steel is polished to a 180-grit pharmaceutical grade (#4) finish. The construction and finish facilitate cleaning and decontamination; however, proper selection and usage of cleaning and sanitizing chemicals is necessary in order to maintain the finish of the stainless steel. Information on cleaning the Class III BSC is in the Maintenance section of this manual.

Filtration

HEPA filters are rated at 99.99% efficiency at 0.3µm particle size (the filter is more efficient for larger or smaller particles). Filters are sealed into the Class III BSC with stainless steel frames and EPDM gaskets. The cabinet is equipped with 200mm x 200mm x 76mm (8"x8"x3") one (1) supply and two (2) exhaust HEPA filters. Gas-tight butterfly valves are provided to the Supply and Exhaust to completely seal the cabinet interior, allowing the filters to be changed without loss of containment. Used HEPA filters can then be bagged and passed out through the Airlock.

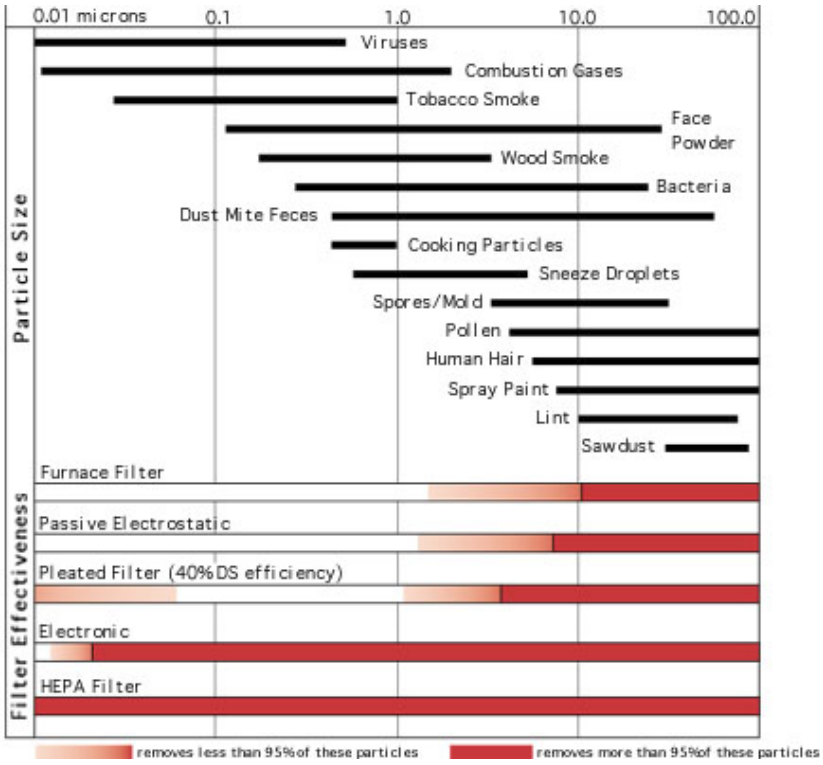
HEPA filters efficiency increases due to the following complimentary filtering mechanisms:

- Impingement: Large particulates, (dust), high density particles are captured
- Interception: Particulates follow airstream around filter fibers and become captured by contact with an edge, or intercepts.
- Diffusion: Small particles acquire random motion due to collision with gas molecules (Brownian motion) and contact the filter fibers.
- Straining: The smallest dimension of dust is greater than the distance between adjoining filter media fibers
- Electrostatic Attraction: Attraction of oppositely charged particles to charged media

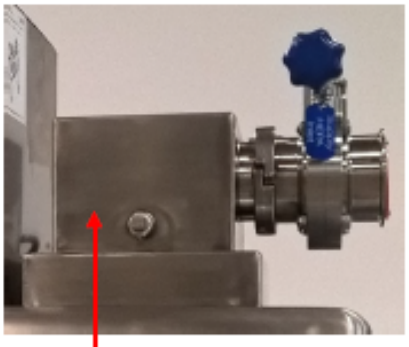
The figure below shows the relative particle size (in microns) of common particulates and the effectiveness of various filters.

Never use damaged HEPA filters. The damaged area can allow potentially hazardous particulates to flow out of the Class III BSC.

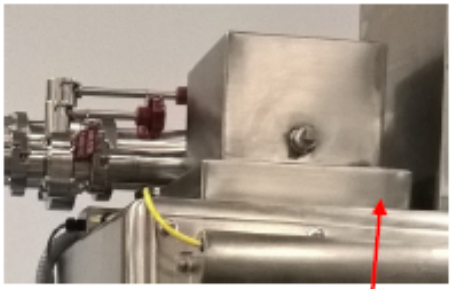
In addition to the operator, a second person should be present during Class III BSC operation to provide support and assistance to the operator.



Laboratory air is drawn into the Class III BSC and filtered by the 200x200x76mm (8"x8"x3") supply HEPA filter. Class III BSC exhaust filtration consists of a double-HEPA filter system, utilizing two 200x200x76mm (8"x8"x3") HEPA filters.



Supply Filter Plenum
(1) 200x200x76mm (8"x8"x3")
HEPA Filter



Exhaust Filter Plenum
(1) 200x200x76mm (8"x8"x3")
HEPA Filters

Supply and exhaust connections are with manually adjustable 76mm (3") gas tight butterfly valves.

The Pass-Through Chamber has an Active purge option with a single HEPA filter on the supply and double HEPA filters on the exhaust.

Exhaust HEPA filter loading is dependent on environmental factors and operations being conducted within the Class III BSC. Operations that produce particulate aerosols will negatively impact the life span of exhaust HEPA filters more rapidly than operations that do not (e.g. poultry containment Class III BSC). Facilities located in areas with greater amounts of particulates in the ambient air will load supply HEPA filters more quickly.

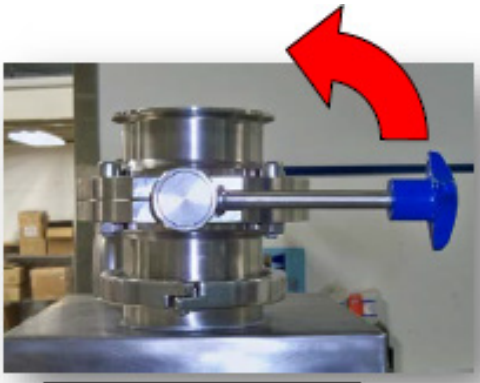
Valves

Class III BSC airflow and pressure is controlled with manually adjustable butterfly valves. The valves are constructed of stainless steel and are gas-tight. For increased visual identification, valves with blue handles indicate the supply air, and valves with red handles indicate exhaust air. Valves with black handles are the optional decontamination/aerosol ports. Valve handles also have colored tags to identify each valve.

To increase cabinet pressure/resistance, gradually close the supply valve with the exhaust fully open. To decrease cabinet pressure/resistance, gradually open the supply valve with the exhaust fully open. For example, if operating pressure needs to be increased (more negative); slowly adjust by closing the supply air valve. If operating pressure needs to be decreased (less negative/closer to zero), slowly adjust the supply valve open.

Valve handles screw in/out to lock valve in position. Turn handle clockwise to tighten and lock in position, turn counterclockwise to loosen.

Decrease
Resistance/Pressure



Increase
Resistance/Pressure

Control Panel

The Control Panel contains the main power, light, and receptacle switches, digital and analog pressure gauges, audible and visual alarm system, alarm silence switches, Airlock active purge process lights, and associated circuit breakers.

Airlocks

The Class III BSC has a double door Airlock which allows the operator to pass materials and/or process supplies into and out of the Class III BSC through the interior chamber door and then on to lab area. The Airlock door may have an interlock system which prevents multiple doors from being open simultaneously and losing containment. The Airlock may also equipped with an optional Active HEPA Purge system; after the interior door has been opened and closed, the active purge system will automatically exhaust potentially contaminated air and cycle sterile air into the Airlock for approximately 4 minutes.

Window

The sloped viewing window is 9.5mm (3/8") thick and made of high density polycarbonate. The window is angled at approximately 7° to increase work area depth and facilitate viewing within the work space.

The window is sealed to the Class III BSC with a stainless steel frame and water jet cut 3/16" silicone gasket. Window is removable to accommodate cleaning and maintenance. The glove ports are sealed into the viewing window with seamless EPDM gaskets. See the Maintenance Section of this manual for important window cleaning information.

Note: Window frame hardware torque specification is 0.4 to .46 kg-meter (35 to 40 inch-lbs), do not over-tighten. Window frame hardware should be checked for proper torque annually by contractor or trained personnel.

Glove Ports

In the past, glove ports were round in shape, fairly small in diameter, and spaced near each other. This greatly restricted freedom of motion both horizontally and vertically. Ergonomic comfort and utility has increased substantially with the incorporation of larger width, oval shaped, angled glove ports. The oval glove ports are spaced 457mm (18in) on center for improved ergonomics, and in varied configurations to improve access to interior equipment. Furthermore, this enables the user to make more efficient use of the interior space while being able to access the pass through chamber for ease of material transfer and chamber decontamination. To reduce fatigue, gloveports are constructed with a slightly extended lip enabling the user to rest their arms.

Depending on model, the Class III BSC has two, three or four large or extra large double-grooved stainless steel glove ports on the viewing windows. The double-groove design allows for glove changes without breaking containment. Gloves are sealed onto the glove ports by the use of three EPDM O-rings. Each glove has one O-ring built in the cuff, two additional O-rings fit over the glove on the glove port grooves. The three O-rings ensure the gloves will not move and ensure a seal. An EPDM trim guard is also provided to the edge of each glove port to protect gloves from any puncturing or tearing.

Note: Glove port hardware torque specification is .52 kg-meter (45 inch-lbs), do not over-tighten.

Gloves

Gloves are a critical component of the protective barrier and the primary interface with operations inside the Class III BSC. Glove selection must be suitable for the needs and circumstances of all projected work. This information should be included within the risk assessment documentation.

The Gloves supplied are usually either Butyl or Hypalon (CSM); other options are available. These materials have different permeability rates with various chemical compounds (including decontamination chemicals). Selection of glove type should be made based on a risk assessment that considers chemical permeability, operations (handling of animals or sharps), and the requirement for dexterity. Consult a glove permeability chart when the use of chemicals is anticipated. This will increase the time before break through and ensure selection of the correct glove. Consideration of operations being performed is essential because gloves differ significantly in the amount of dexterity.

Ordering the correct hand size is important for safety and ability to perform the work required through the gloves. Gloves that are too large create a ballooning effect making it very difficult to manipulate equipment such as pipettes, small tubes, plates, and other common items. This increases the risk of a spill, contamination of the material, and worker fatigue.

The useful life of gloves varies significantly depending on Class III BSC operational conditions, chemicals, sterilization methods, temperatures, etc. Butyl and Hypalon (CSM) gloves left in the bag and stored at 10° to 29.4° Celsius (50° - 85°F) have a 3-year shelf life.

The Class III BSC gloves should be tested weekly and pass inspection and testing for integrity. This provides quality assurance that the gloves are an optimal barrier for operator safety.
Class III BSC gloves should be shipped and stored flat not folded. Over time, leaks can develop along the creased areas where gloves were folded.

Prior to operations, all gloves should be visually inspected and replaced if punctures, "dry rot," creases, or other defects are found. Check between fingers, palm area, and tops of gloves for holes, discoloration, and any imperfections.

Also pay particular attention to the glove area around the glove port(s), making sure there are no holes, stressed, or age related problems. Damaged gloves should be replaced immediately.

Performing a 10 minute Rate of Rise test is recommended on a weekly basis.

Gloves should be carefully inspected for wear, stress, and operational damage before and after working within a Class III BSC. Gloves should be visually inspected periodically for cleanliness during work, especially if a breach is suspected. Gloves should be replaced when any cracks, wear areas, or tears are observed.

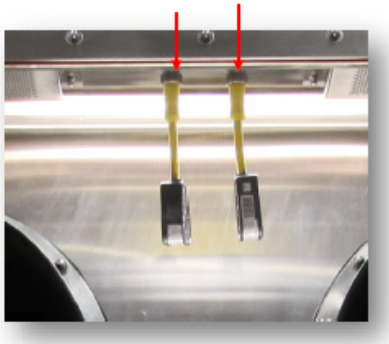
Electrical Components

Lighting

The interior of the Class III BSC is illuminated by non-glare LED lights in an exterior-mounted housing. The lights are isolated from the work area by the front window which is sealed with a stainless steel frame and silicone gasket, allowing light bulbs to be changed without breaking containment. For bulb replacement see the Maintenance Section of this manual.

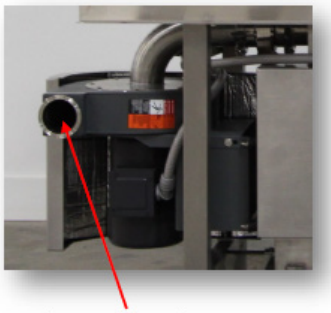
Electrical Receptacles

The Class III BSC features hanging specified electrical receptacles on the interior of the cabinet used for powering equipment. The receptacles are sealed into the work area via a sealed plug connection, and are removable and replaceable should they become contaminated; without breaking containment. To remove the receptacle, simply unscrew the stainless steel connector at the top of the receptacle cord (indicated in picture). Receptacle power is independently switched at the control panel.



Exhaust Blower Motor

Necessary airflow for the Class III BSC is created by a dedicated blower motor. This blower creates the necessary negative pressure for the unit to provide Class III containment. The motor blower is housed is a sound-dampening stainless steel enclosure with vibration mounts.
A 3.05m (10 ft) length of flexible exhaust flex hose is provided so the blower box can be moved. Optional installation for the blower include a) mounting it on the stand below the box or b) mounting it below the airlock.



Airlock Options

Airlock: This Class III BSC has an airlock which allows the operator to pass materials and/or process supplies into and out of the Airlock through the interior chamber door and then into the lab area.

Options available for the Airlock:

1. The Airlock can be fitted on either the left or right side.
2. The Airlock can be fitted with an Active HEPA purge system
3. Airlock door can be installed on the end or at the front.
4. Interlocks can be installed for the doors: electromechanical can be used with any door configuration, and a mechanical interlock can be used with an "End to End" door configuration, only.

Decontamination Ports

The location of decontamination ports is an important consideration in the design phase and must take into account the type of decontaminant used as well as the internal size of the Class III BSC. Placement of ports in close proximity, especially with a small Class III BSC, can result in the inability to maintain the concentration of the decontaminant over the required time in the decontamination cycle. Ports with quick-clamp couplings simplify connecting decontaminant supply and exhaust hoses. The stainless steel ports allow for gas decontamination of the Class III BSC using a gas or vapor decontaminant. Sanitary quick clamps for connection to a decontamination gas generator are included; the transition adapter to cam and groove fitting is not provided.

Carbon Filter

Non-TEDA carbon filtration is available.

Table Stand Options

The stand is equipped with adjustable feet with heavy duty casters being an available option.

System Operating Information

The Class III BSC operates under negative pressure in relation to the area in which it is situated. This negative pressure provides the increased level of safety required in the event of a breach of containment, such as a leak in a glove.

Negative pressure is maintained throughout the Class III BSC. Pressure gauges monitor Class III BSC differential pressure relative to the surrounding environment. Mechanical Minihelic pressure gauges will operate without electricity, in the event of power loss.

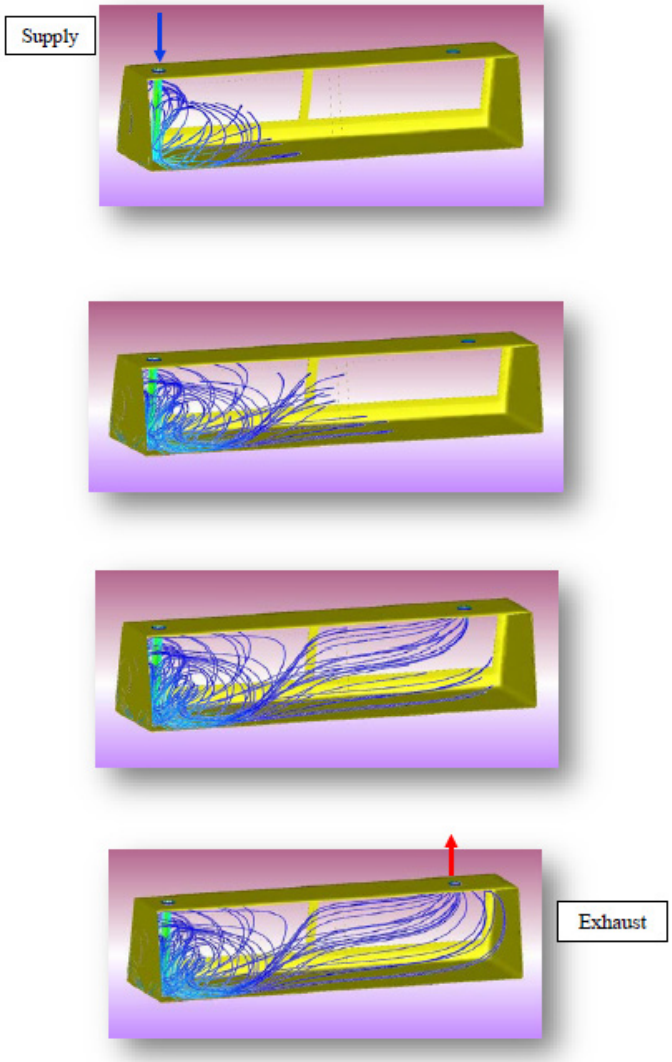
If Class III BSC pressure rises above -0.5" H2O (-125 Pa) the alarm will sound. Unless negative pressure can be immediately regained, Class III BSC Supply and Exhaust valves should be closed, and decontamination and test sample safety procedures should be initiated.

The desired operational pressure within the Class III BSC ranges from approximately -.5" to -1.2" H_2O (-125 to -300 Pa). Nominal operating pressure should be specified in laboratory SOPs. Cabinet operating pressure is adjustable by the use of 76mm (3in) manual butterfly valves.

The system should be carefully inspected and thoroughly tested prior to the introduction of any hazardous materials. Periodic inspection of the systems filter housings and gaskets is highly recommended.
The Class III BSC requires dedicated circuits for operation.

Airflow Characteristics

Typically, airflow in Class III BSCs is referred to as turbulent airflow. This means the airflow is drawn into the Class III BSC through the inlet/supply HEPA filter and moves toward the exhaust outlet in a manner whereby velocity and pressures are randomized throughout the cabinet. The following images depict typical turbulent airflow patterns inside a Class III BSC.



Unique airflow rates, as with all characteristics of the operations, should have an accompanying risk assessment. Proper Standard Operating Procedures (SOPs), administrative controls, use of simulations during training and proficiency demonstration, and testing procedures should be developed and followed based on design.

Class III BSC Startup & Shutdown

Startup Procedures

1. Visually inspect Class III BSC elements, particularly for damage to the exposed surfaces of the HEPA filters, gloves, o-rings and hoses. Make sure duct clamps are tight and in place.

Note: Temperature changes in the Class III BSC and/or Laboratory have a dramatic effect on the pressure within the Class III BSC. The use of accurate thermometers inside and outside the box is recommended.

2. Close all doors on Class III BSC
3. Open Class III BSC Supply and Exhaust air valves
4. Pressure test the Class III BSC for leaks
   - Turn power switch on.
   - Close the Supply Air Valve. Negative pressure will increase and pull the gloves into the Class III BSC. Draw between -3" and -4" H_2O (-750 and -1000 Pa).
   - Close the Exhaust Air Valve.
   - Gradually reduce negative pressure in the Class III BSC by opening the Supply Air Valve until pressure reads between -2" and -3" H2O (-500 and -750 Pa), then close tightly.
   - Let pressure settle for 10 to 15 minutes.
   - Record the pressure from Digihelic Pressure Gauge.
   - After 10 minutes elapses, record new pressure reading. Pressure should not rise more than 0.5" H2O (125 Pa) in 10 min.
   - If there is less than 0.5" H2O (125 Pa) difference between the start and finish pressure readings the Class III BSC is considered leak-tight.
   - If the difference between the start and finish pressure readings exceeds 0.5" H2O (125 Pa), the Class III BSC is not considered operational and the source of the leak must be found and corrected.
5. Test the Class III BSC Pressure Alarm
   - Ensure the Supply and Exhaust Air valves are fully open.
   - Close the Supply Air Valve until system pressure registers between -1.0" and -1.3" H2O (-250 and 325 Pa).
   - Record negative pressure attained and time.
   - Momentarily close the Exhaust Air Valve.
   - Alarm should sound when indicated pressure rises above -0.5" H2O (-125 Pa).
   - Silence the Alarm.
   - Return valve to initial position after verification.
6. Set Operational Flow and Pressure
   - Turn power switch on, gloves should pull into cabinet.
   - Pull off a glove from one of the glove ports.
   - Using an anemometer, take an air velocity measurement from the center of the open glove port.
   - Inflow velocity should measure at a minimum 100 ft/minute (.51 m/s)
   - Adjust exhaust valve to attain 100 ft/min (.51 m/a) inflow through open glove port.
   - Secure glove back onto glove port.
7. Begin to use the Class III BSC

Shutdown Procedures

Proper laboratory shutdown procedures are laboratory-specific, and procedures should be specified in SOP protocol. There are two different types of shutdown. First is routine shutdown, which is performed following daily work in the Class III BSC. This shutdown procedure consists of wrapping up work inside the cabinet and shutting off the lights.

The second type of shutdown is a full laboratory shutdown, which requires steps to ensure the Class III BSC is ready to be powered down. Laboratory shutdown procedures should be defined as part of SOP protocol. The following steps are meant to provide a general guide for Class III BSC shutdown.

1. Wrap up work inside the Class III BSC
2. Close/Cover containers and clean work area
3. Sterilize work surfaces, tools, and materials that may have become contaminated
4. Decontaminate and remove process supplies and/or tools via dunk tank or autoclave
5. Decontaminate entire Class III BSC system
6. Validate Decontamination
7. Replace HEPA Filters
8. Replace Gloves
9. Turn off power to Class III BSC system
10. Close all supply and exhaust valves
11. Class III BSC is shut down

Entry & Exit of Samples & Materials

Transfer devices allow for the passage of materials into and out of the Class III BSC. The choice of transfer device is based on the type of operations being performed within the Class III BSC.

Airlock

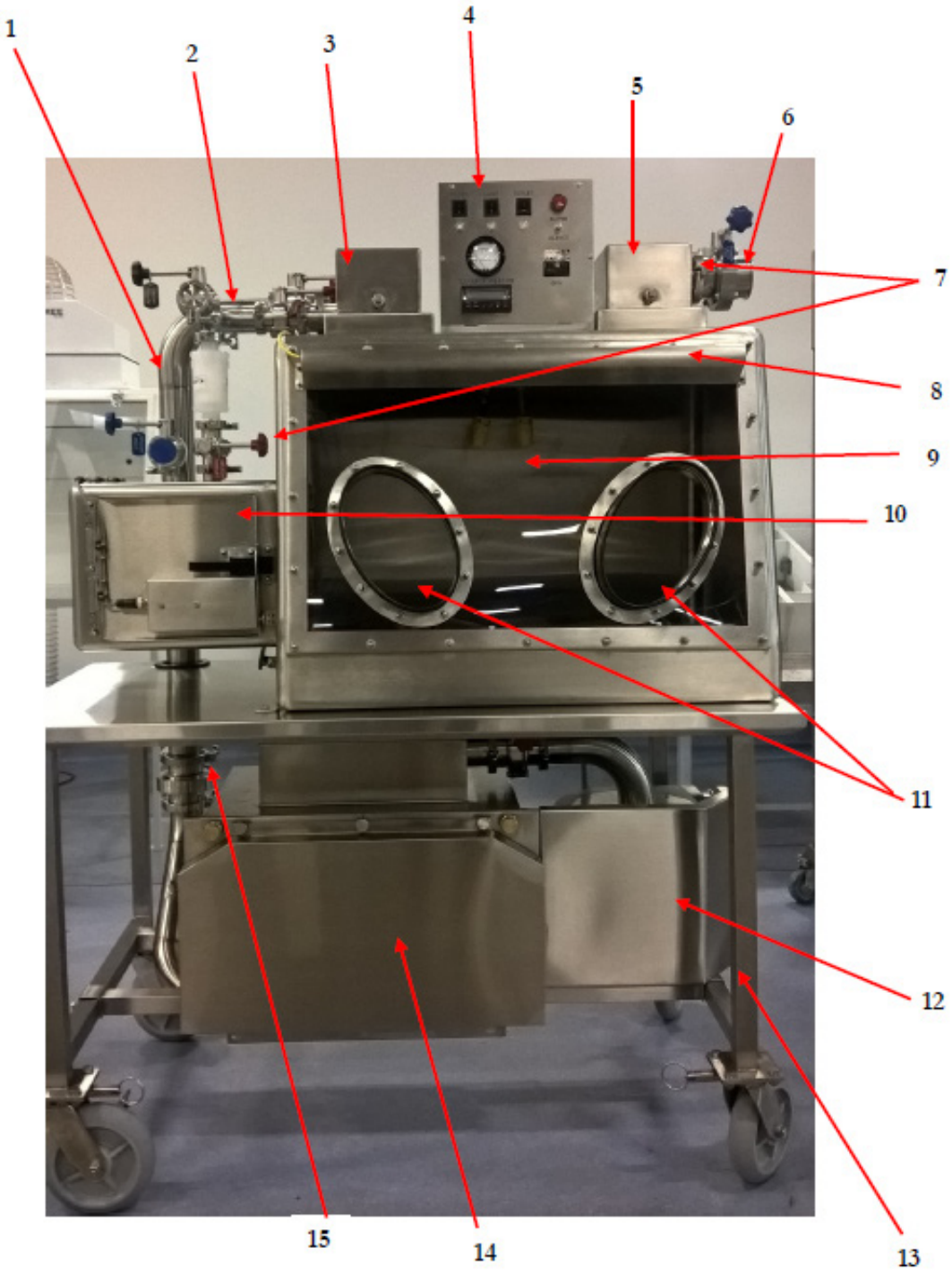
The Class III BSC has a double door airlock which allows the operator to pass materials and/or process supplies into and out of the Airlock through the interior chamber door and then on to either the lab area. The Airlock is equipped with a door interlock system which prevents multiple doors from being open simultaneously and losing containment. The Airlock may also equipped with an Active HEPA Purge system; after a door has been opened and closed, the active purge system will automatically exhaust potentially contaminated air and cycle sterile air into the Airlock for approximately 4 minutes.

Class III BSC Parts Identification Guide

Class III BSC - (Figure 1 and Appendix B – As-Builts)

1. Exhaust Duct to Carbon Filtration System
2. Exhaust Air Valve: Air leaving the Class III BSC flows through this 76mm (3in) gas tight butterfly valve; the red handle indicates exhausted air. This valve allows for air flow adjustment and the complete sealing of the Class III BSC.
3. Exhaust HEPA Filter: Air exiting the Class III BSC passes through the double exhaust HEPA filters, ensuring all exhaust is particle free.
4. BSC Control Panel: The Control Panel includes power, receptacles, light switches, pressure displays, low pressure alarm indicating cabinet conditions, associated circuit breakers and Airlock Purge process lights (optional).
5. Supply HEPA Filter: Air entering the Class III BSC flows through the Supply HEPA filter, ensuring all air entering the cabinet is particle free.
6. Supply Air Valve: Air entering the Class III BSC passes through this 76mm (3in) gas tight butterfly valve; the blue handle indicates supply air. This valve allows for air flow adjustment and the complete sealing of the Class III BSC.
7. Decontamination Ports (Optional): Allows for decontamination of the cabinet utilizing a gas decontaminant; the gas or vapor is introduced through these ports.
8. LED Light Hood: Provides lighting inside the Class III BSC. The hood is mounted above the viewing window and is easily removable for bulb replacement.
9. Sealed Electrical Receptacles: Single phase receptacles for powering equipment inside the cabinet. The outlets are sealed into the work area via a sealed plug, and are removable and replaceable should they become contaminated. Additional power supply required for use.
10. Airlock: The Class III BSC has a double door airlock which allows the operator to pass materials and/or process supplies into and out of the Airlock through the interior chamber door and then on to the lab area.
11. Gloves & Glove-ports: Double groove stainless steel glove-ports provide a structure for gloves to secure to. Gloves provide the operator with the ability to safely manipulate, disinfect, and process samples in the Class III BSC for analysis.
12. Exhaust Blower: The Class III BSC is equipped with an independent blower system which creates the necessary airflow to maintain negative pressure within the work chamber. The blower is housed in a stainless steel sound-dampening housing.
13. Isolation Valve: For Isolating the filter housing

Figure 1



Quality Statement

Accountability
We will deliver our products on time, as promised, and free from defects.

Ownership
We will strive to exceed expectations at every level and we will work to make sure that each customer is satisfied with the service that they receive.

Longevity
All of our products are constructed from the highest quality materials and are designed to operate reliably for decades. We stand behind our work and take pride in our superior craftsmanship.

Our Company

Germfree has been a leading innovator in aseptic control and isolation systems since 1962.

We design and manufacture a diverse range of equipment and facilities for life science applications.

Our systems are integral to critical processes across many sectors. We specialize in complex projects and custom applications that serve the rigorous demands of our clients. Our high-specification bioGO Modular Facilities operate across the world, and are sustainable as permanent facilities in remote regions with harsh conditions.

Germfree's Mission

Creating Environments that Serve Life Science Innovation and Advance Global Health

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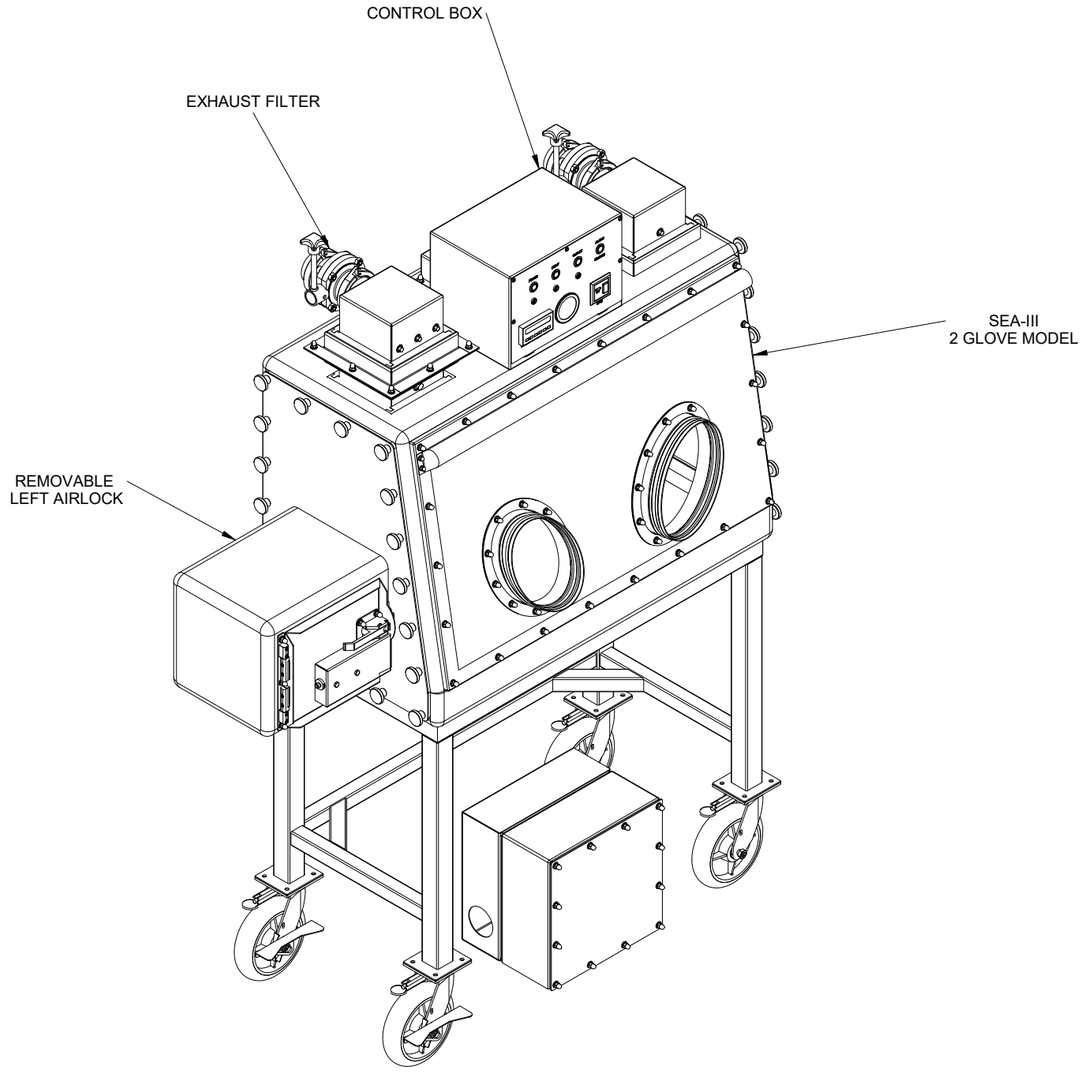
Appendix A: Technical Drawings

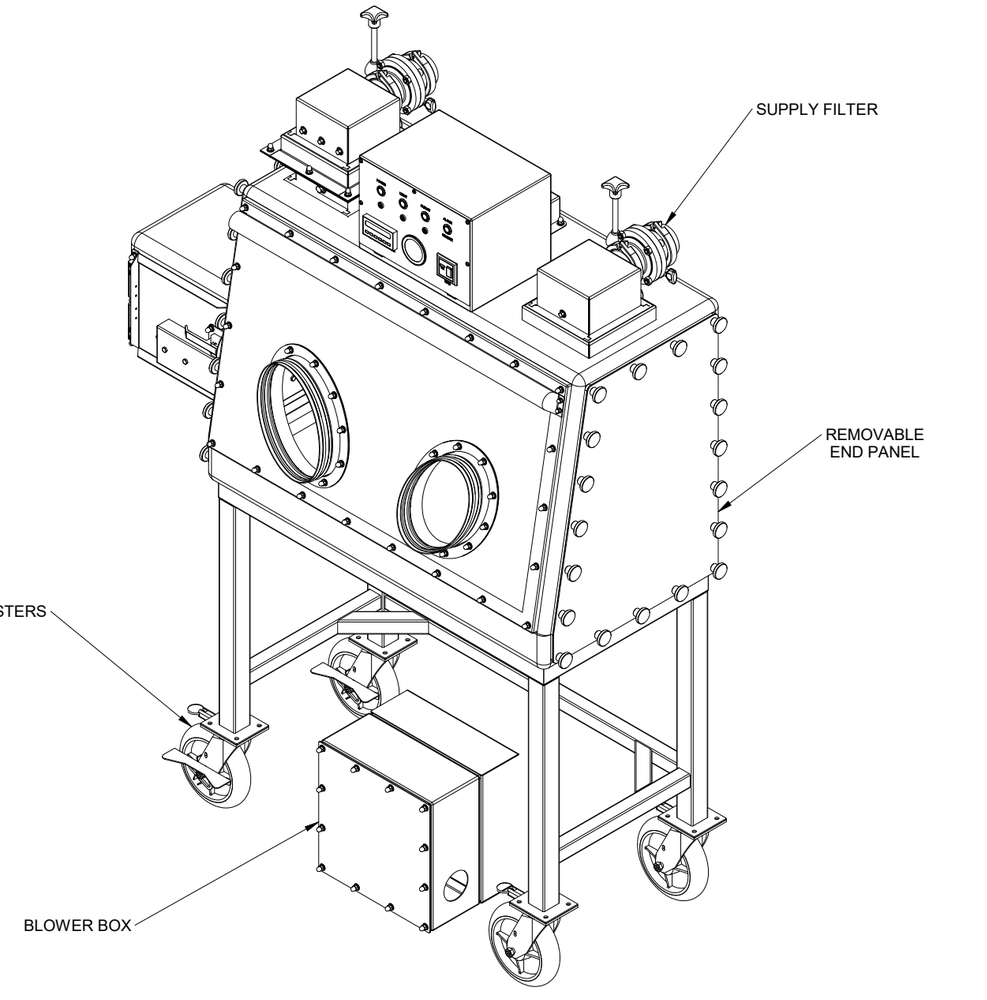
SEA-3 (2 Glove, Left Airlock, Casters)

NOTE:
1. DO NOT SCALE DRAWING
2. BREAK ALL SHARP EDGES
3. MARK GERMFREE PART NO./REV. ON ALL PARTS
4. WELD ALL JOINTS .13 FILLET
5. ALL WELDS GROUND AND POLISHED
6. REMOVE ALL WELD DISCOLORATION
7. DIMENSIONS IN PARENTHESIS "( )" ARE FOR REFERENCE
8. FLAT PATTERN DIMENSION DATA USE (.DXF) ELECTRONIC FILE

REVISIONS						
REV	DESCRIPTION	DATE	DGNR	DRFTR	CHKR	APRV
A	INITIAL RELEASE	d mmm yyyy	MSP	MSP	BAS	JQS



LEFT ISO VIEW



RIGHT ISO VIEW

UNLESS OTHERWISE SPECIFIED:
TOLERANCES ARE:
.XX = ±.03
.XXX = ±.010
FRACTIONS = ±1/16
ANGLES = ±.5°

DIMENSIONS ARE IN INCHES.
DO NOT SCALE DRAWING.

SIGNATURES		DATE
DRAFTER:	M.PACE	d mmm yyyy
ENG/DGNR:	M.PACE	d mmm yyyy
CHECKER:	B.SERLE	d mmm yyyy
APPROVAL:	J.SERLE	d mmm yyyy

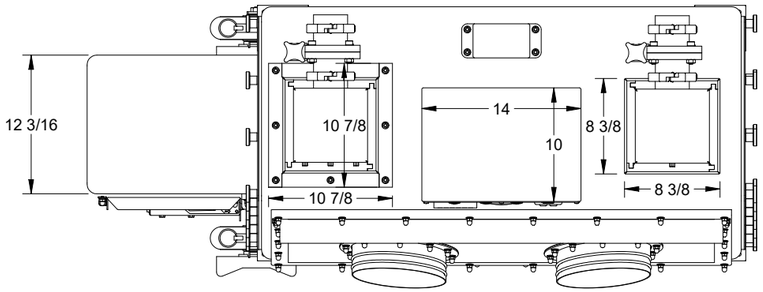
Germfree Laboratories

SEA-III
2 GLOVE MODEL

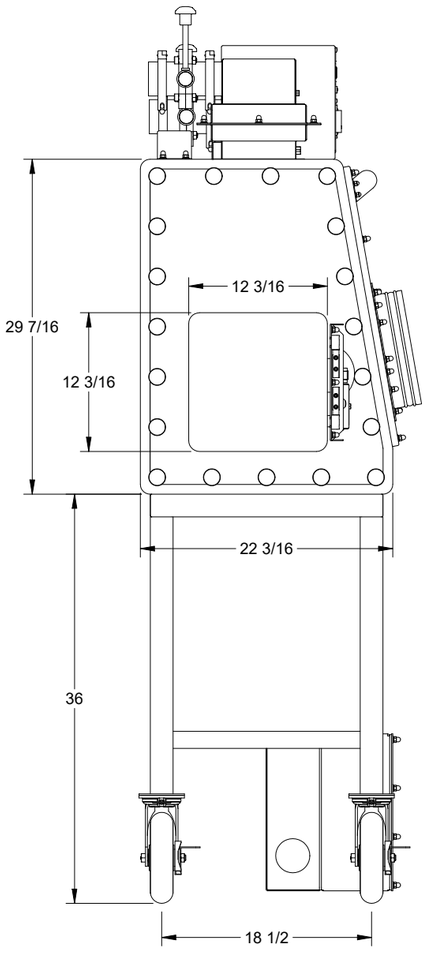
DRAWING NO:	REV:
XXX-XXXX-XX	A

W.O:	PROJECT:	SCALE:	SHEET NAME:	SHEET:
XXXXXX	PXXXXXXX	N/A	OVERVIEW	1 of 2

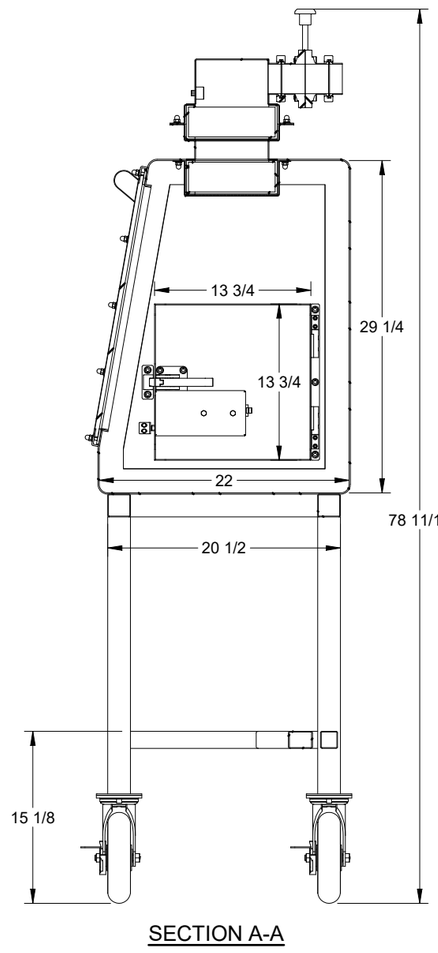
P:\Standard Products\Equipment\SEA-3 (2 GLOVE)\SEA-3 (2 Glove, Left Airlock) (Casters)\Engineering\2D\Mechanical\SEA-3 (2 Glove, Left Airlock, Casters).dft



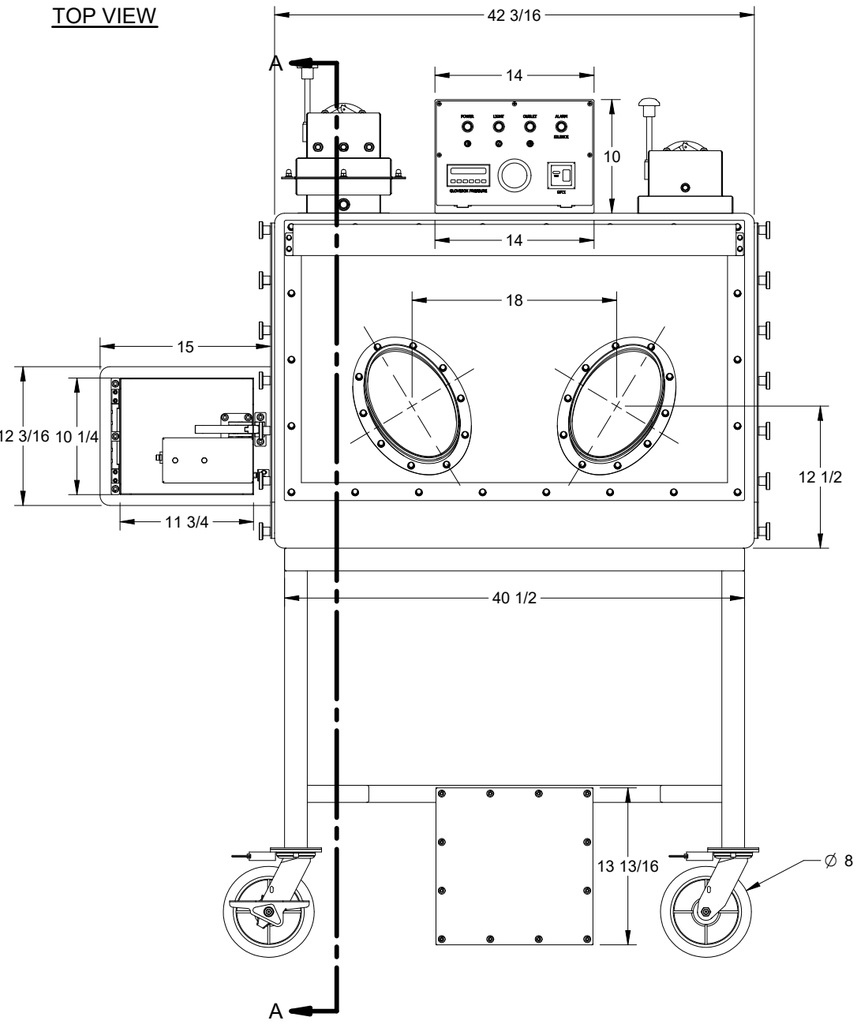
TOP VIEW



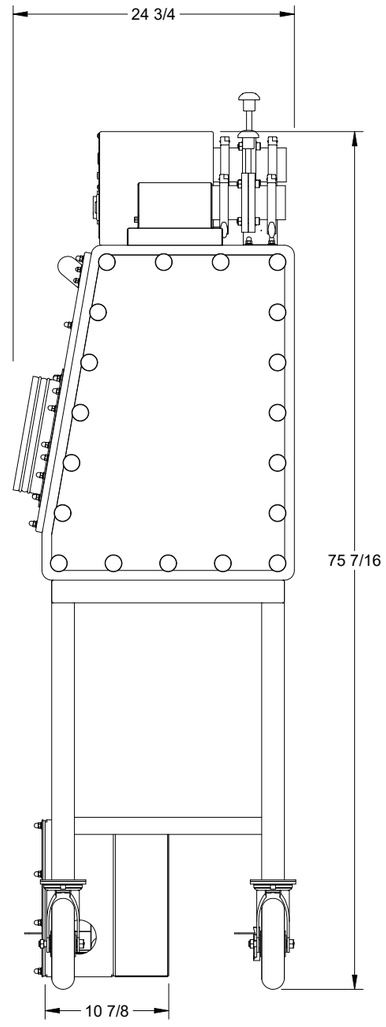
LEFT SIDE



SECTION A-A



FRONT VIEW



RIGHT SIDE

UNLESS OTHERWISE SPECIFIED: TOLERANCES ARE: .XX = ±.03 .XXX = ±.010 FRACTIONS = ±1/16 ANGLES = ±.5°	SIGNATURES	DATE	Germfree Laboratories
	DRAFTER: M.PACE	d mmm yyyy	
	ENG/DGNR: M.PACE	d mmm yyyy	SEA-III 2 GLOVE MODEL
	CHECKER: B.SERLE	d mmm yyyy	
	APPROVAL: J.SERLE	d mmm yyyy	DRAWING NO: XXX-XXXX-XX REV: A
DIMENSIONS ARE IN INCHES. DO NOT SCALE DRAWING.	THIS PRINT IS PROVIDED ON A RESTRICTED BASIS AND IS NOT TO BE USED IN ANY WAY DETRIMENTAL TO THE INTERESTS OF GERMFREE LABORATORIES		W.O: XXXXXX PROJECT: PXXXXXXX SCALE: N/A SHEET NAME: DETAILS SHEET: 2 of 2

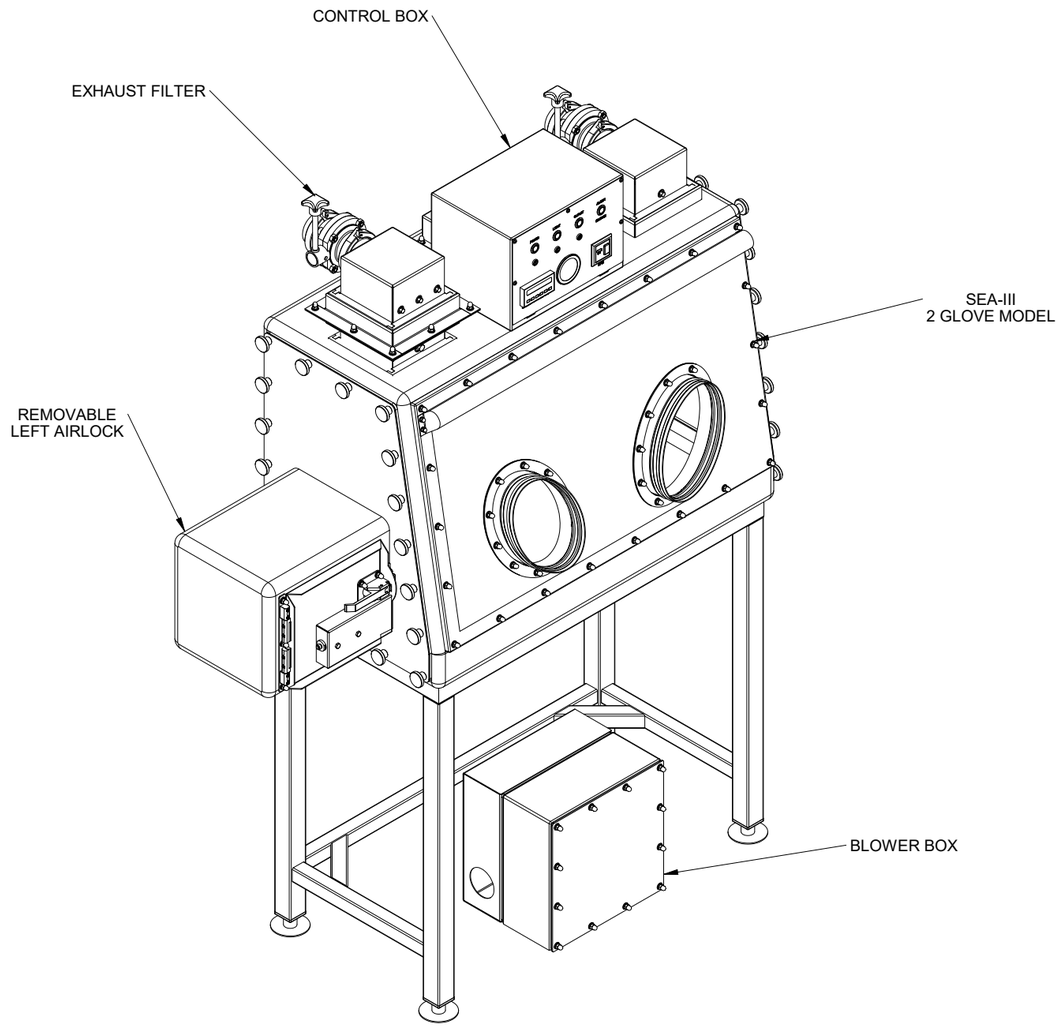
P:\Standard Products\Equipment\SEA-3 (2 GLOVE)\SEA-3 (2 Glove, Left Airlock) (Casters)\Engineering\2D\Mechanical\SEA-3 (2 Glove, Left Airlock, Casters).dft

Germfree

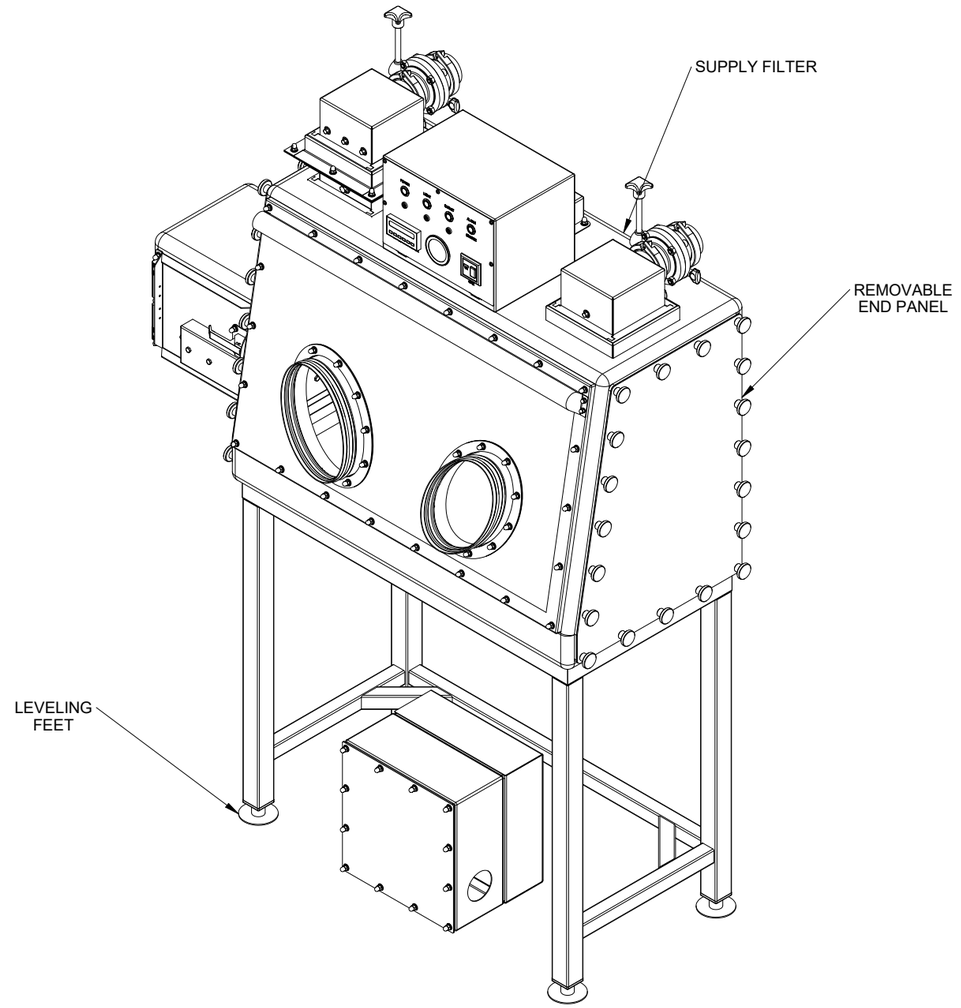
SEA-3 (2 Glove, Left Airlock)

NOTE:
1. DO NOT SCALE DRAWING
2. BREAK ALL SHARP EDGES
3. MARK GERMFREE PART NO./REV. ON ALL PARTS
4. WELD ALL JOINTS .13 FILLET
5. ALL WELDS GROUND AND POLISHED
6. REMOVE ALL WELD DISCOLORATION
7. DIMENSIONS IN PARENTHESIS "( )" ARE FOR REFERENCE
8. FLAT PATTERN DIMENSION DATA USE (.DXF) ELECTRONIC FILE

REVISIONS						
REV	DESCRIPTION	DATE	DGNR	DRFTR	CHKR	APRV
A	INITIAL RELEASE	d mmm yyyy	MSP	MSP	BAS	JQS



LEFT ISO VIEW



RIGHT ISO VIEW

UNLESS OTHERWISE SPECIFIED:
TOLERANCES ARE:
.XX = ±.03
.XXX = ±.010
FRACTIONS = ±1/16
ANGLES = ±.5°

DIMENSIONS ARE IN INCHES.
DO NOT SCALE DRAWING.

SIGNATURES		DATE
DRAFTER:	M.PACE	d mmm yyyy
ENG/DGNR:	M.PACE	d mmm yyyy
CHECKER:	B.SERLE	d mmm yyyy
APPROVAL:	J.SERLE	d mmm yyyy

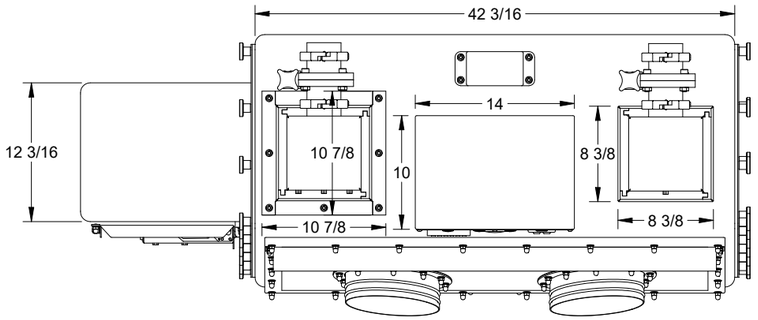
Germfree Laboratories

SEA-III
2 GLOVE MODEL

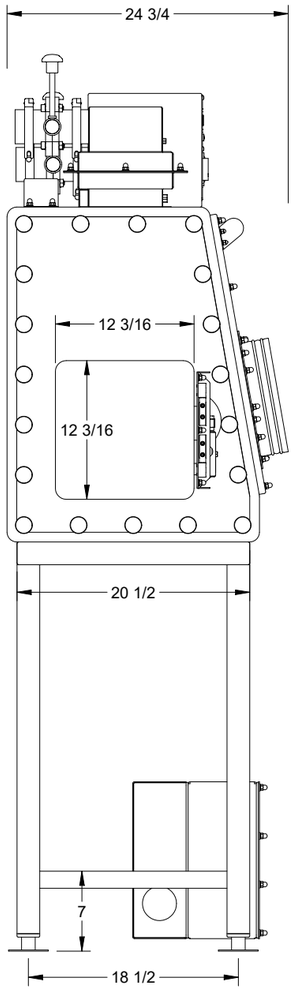
DRAWING NO:	REV:
XXX-XXXX-XX	A

W.O:	PROJECT:	SCALE:	SHEET NAME:	SHEET:
XXXXXX	PXXXXXXX	N/A	OVERVIEW	1 of 2

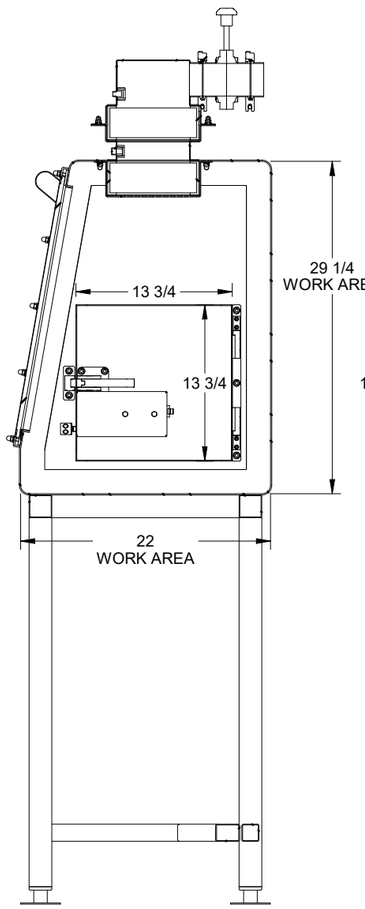
P:\Standard Products\Equipment\SEA-3 (2 GLOVE)\SEA-3 (2 Glove, Left Airlock) (Feet)\Engineering\2D\Mechanical\SEA-3 (2Glove, Left Airlock, Feet).dft



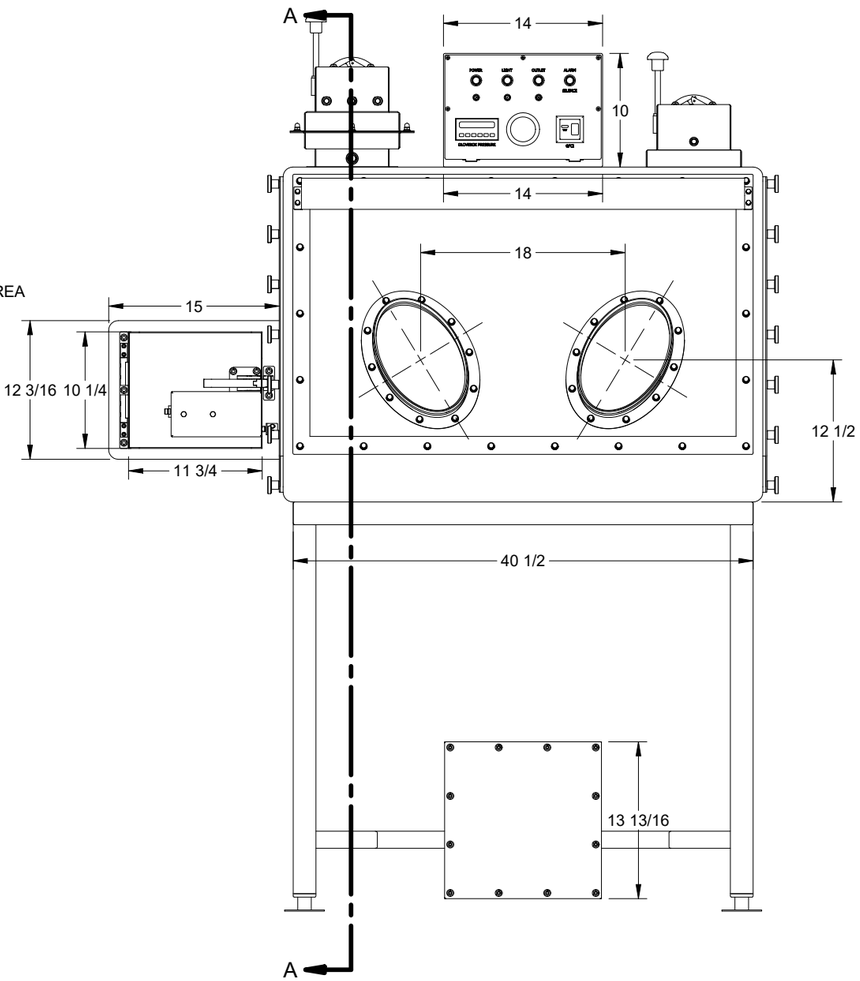
TOP VIEW



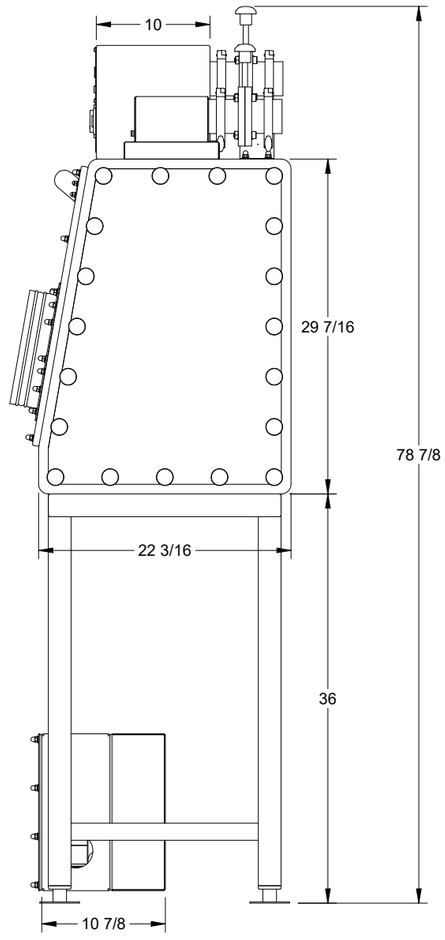
LEFT SIDE



SECTION A-A



FRONT VIEW



RIGHT SIDE

UNLESS OTHERWISE SPECIFIED: TOLERANCES ARE: .XX = ±.03 .XXX = ±.010 FRACTIONS = ±1/16 ANGLES = ±.5°	SIGNATURES	DATE	Germfree Laboratories
	DRAFTER: M.PACE	d mmm yyyy	
	ENG/DGNR: M.PACE	d mmm yyyy	SEA-III 2 GLOVE MODEL
	CHECKER: B.SERLE	d mmm yyyy	
	APPROVAL: J.SERLE	d mmm yyyy	DRAWING NO: XXX-XXXX-XX REV: A
DIMENSIONS ARE IN INCHES. DO NOT SCALE DRAWING.	THIS PRINT IS PROVIDED ON A RESTRICTED BASIS AND IS NOT TO BE USED IN ANY WAY DETRIMENTAL TO THE INTERESTS OF GERMFREE LABORATORIES		W.O: XXXXXX PROJECT: PXXXXXXX SCALE: N/A SHEET NAME: DETAILS SHEET: 2 of 2

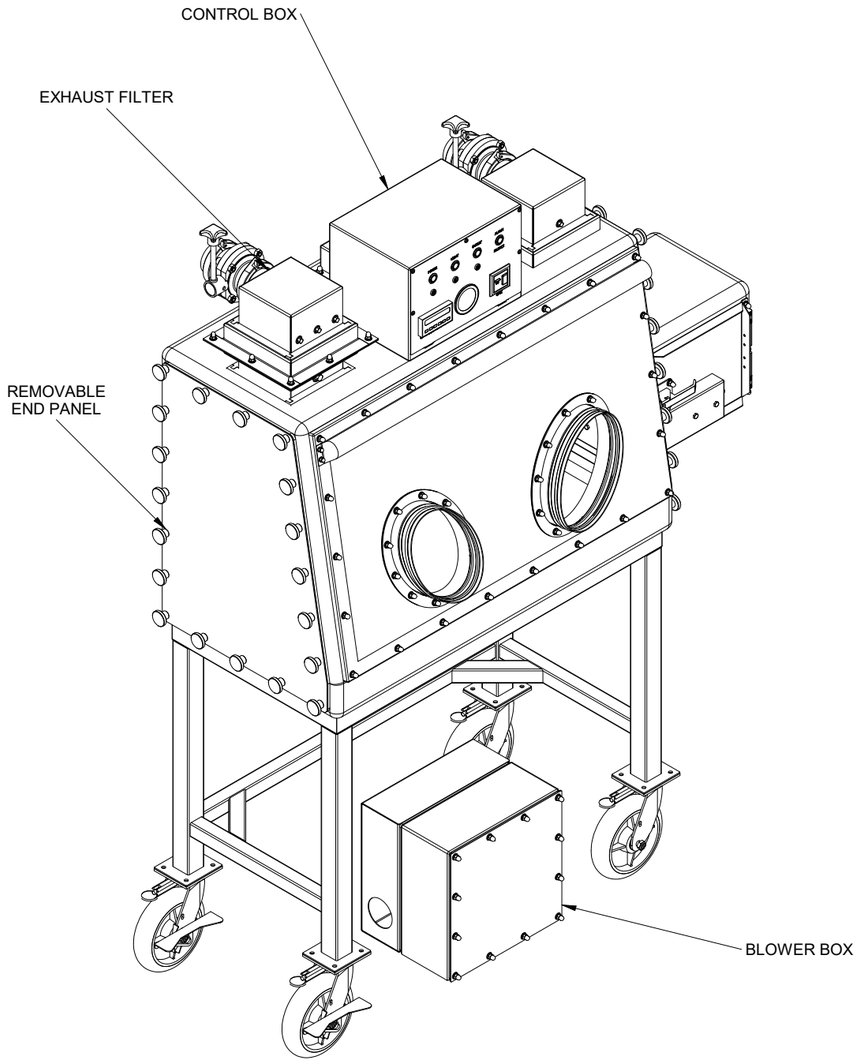
P:\Standard Products\Equipment\SEA-3 (2 GLOVE)\SEA-3 (2 Glove, Left Airlock) (Feet)\Engineering\2D\Mechanical\SEA-3 (2Glove, Left Airlock, Feet).dft

Germfree

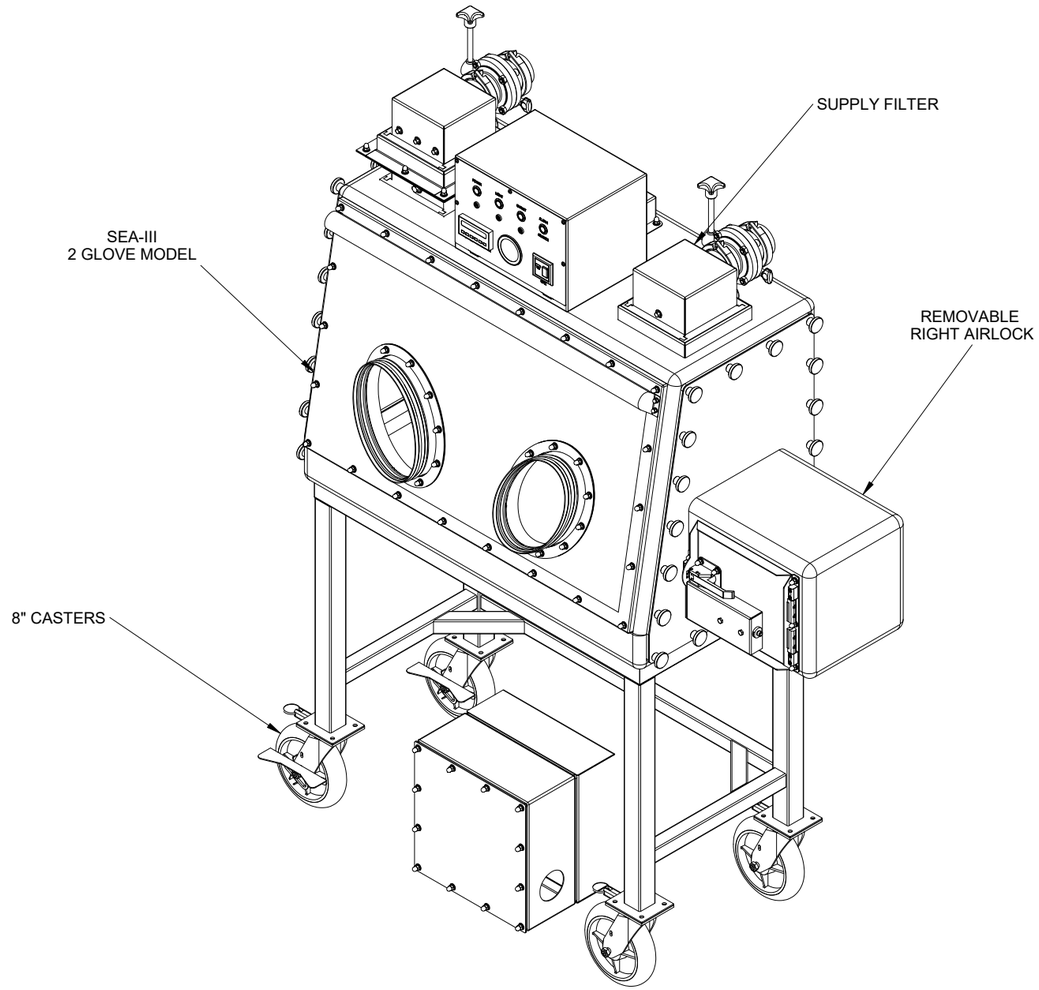
SEA-3 (2 Glove, Right Airlock, Casters)

NOTE:
1. DO NOT SCALE DRAWING
2. BREAK ALL SHARP EDGES
3. MARK GERMFREE PART NO./REV. ON ALL PARTS
4. WELD ALL JOINTS .13 FILLET
5. ALL WELDS GROUND AND POLISHED
6. REMOVE ALL WELD DISCOLORATION
7. DIMENSIONS IN PARENTHESIS "( )" ARE FOR REFERENCE
8. FLAT PATTERN DIMENSION DATA USE (.DXF) ELECTRONIC FILE

REVISIONS						
REV	DESCRIPTION	DATE	DGNR	DRFTR	CHKR	APRV
A	INITIAL RELEASE	d mmm yyyy	MSP	MSP	BAS	JQS



LEFT ISO VIEW



RIGHT ISO VIEW

UNLESS OTHERWISE SPECIFIED: TOLERANCES ARE: XX = ±.03 XXX = ±.010 FRACTIONS = ±1/16 ANGLES = ±.5°	SIGNATURES	DATE
	DRAFTER: M.PACE	d mmm yyyy
	ENG/DGNR: M.PACE	d mmm yyyy
	CHECKER: B.SERLE	d mmm yyyy
DIMENSIONS ARE IN INCHES. DO NOT SCALE DRAWING.	APPROVAL: J.SERLE	d mmm yyyy

Germfree Laboratories

SEA-III
2 GLOVE MODEL

DRAWING NO:	REV:
XXX-XXXX-XX	A

W.O:	PROJECT:	SCALE:	SHEET NAME:	SHEET:
XXXXXX	PXXXXXXX	N/A	OVERVIEW	1 of 2

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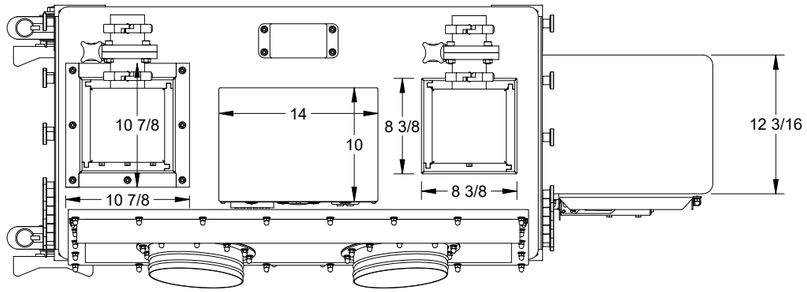
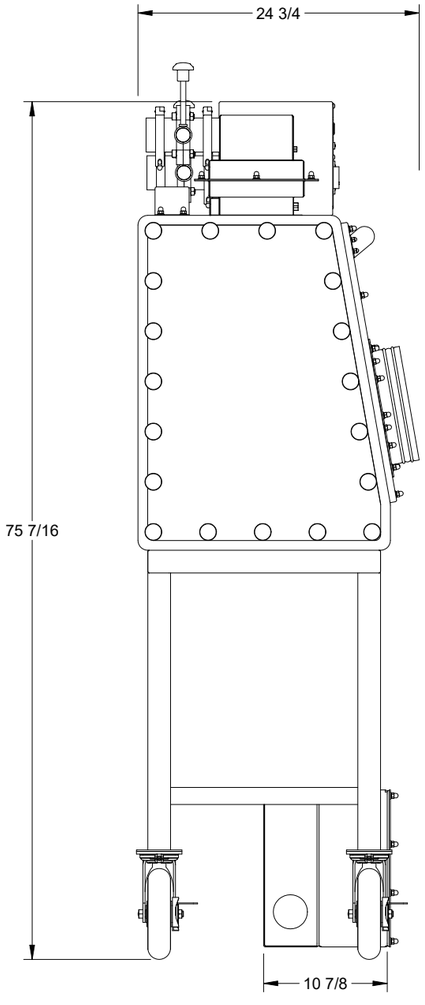
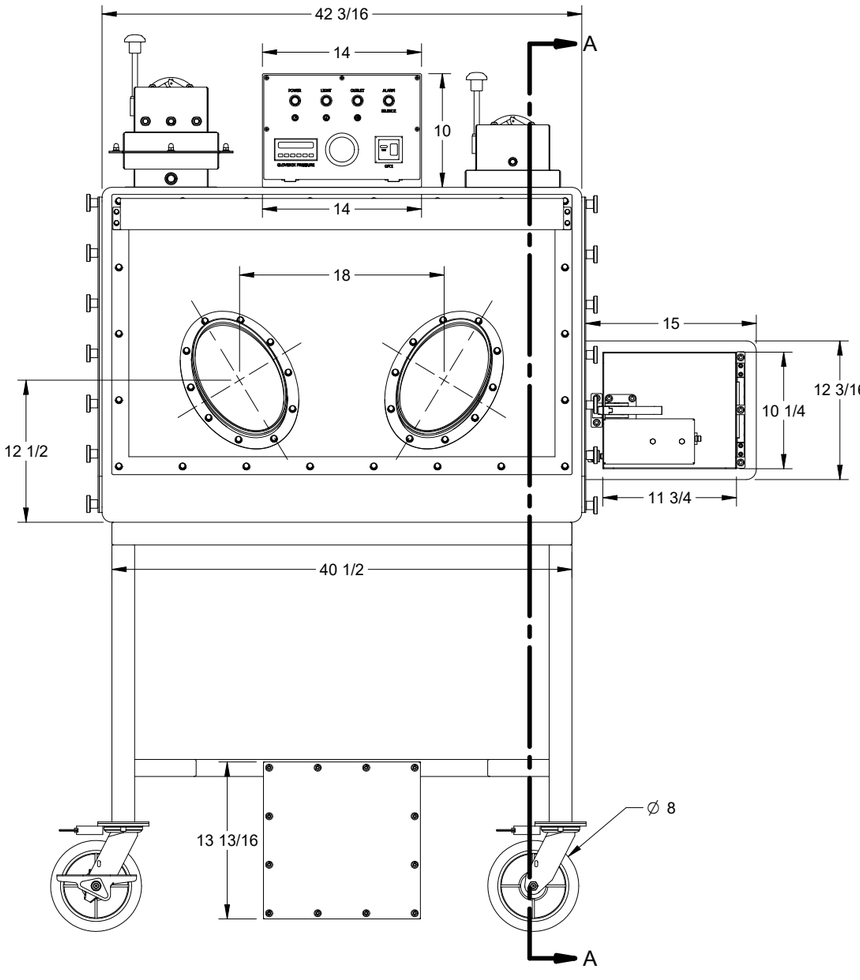


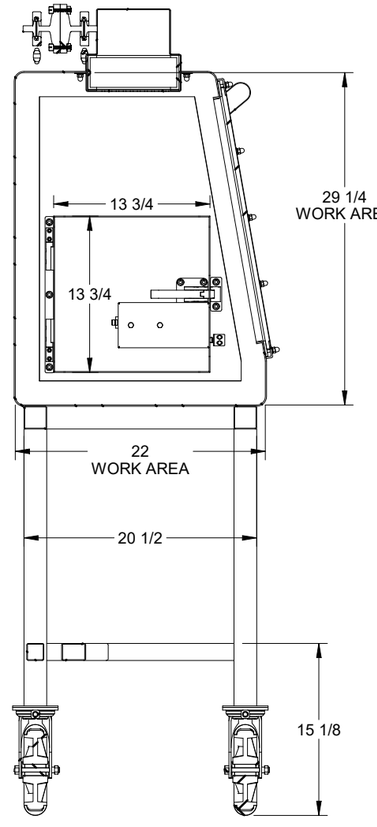
TOP VIEW



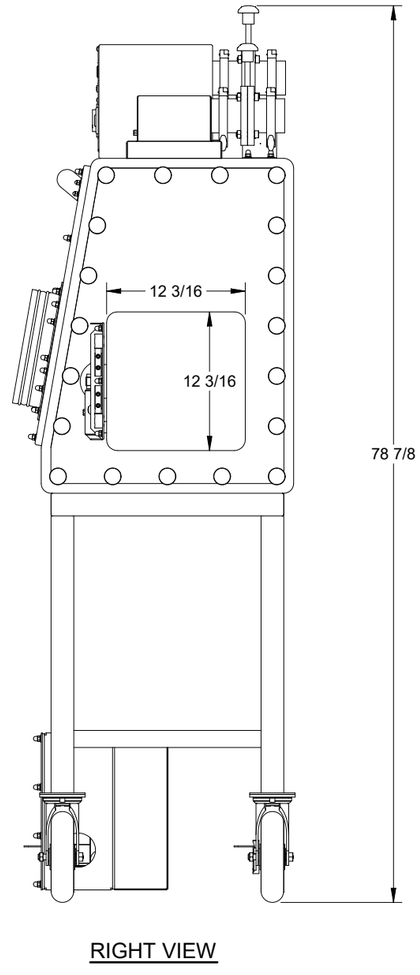
LEFT VIEW



FRONT VIEW



SECTION A-A



RIGHT VIEW

UNLESS OTHERWISE SPECIFIED: TOLERANCES ARE: .XX = ±.03 .XXX = ±.010 FRACTIONS = ±1/16 ANGLES = ±.5°	SIGNATURES	DATE	Germfree Laboratories
	DRAFTER: M.PACE	d mmm yyyy	
	ENG/DGNR: M.PACE	d mmm yyyy	
	CHECKER: B.SERLE	d mmm yyyy	SEA-III 2 GLOVE MODEL
	APPROVAL: J.SERLE	d mmm yyyy	DRAWING NO: XXX-XXXX-XX REV: A
DIMENSIONS ARE IN INCHES. DO NOT SCALE DRAWING.	THIS PRINT IS PROVIDED ON A RESTRICTED BASIS AND IS NOT TO BE USED IN ANY WAY DETRIMENTAL TO THE INTERESTS OF GERMFREE LABORATORIES.		W.O: XXXXXX PROJECT: PXXXXXXX SCALE: N/A SHEET NAME: DETAILS SHEET: 2 of 2

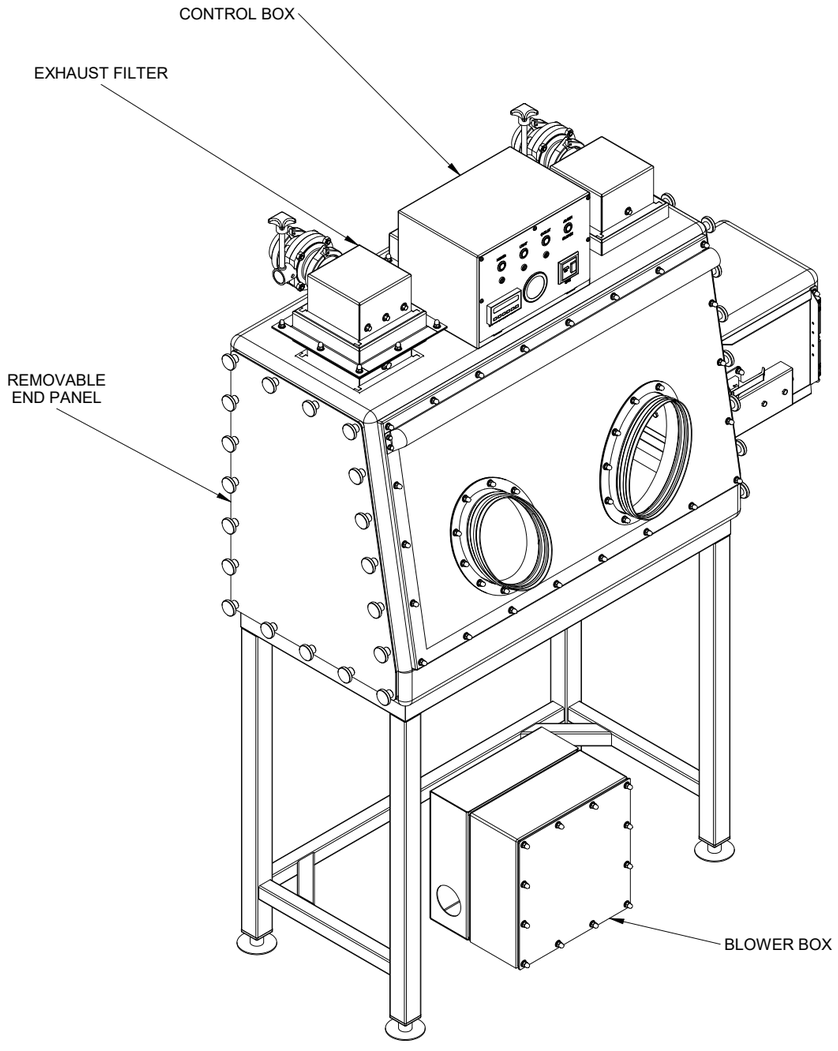
P:\Standard Products\Equipment\SEA-3 (2 GLOVE)\SEA-3 (2 Glove, Right Airlock) (Casters)\Engineering\2D\Mechanical\SEA-3 (2 Glove, Right Airlock, Casters).dft

Germfree

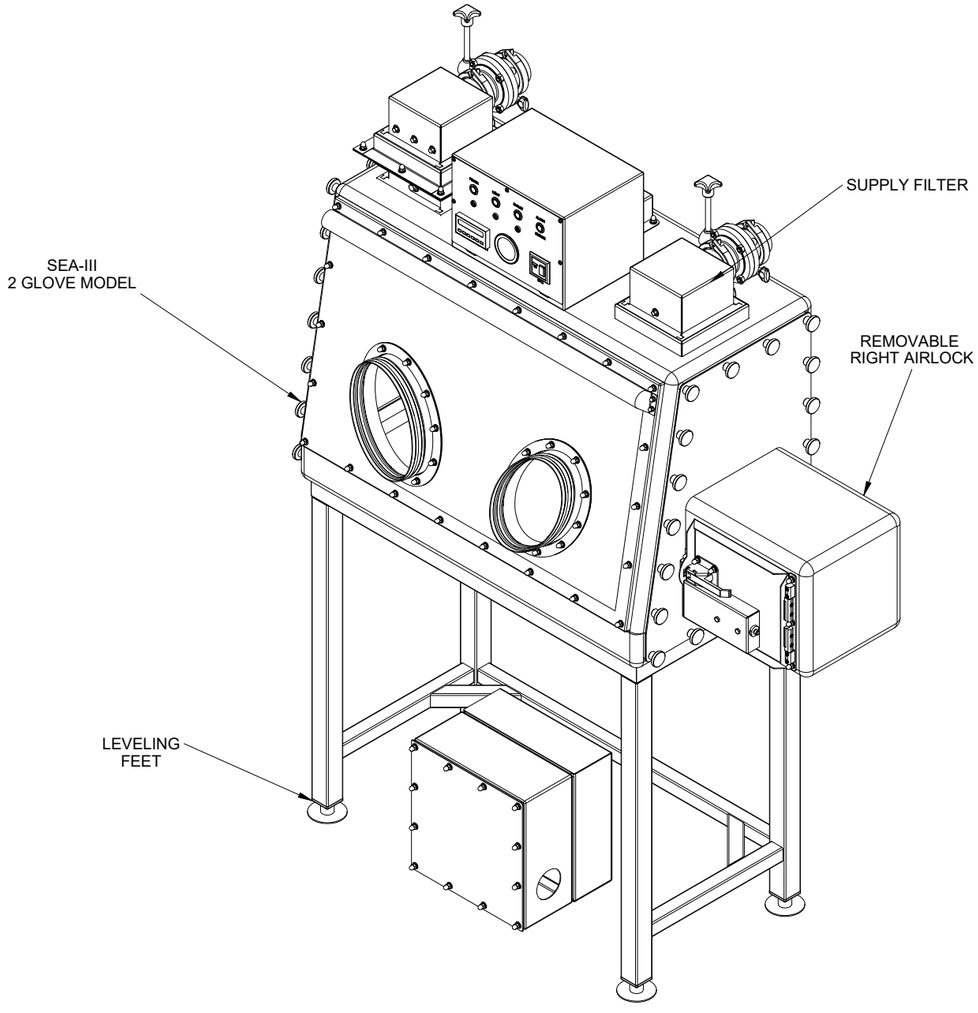
SEA-3 (2 Glove, Right Airlock)

NOTE:
1. DO NOT SCALE DRAWING
2. BREAK ALL SHARP EDGES
3. MARK GERMFREE PART NO./REV. ON ALL PARTS
4. WELD ALL JOINTS .13 FILLET
5. ALL WELDS GROUND AND POLISHED
6. REMOVE ALL WELD DISCOLORATION
7. DIMENSIONS IN PARENTHESIS "( )" ARE FOR REFERENCE
8. FLAT PATTERN DIMENSION DATA USE (.DXF) ELECTRONIC FILE

REVISIONS						
REV	DESCRIPTION	DATE	DGNR	DRFTR	CHKR	APRV
-	INITIAL RELEASE	d mmm yyyy	MSP	MSP	BAS	JQS



LEFT ISO VIEW



RIGHT ISO VIEW

UNLESS OTHERWISE SPECIFIED:
TOLERANCES ARE:
.XX = ±.03
.XXX = ±.010
FRACTIONS = ±1/16
ANGLES = ±.5°

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DO NOT SCALE DRAWING.

SIGNATURES		DATE
DRAFTER:	M.PACE	d mmm yyyy
ENG/DGNR:	M.PACE	d mmm yyyy
CHECKER:	B.SERLE	d mmm yyyy
APPROVAL:	J.SERLE	d mmm yyyy

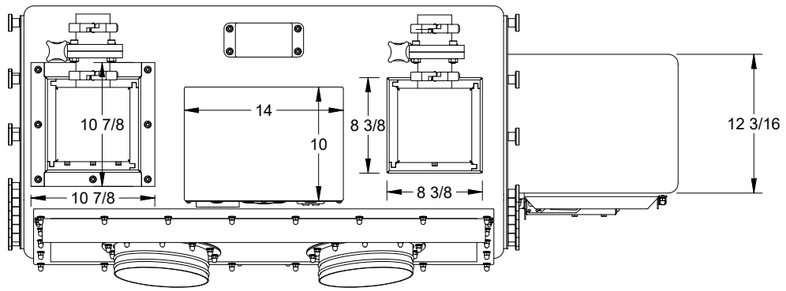
Germfree Laboratories

SEA-III
2 GLOVE MODEL

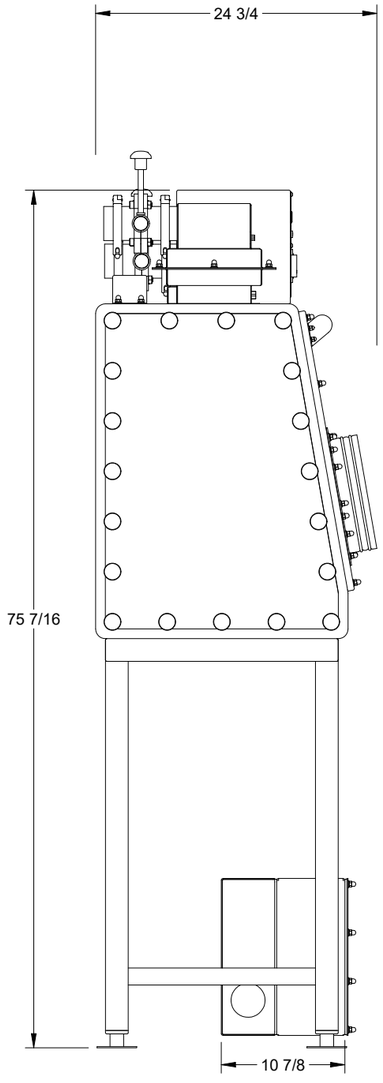
DRAWING NO:	REV:
XXX-XXXX-XX	A

W.O:	PROJECT:	SCALE:	SHEET NAME:	SHEET:
XXXXXX	PXXXXXXX	N/A	OVERVIEW	1 of 2

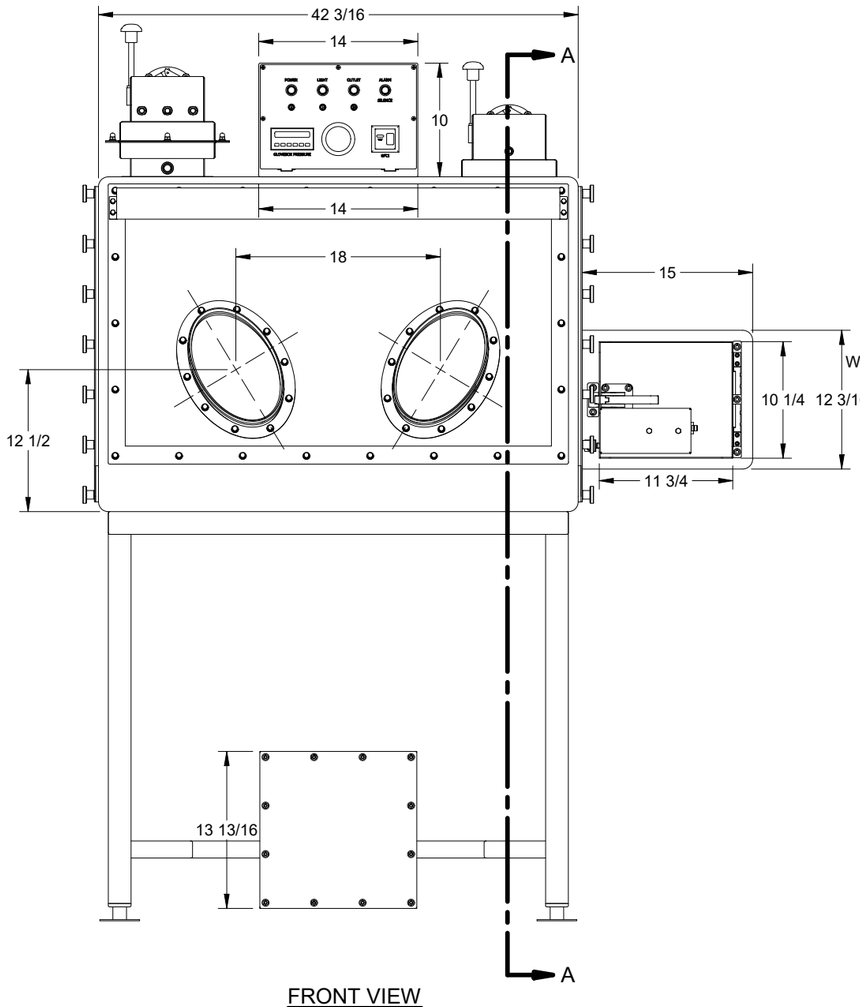
P:\Standard Products\Equipment\SEA-3 (2 GLOVE)\SEA-3 (2 Glove, Right Airlock) (Feet)\Engineering\2D\Mechanical\SEA-3 (2 Glove, Right Airlock, Feet).dft



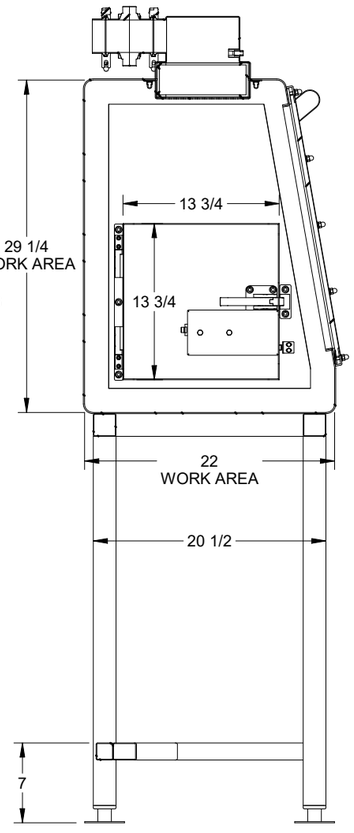
TOP VIEW



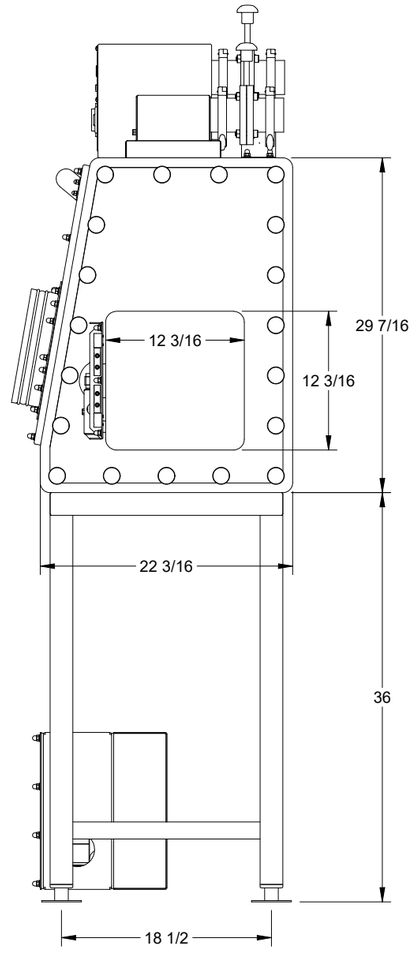
LEFT VIEW



FRONT VIEW



SECTION A-A



RIGHT VIEW

UNLESS OTHERWISE SPECIFIED: TOLERANCES ARE: .XX = ±.03 .XXX = ±.010 FRACTIONS = ±1/16 ANGLES = ±.5°	SIGNATURES	DATE	Germfree Laboratories
DIMENSIONS ARE IN INCHES. DO NOT SCALE DRAWING.	DRAFTER: M.PACE	d mmm yyyy	SEA-III 2 GLOVE MODEL
	ENG/DGNR: M.PACE	d mmm yyyy	
	CHECKER: B.SERLE	d mmm yyyy	
	APPROVAL: J.SERLE	d mmm yyyy	DRAWING NO: XXX-XXXX-XX REV: A
THIS PRINT IS PROVIDED ON A RESTRICTED BASIS AND IS NOT TO BE USED IN ANY WAY DETRIMENTAL TO THE INTERESTS OF GERMFREE LABORATORIES			W.O: XXXXXX PROJECT: PXXXXXXX SCALE: N/A SHEET NAME: DETAILS SHEET: 2 of 2

P:\Standard Products\Equipment\SEA-3 (2 GLOVE)\SEA-3 (2 Glove, Right Airlock) (Feet)\Engineering\2D\Mechanical\SEA-3 (2 Glove, Right Airlock, Feet).dft

Germfree

SEA-4 (3 Glove, Left Airlock, Casters)

NOTE:
1. DO NOT SCALE DRAWING
2. BREAK ALL SHARP EDGES
3. MARK GERMFREE PART NO./REV. ON ALL PARTS
4. WELD ALL JOINTS .13 FILLET
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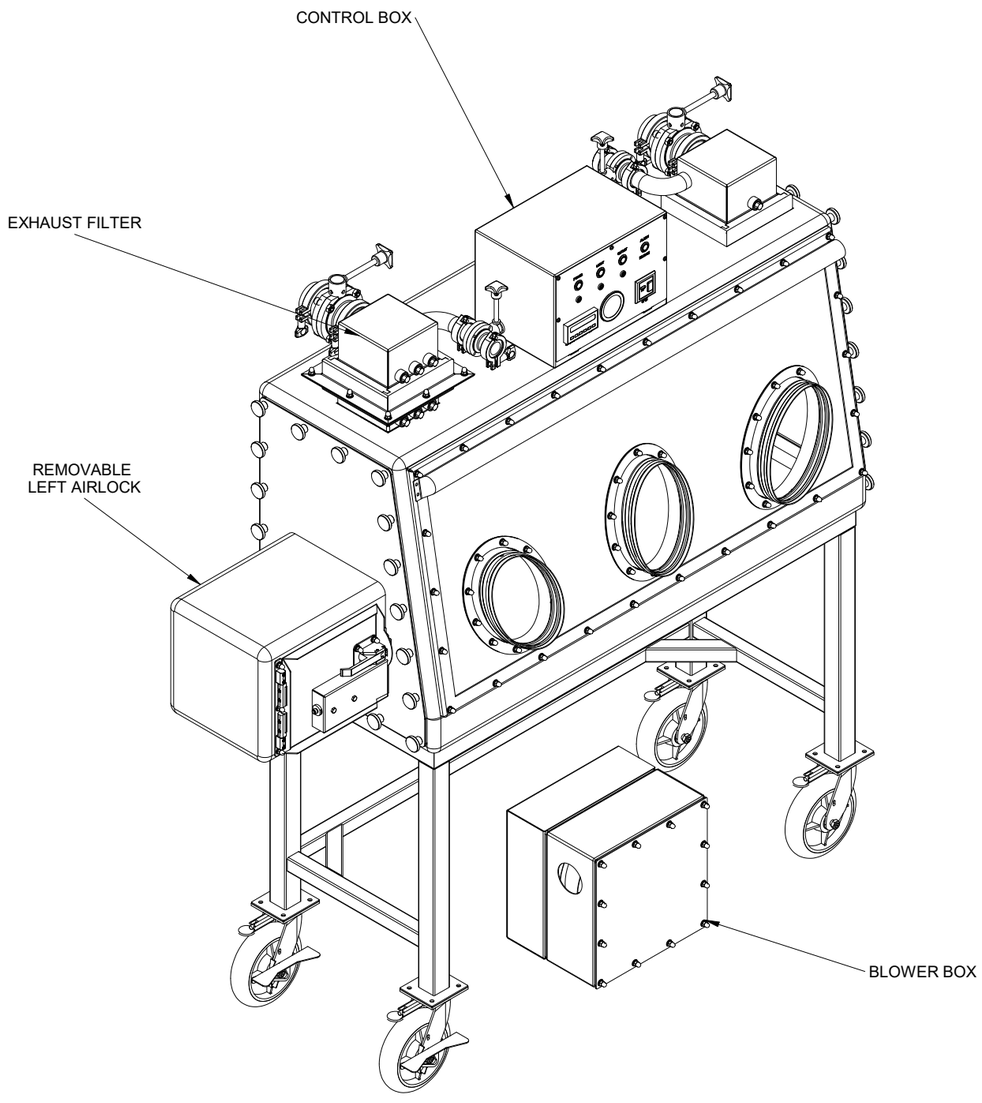
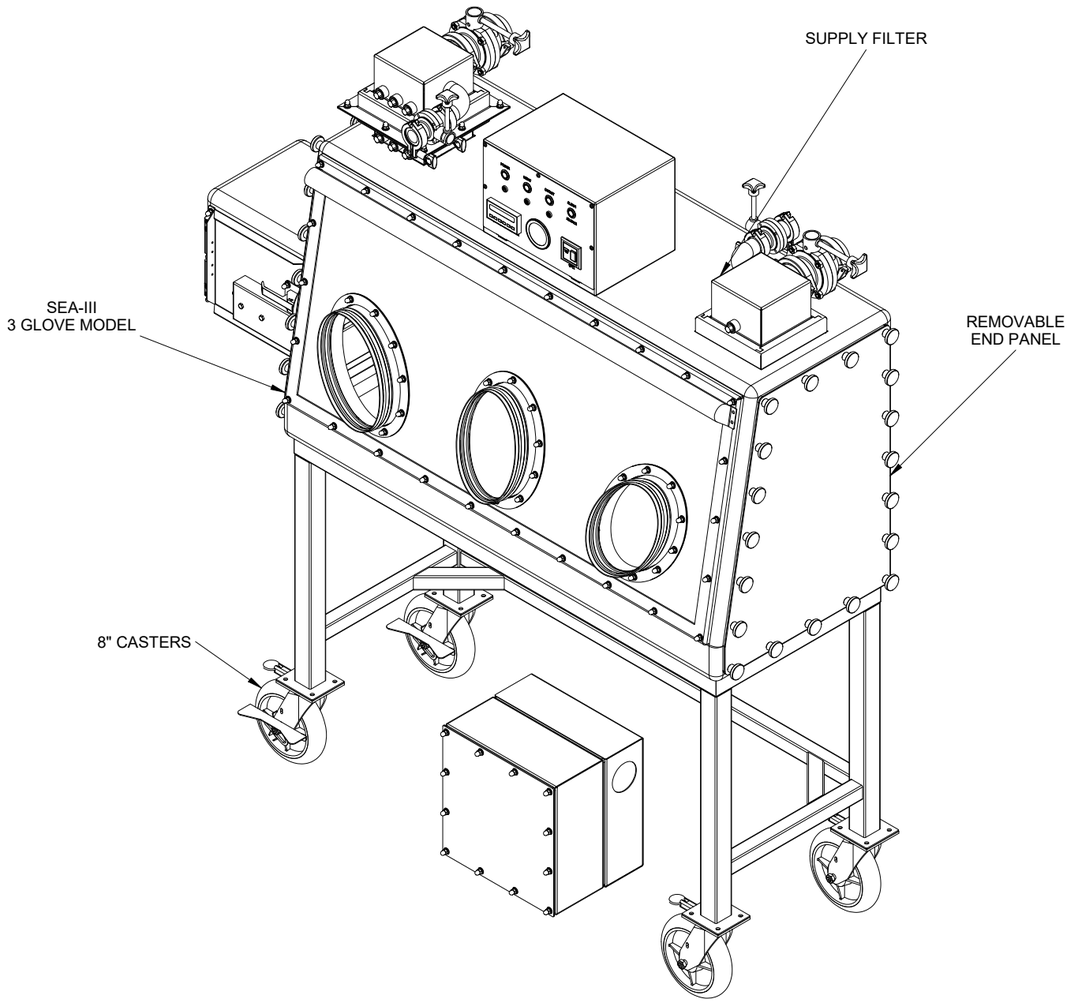
REVISIONS						
REV	DESCRIPTION	DATE	DGNR	DRFTR	CHKR	APRV
-	INITIAL RELEASE	d mmm yyyy	MSP	MSP	BAS	JQS



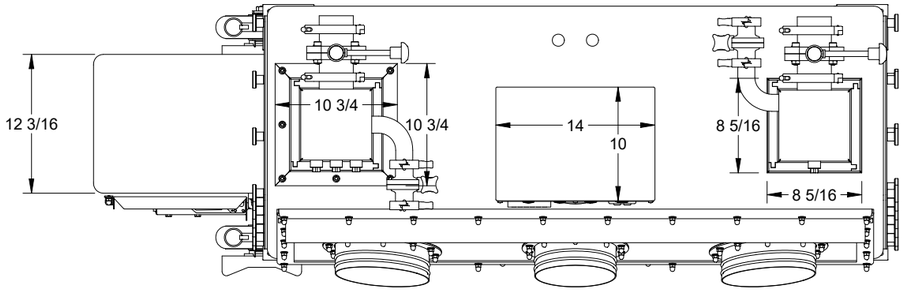
LEFT ISO VIEW



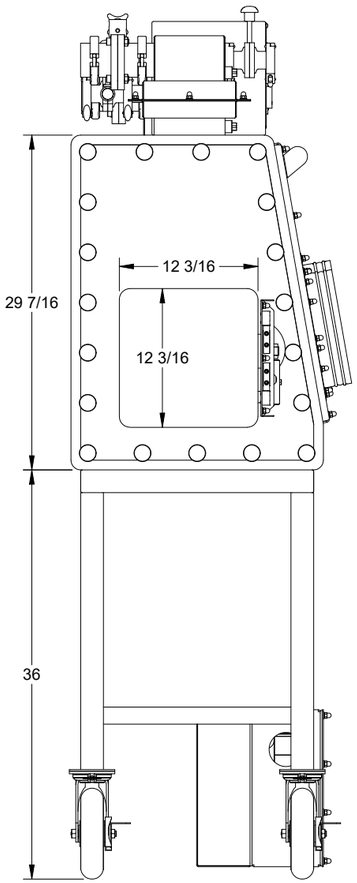
RIGHT ISO VIEW

UNLESS OTHERWISE SPECIFIED: TOLERANCES ARE: .XX = ±.03 .XXX = ±.010 FRACTIONS = ±1/16 ANGLES = ±.5°	SIGNATURES	DATE	Germfree Laboratories
DIMENSIONS ARE IN INCHES. DO NOT SCALE DRAWING.	DRAFTER: M.PACE	d mmm yyyy	SEA-III 3 GLOVE MODEL
	ENG/DGNR: M.PACE	d mmm yyyy	
	CHECKER: B.SERLE	d mmm yyyy	
	APPROVAL: J.SERLE	d mmm yyyy	DRAWING NO: XXX-XXXX-XX REV: A
THIS PRINT IS PROVIDED ON A RESTRICTED BASIS AND IS NOT TO BE USED IN ANY WAY DETRIMENTAL TO THE INTERESTS OF GERMFREE LABORATORIES			W.O: XXXXXX PROJECT: PXXXXXXX SCALE: N/A SHEET NAME: OVERVIEW SHEET: 1 of 2

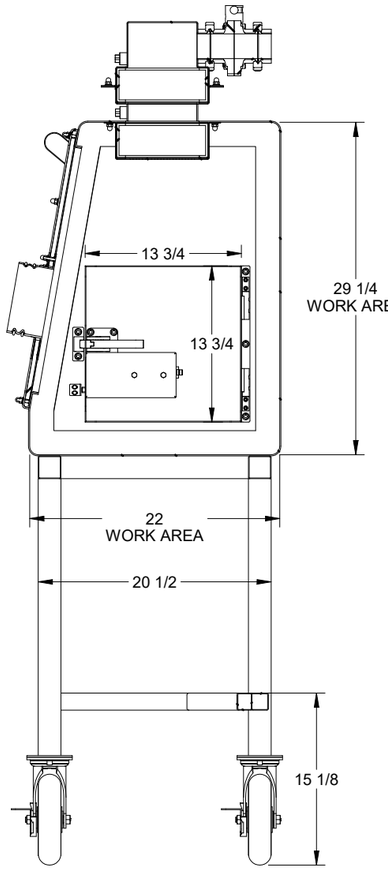
P:\Standard Products\Equipment\SEA-3 (3 GLOVE)\SEA-3 (3 Glove, Left Airlock, Casters)\Engineering\2D\Mechanical\SEA-3 (3 Glove, Left Airlock, Casters).dft



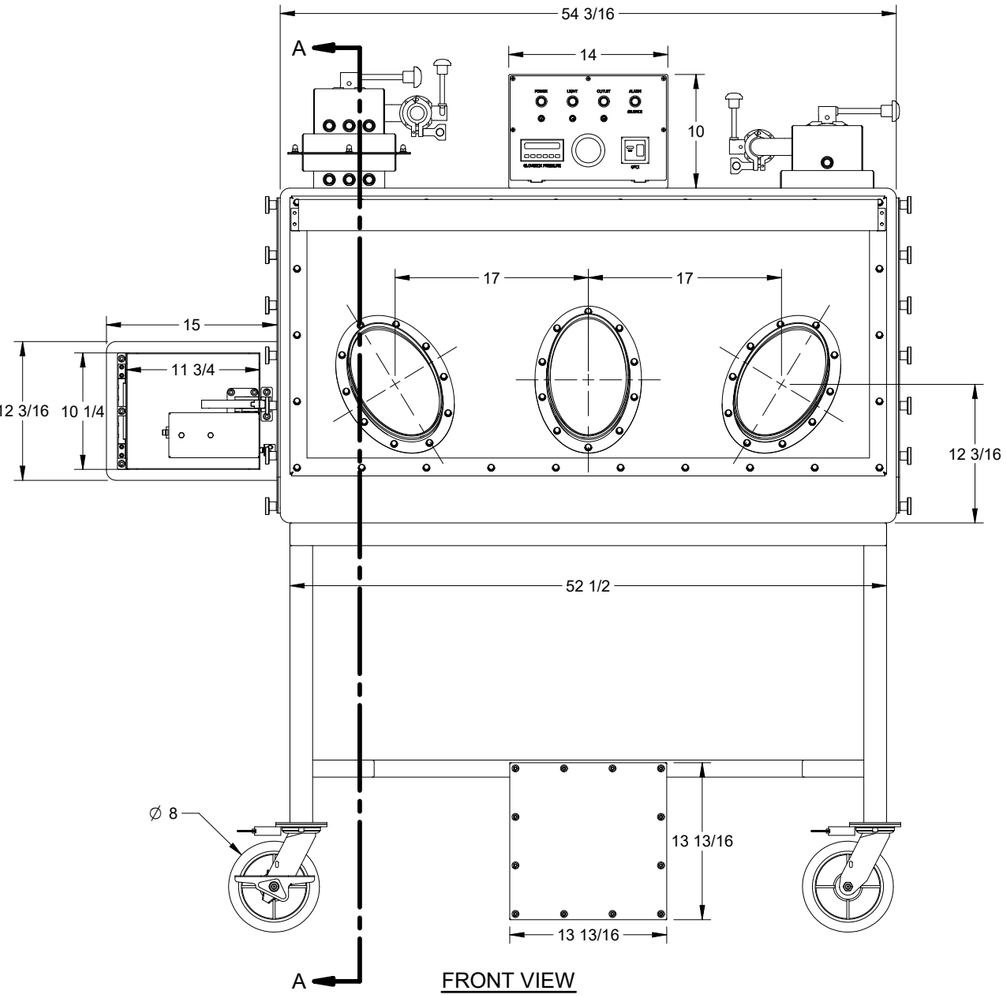
TOP VIEW



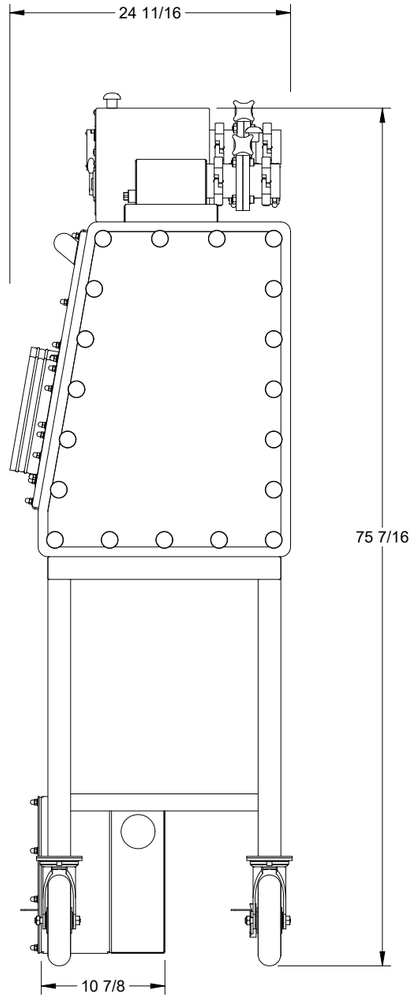
LEFT VIEW



SECTION A-A



FRONT VIEW



RIGHT VIEW

UNLESS OTHERWISE SPECIFIED: TOLERANCES ARE: XX = ±.03 XXX = ±.010 FRACTIONS = ±1/16 ANGLES = ±.5°	SIGNATURES	DATE	Germfree Laboratories
	DRAFTER: M.PACE	d mmm yyyy	SEA-III 3 GLOVE MODEL
	ENG/DGNR: M.PACE	d mmm yyyy	
	CHECKER: B.SERLE	d mmm yyyy	DRAWING NO: XXX-XXXX-XX REV: A
	APPROVAL: J.SERLE	d mmm yyyy	
DIMENSIONS ARE IN INCHES. DO NOT SCALE DRAWING.	THIS PRINT IS PROVIDED ON A RESTRICTED BASIS AND IS NOT TO BE USED IN ANY WAY DETRIMENTAL TO THE INTERESTS OF GERMFREE LABORATORIES		W.O: XXXXXX PROJECT: PXXXXXXX SCALE: N/A SHEET NAME: DETAILS SHEET: 2 of 2

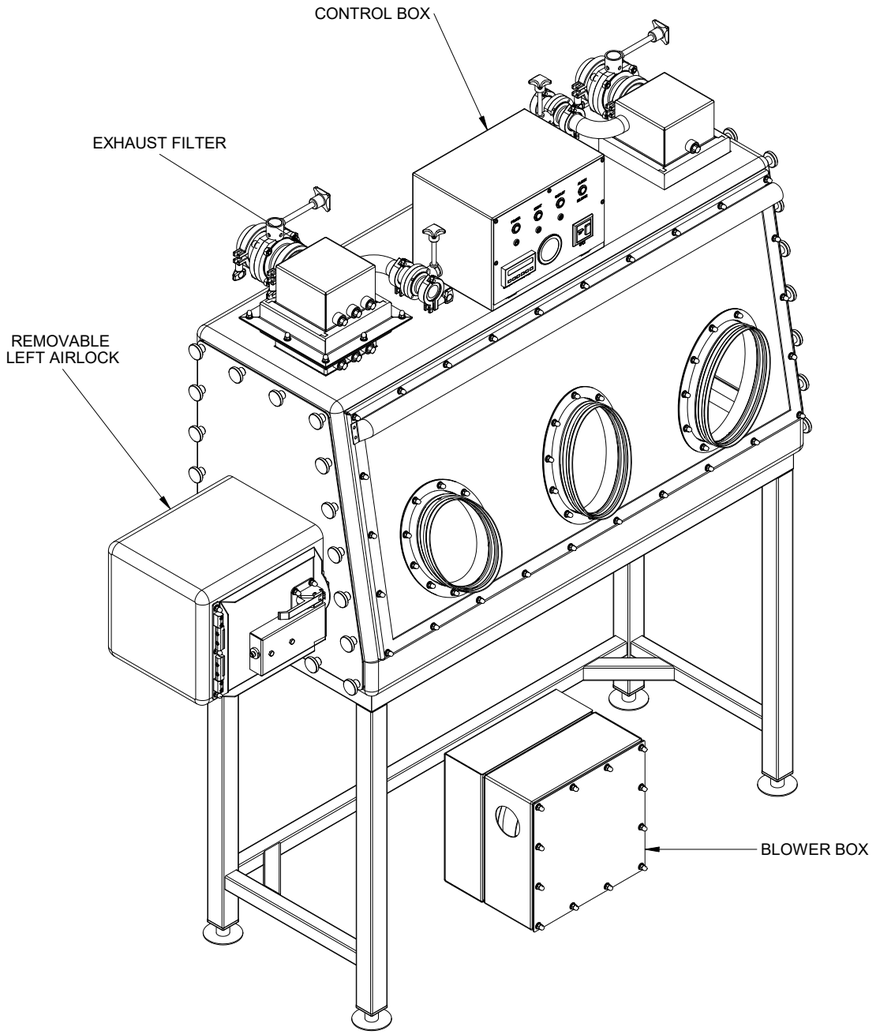
P:\Standard Products\Equipment\SEA-3 (3 GLOVE)\SEA-3 (3 Glove, Left Airlock, Casters)\Engineering\2D\Mechanical\SEA-3 (3 Glove, Left Airlock, Casters).dft

Germfree

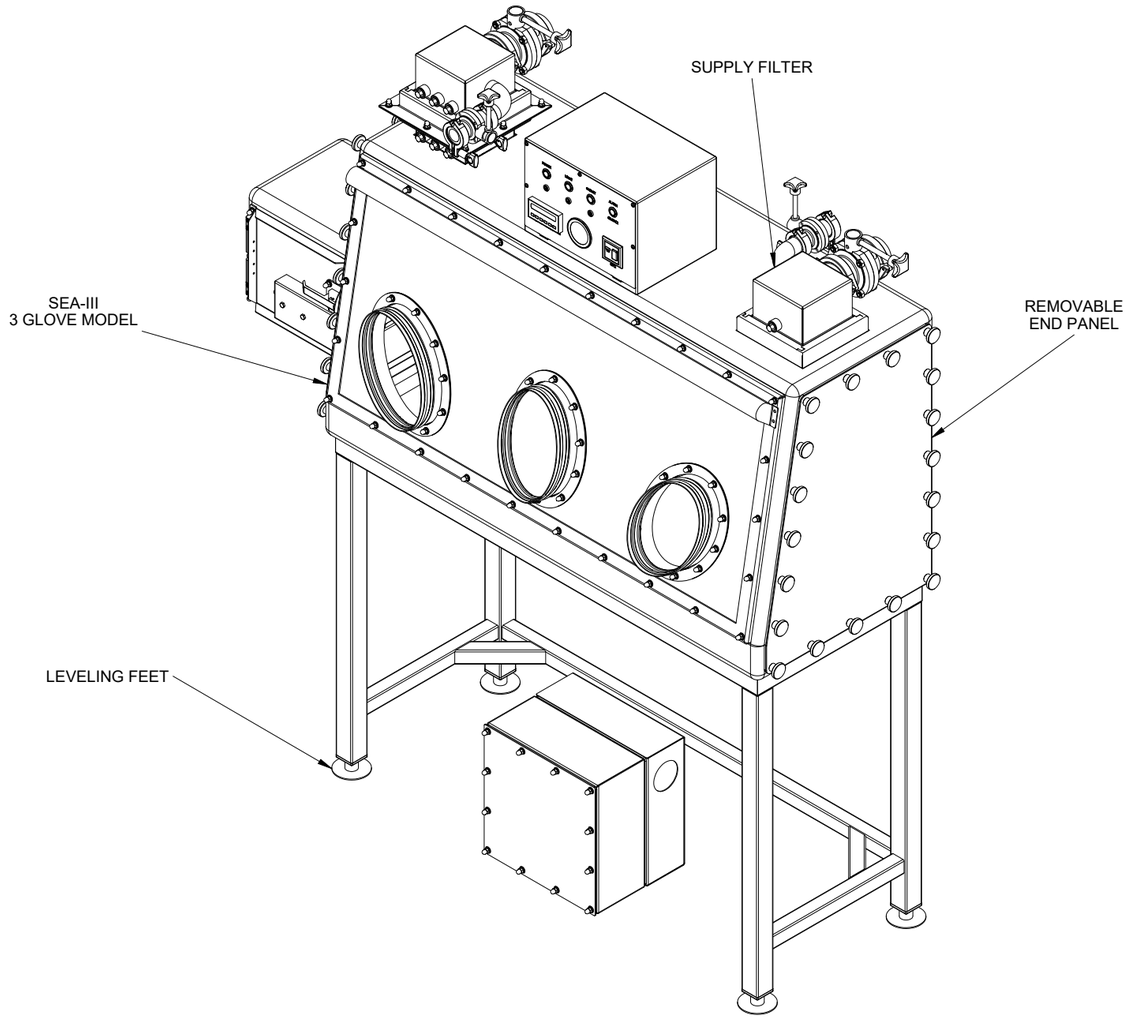
SEA-4 (3 Glove, Left Airlock)

NOTE:
1. DO NOT SCALE DRAWING
2. BREAK ALL SHARP EDGES
3. MARK GERMFREE PART NO./REV. ON ALL PARTS
4. WELD ALL JOINTS .13 FILLET
5. ALL WELDS GROUND AND POLISHED
6. REMOVE ALL WELD DISCOLORATION
7. DIMENSIONS IN PARENTHESIS "( )" ARE FOR REFERENCE
8. FLAT PATTERN DIMENSION DATA USE (.DXF) ELECTRONIC FILE

REVISIONS						
REV	DESCRIPTION	DATE	DGNR	DRFTR	CHKR	APRV
A	INITIAL RELEASE	d mmm yyyy	MSP	MSP	BAS	JQS



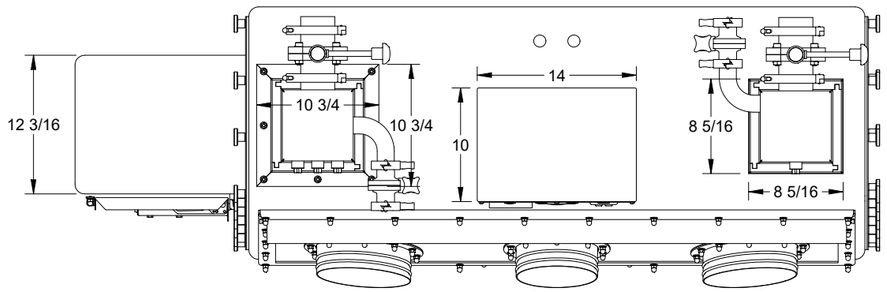
LEFT ISO VIEW



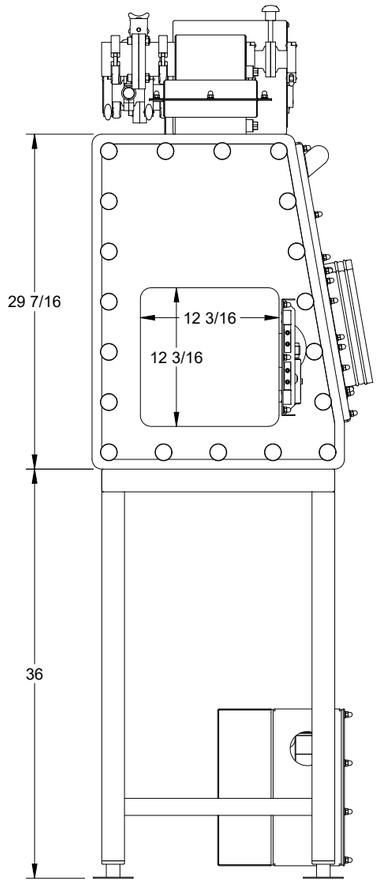
RIGHT ISO VIEW

UNLESS OTHERWISE SPECIFIED: TOLERANCES ARE: .XX = ±.03 .XXX = ±.010 FRACTIONS = ±1/16 ANGLES = ±.5"	SIGNATURES	DATE	Germfree Laboratories
	DRAFTER: M.PACE	d mmm yyyy	
	ENG/DGNR: M.PACE	d mmm yyyy	SEA-III 3 GLOVE MODEL
	CHECKER: B.SERLE	d mmm yyyy	
	APPROVAL: J.SERLE	d mmm yyyy	DRAWING NO: XXX-XXXX-XX REV: A
DIMENSIONS ARE IN INCHES. DO NOT SCALE DRAWING.	THIS PRINT IS PROVIDED ON A RESTRICTED BASIS AND IS NOT TO BE USED IN ANY WAY DETRIMENTAL TO THE INTERESTS OF GERMFREE LABORATORIES		W.O: XXXXXX PROJECT: PXXXXXXX SCALE: N/A SHEET NAME: OVERVIEW SHEET: 1 of 2

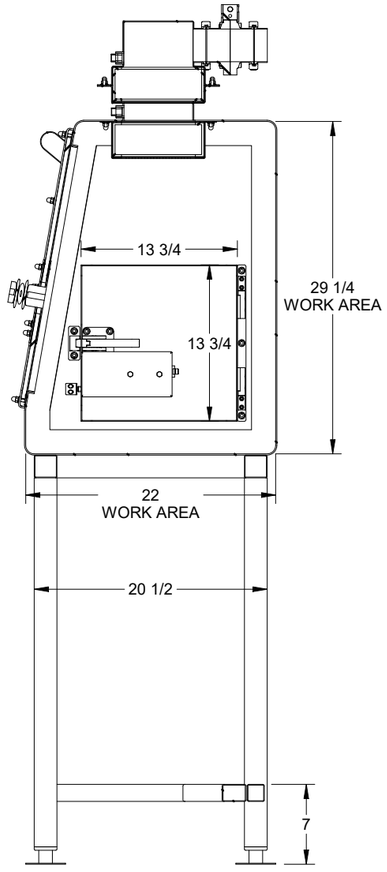
P:\Standard Products\Equipment\SEA-3 (3 GLOVE)\SEA-3 (3 Glove, Left Airlock, Feet)\Engineering\2D\Mechanical\SEA-3 (3 Glove, Left Airlock, Feet).dft



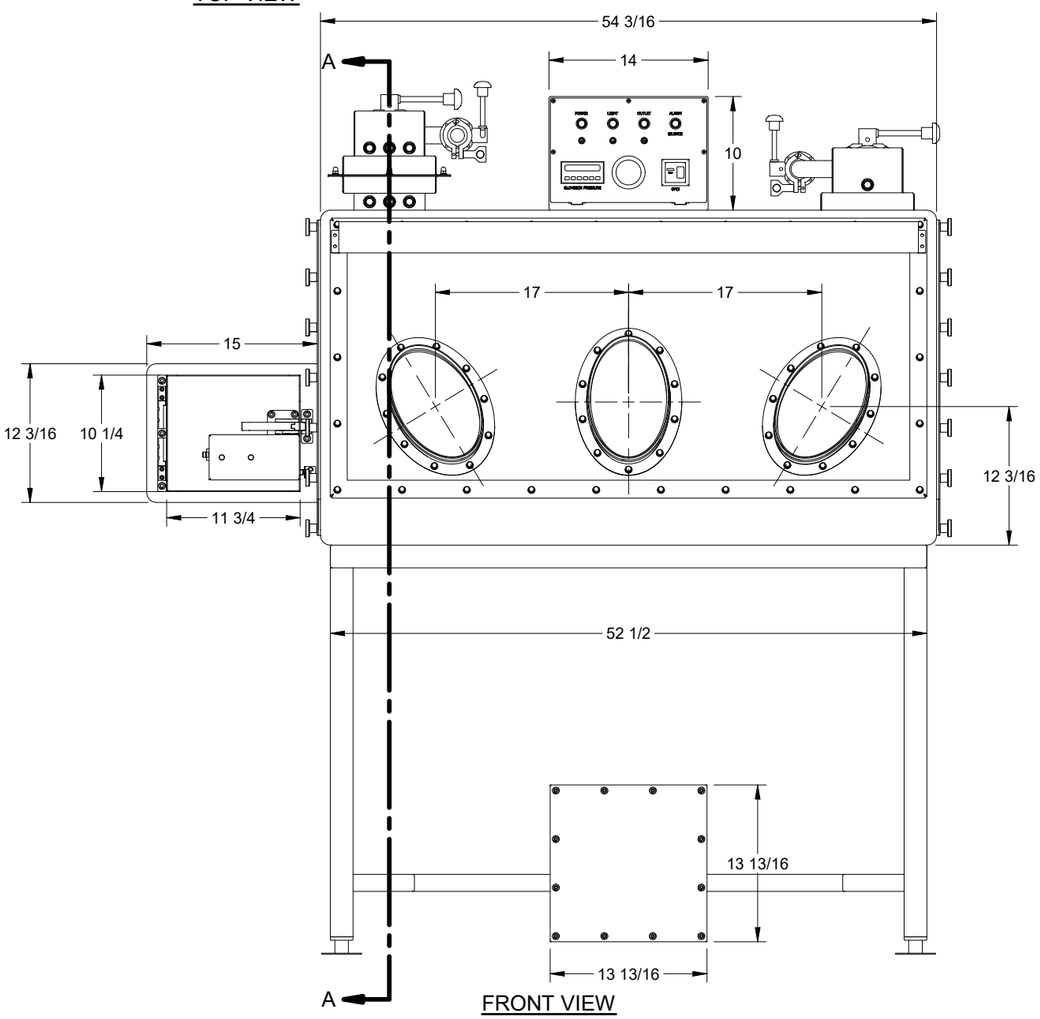
TOP VIEW



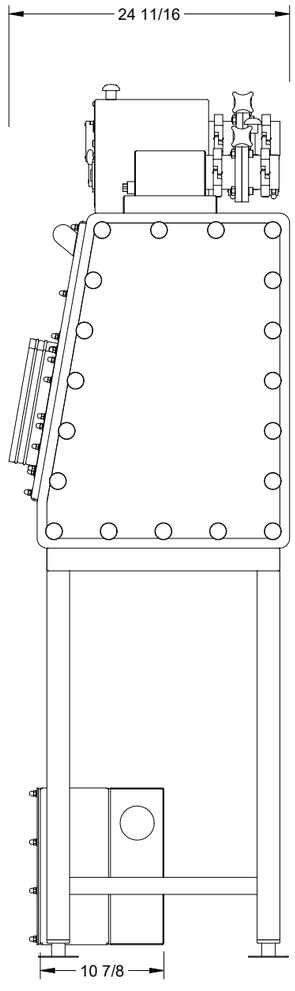
LEFT VIEW



SECTION A-A



FRONT VIEW



RIGHT VIEW

UNLESS OTHERWISE SPECIFIED: TOLERANCES ARE: .XX = ±.03 .XXX = ±.010 FRACTIONS = ±1/16 ANGLES = ±.5°	SIGNATURES	DATE
	DRAFTER: M.PACE	d mmm yyyy
	ENG/DGNR: M.PACE	d mmm yyyy
	CHECKER: B.SERLE	d mmm yyyy
	APPROVAL: J.SERLE	d mmm yyyy
DIMENSIONS ARE IN INCHES. DO NOT SCALE DRAWING.	THIS PRINT IS PROVIDED ON A RESTRICTED BASIS AND IS NOT TO BE USED IN ANY WAY DETRIMENTAL TO THE INTERESTS OF GERMFREE LABORATORIES	

Germfree Laboratories

SEA-III
3 GLOVE MODEL

DRAWING NO:	REV:
XXX-XXXX-XX	A

W.O:	PROJECT:	SCALE:	SHEET NAME:	SHEET:
XXXXXX	PXXXXXXX	N/A	DETAILS	2 of 2

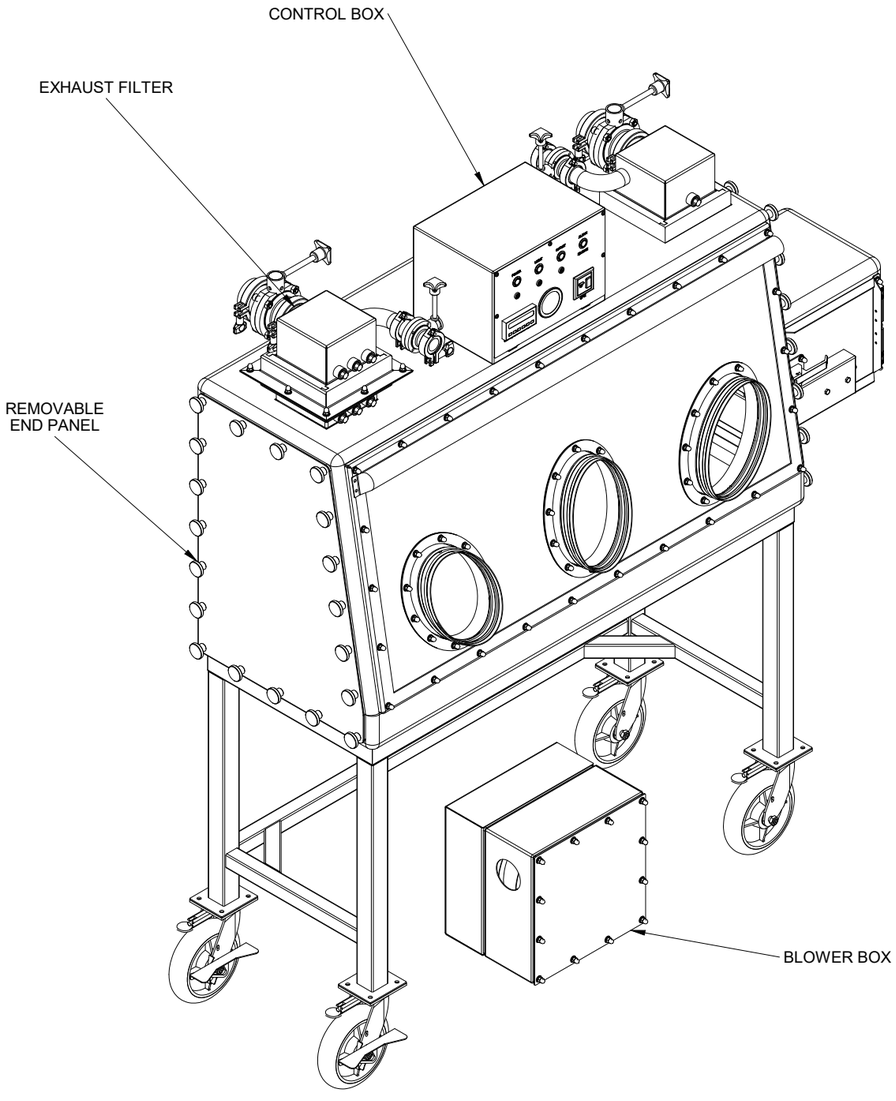
P:\Standard Products\Equipment\SEA-3 (3 GLOVE)\SEA-3 (3 Glove, Left Airlock, Feet)\Engineering\2D\Mechanical\SEA-3 (3 Glove, Left Airlock, Feet).dft

Germfree

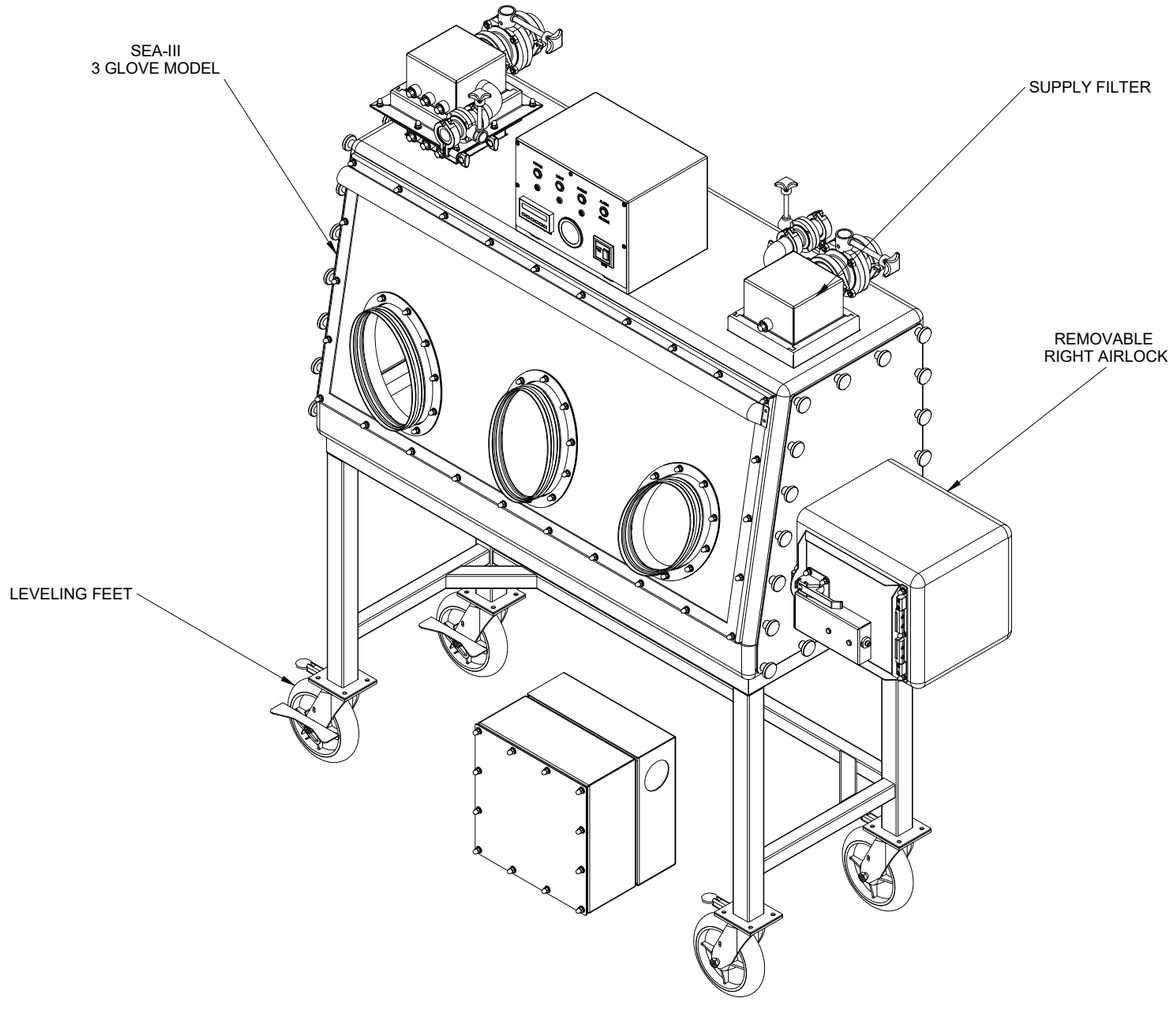
SEA-4 (3 Glove, Right Airlock, Casters)

NOTE:
1. DO NOT SCALE DRAWING
2. BREAK ALL SHARP EDGES
3. MARK GERMFREE PART NO./REV. ON ALL PARTS
4. WELD ALL JOINTS .13 FILLET
5. ALL WELDS GROUND AND POLISHED
6. REMOVE ALL WELD DISCOLORATION
7. DIMENSIONS IN PARENTHESIS "( )" ARE FOR REFERENCE
8. FLAT PATTERN DIMENSION DATA USE (.DXF) ELECTRONIC FILE

REVISIONS						
REV	DESCRIPTION	DATE	DGNR	DRFTR	CHKR	APRV
A	INITIAL RELEASE	d mmm yyyy	MSP	MSP	BAS	JQS



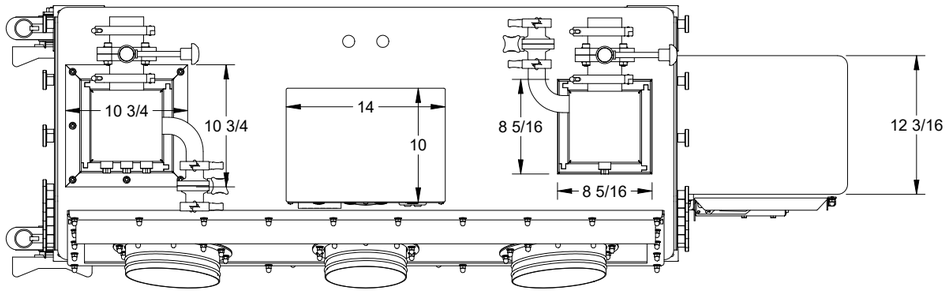
LEFT ISO VIEW

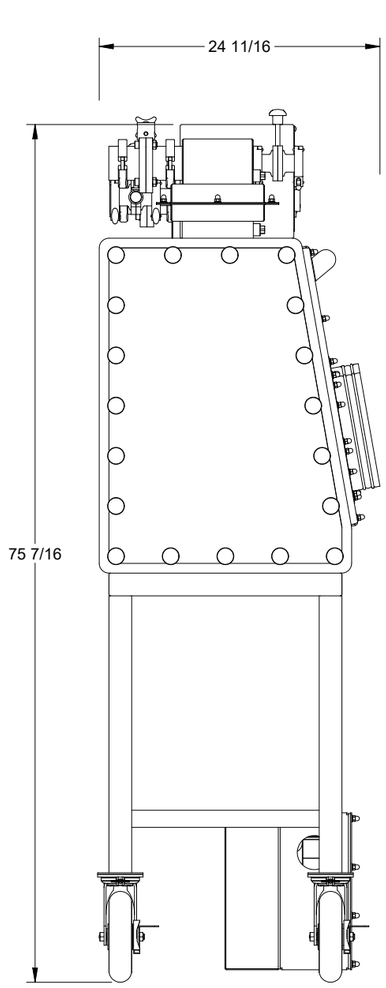


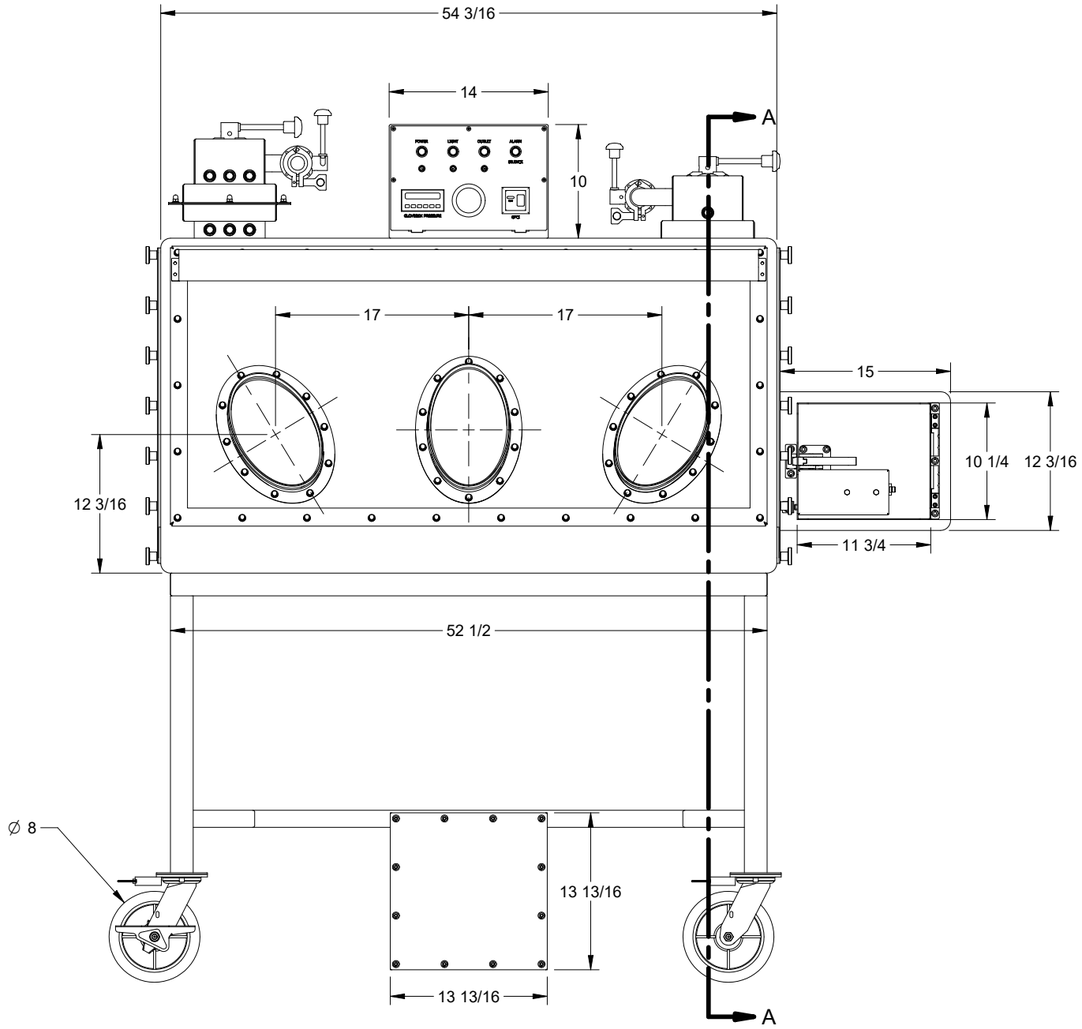
RIGHT ISO VIEW

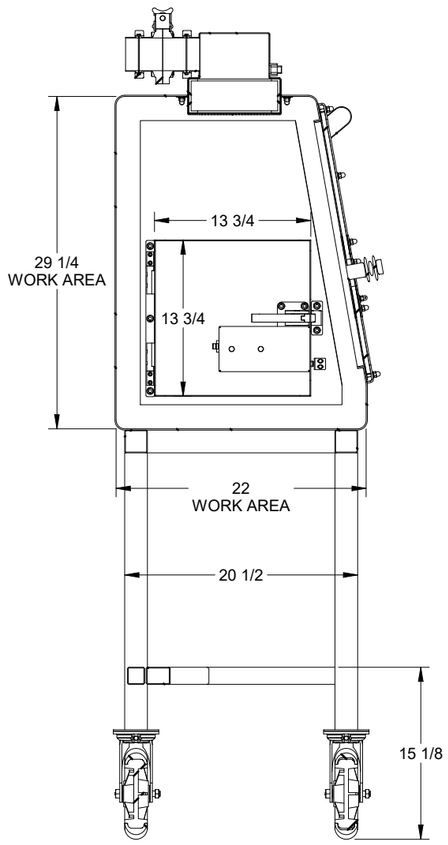
UNLESS OTHERWISE SPECIFIED: TOLERANCES ARE: .XX = ±.03 .XXX = ±.010 FRACTIONS = ±1/16 ANGLES = ±.5"	SIGNATURES	DATE	Germfree Laboratories
	DRAFTER: M.PACE	d mmm yyyy	
	ENG/DGNR: M.PACE	d mmm yyyy	SEA-III 3 GLOVE MODEL
	CHECKER: B.SERLE	d mmm yyyy	
	APPROVAL: J.SERLE	d mmm yyyy	DRAWING NO: XXX-XXXX-XX REV: A
DIMENSIONS ARE IN INCHES DO NOT SCALE DRAWING	THIS PRINT IS PROVIDED ON A RESTRICTED BASIS AND IS NOT TO BE USED IN ANY WAY DETRIMENTAL TO THE INTERESTS OF GERMFREE LABORATORIES		W.O: XXXXXX PROJECT: PXXXXXXX SCALE: N/A SHEET NAME: OVERVIEW SHEET: 1 of 2

P:\Standard Products\Equipment\SEA-3 (3 GLOVE)\SEA-3 (3 Glove, Right Airlock, Casters)\Engineering\2D\Mechanical\SEA-3 (3 Glove, Right Airlock, Casters).dft

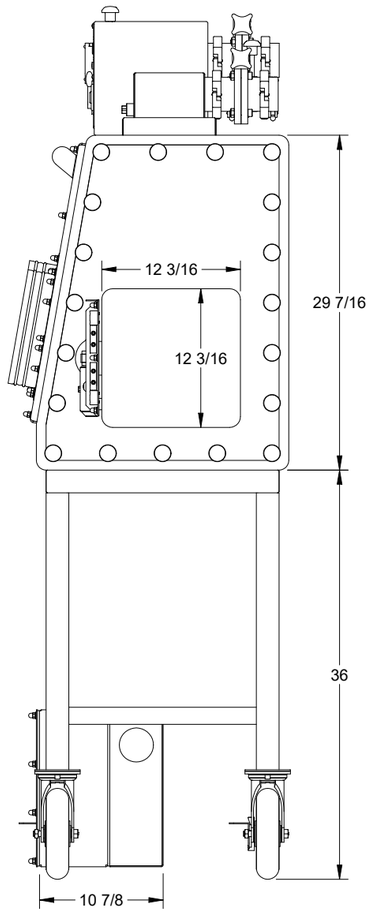








SECTION A-A



UNLESS OTHERWISE SPECIFIED: TOLERANCES ARE: .XX = ±.03 .XXX = ±.010 FRACTIONS = ±1/16 ANGLES = ±.5°	SIGNATURES	DATE
	DRAFTER: M.PACE	d mmm yyyy
	ENG/DGNR: M.PACE	d mmm yyyy
	CHECKER: B.SERLE	d mmm yyyy
	APPROVAL: J.SERLE	d mmm yyyy
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Germfree Laboratories

SEA-III
3 GLOVE MODEL

DRAWING NO:	REV:
XXX-XXXX-XX	A

W.O:	PROJECT:	SCALE:	SHEET NAME:	SHEET:
XXXXXX	PXXXXXXX	N/A	DETAILS	2 of 2

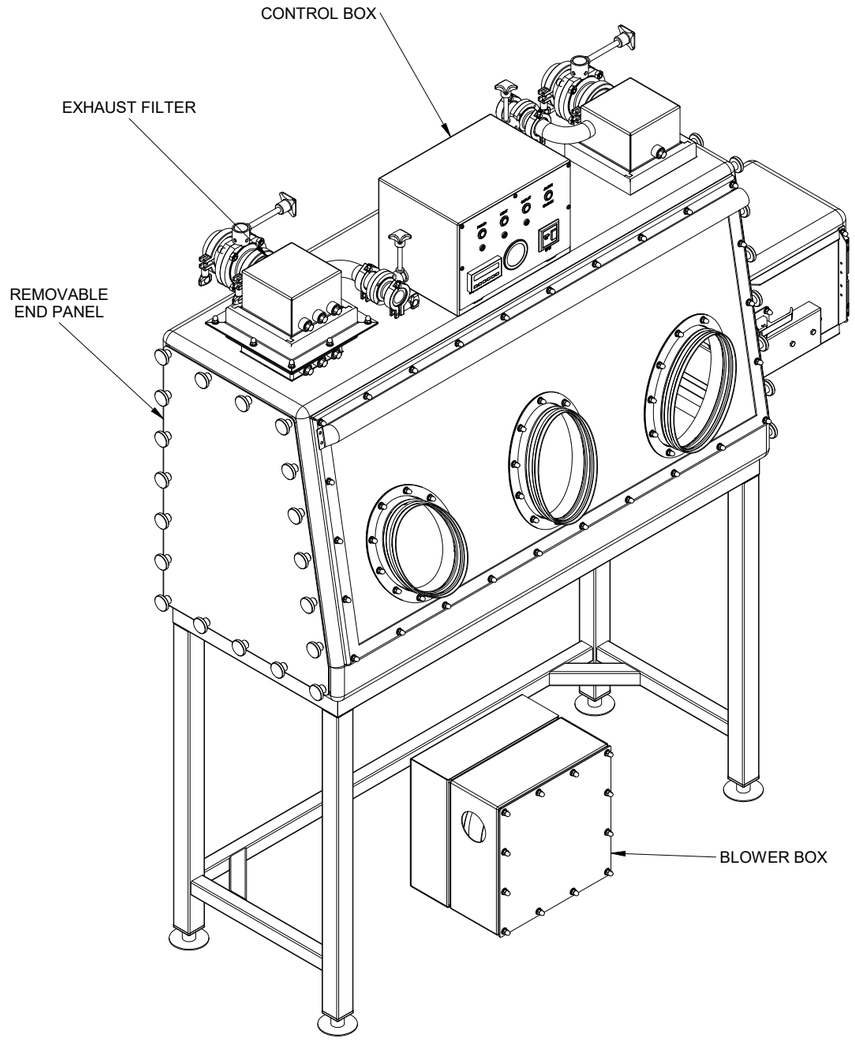
P:\Standard Products\Equipment\SEA-3 (3 GLOVE)\SEA-3 (3 Glove, Right Airlock, Casters)\Engineering\2D\Mechanical\SEA-3 (3 Glove, Right Airlock, Casters).dft

Germfree

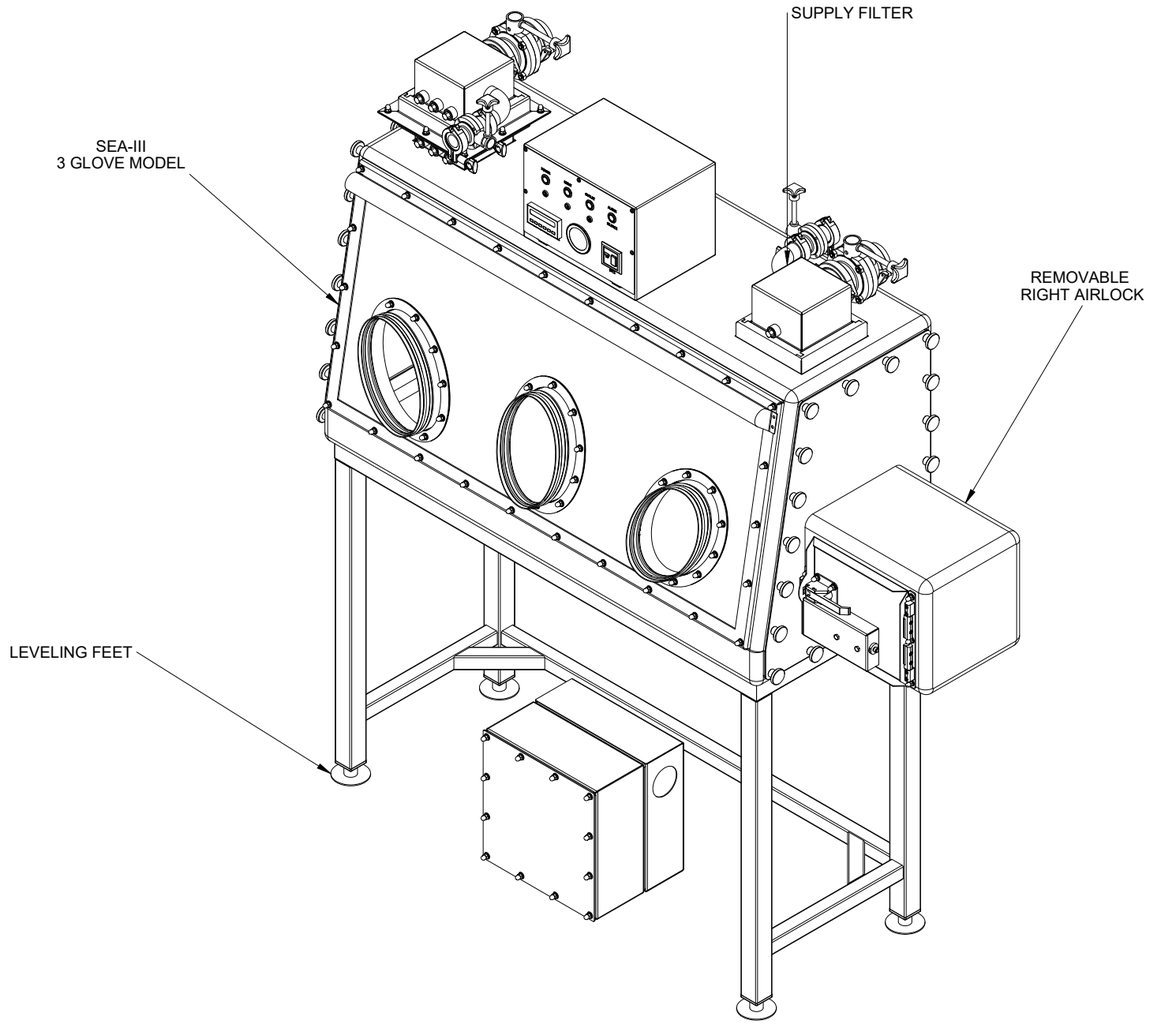
SEA-4 (3 Glove, Right Airlock)

NOTE:
1. DO NOT SCALE DRAWING
2. BREAK ALL SHARP EDGES
3. MARK GERMFREE PART NO./REV. ON ALL PARTS
4. WELD ALL JOINTS .13 FILLET
5. ALL WELDS GROUND AND POLISHED
6. REMOVE ALL WELD DISCOLORATION
7. DIMENSIONS IN PARENTHESIS "( )" ARE FOR REFERENCE
8. FLAT PATTERN DIMENSION DATA USE (.DXF) ELECTRONIC FILE

REVISIONS						
REV	DESCRIPTION	DATE	DGNR	DRFTR	CHKR	APRV
A	INITIAL RELEASE	d mmm yyyy	MSP	MSP	BAS	JQS



LEFT ISO VIEW



RIGHT ISO VIEW

UNLESS OTHERWISE SPECIFIED:
TOLERANCES ARE:
.XX = ±.03
.XXX = ±.010
FRACTIONS = ±1/16
ANGLES = ±.5°

DIMENSIONS ARE IN INCHES.
DO NOT SCALE DRAWING.

SIGNATURES		DATE
DRAFTER:	M.PACE	d mmm yyyy
ENG/DGNR:	M.PACE	d mmm yyyy
CHECKER:	B.SERLE	d mmm yyyy
APPROVAL:	J.SERLE	d mmm yyyy

Germfree Laboratories

SEA-III
3 GLOVE MODEL

DRAWING NO:	REV:
XXX-XXXX-XX	A

W.O:	PROJECT:	SCALE:	SHEET NAME:	SHEET:
XXXXXX	PXXXXXXX	N/A	OVERVIEW	1 of 2

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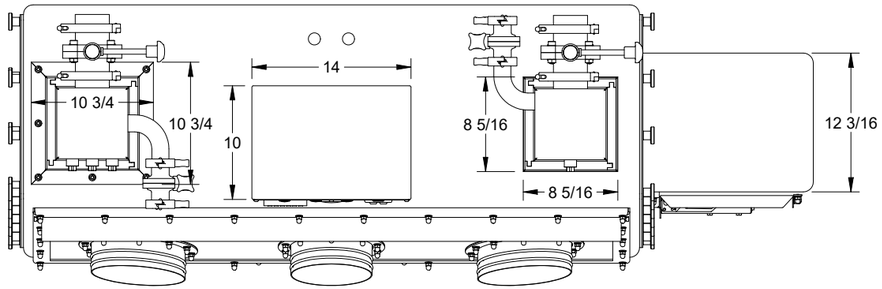
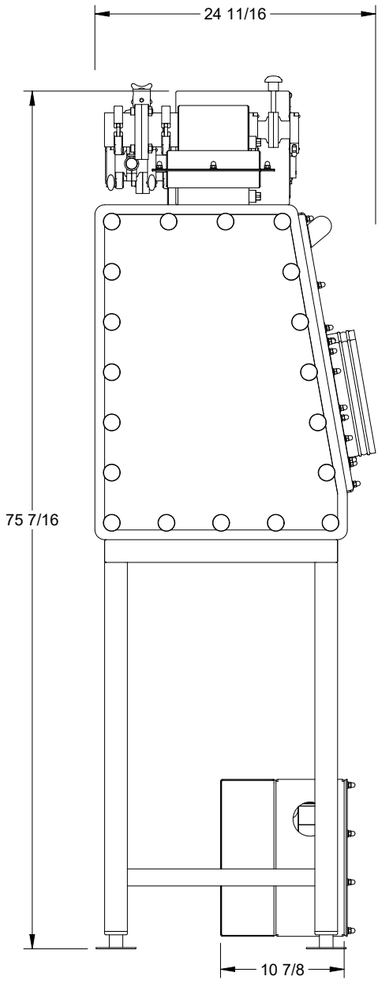
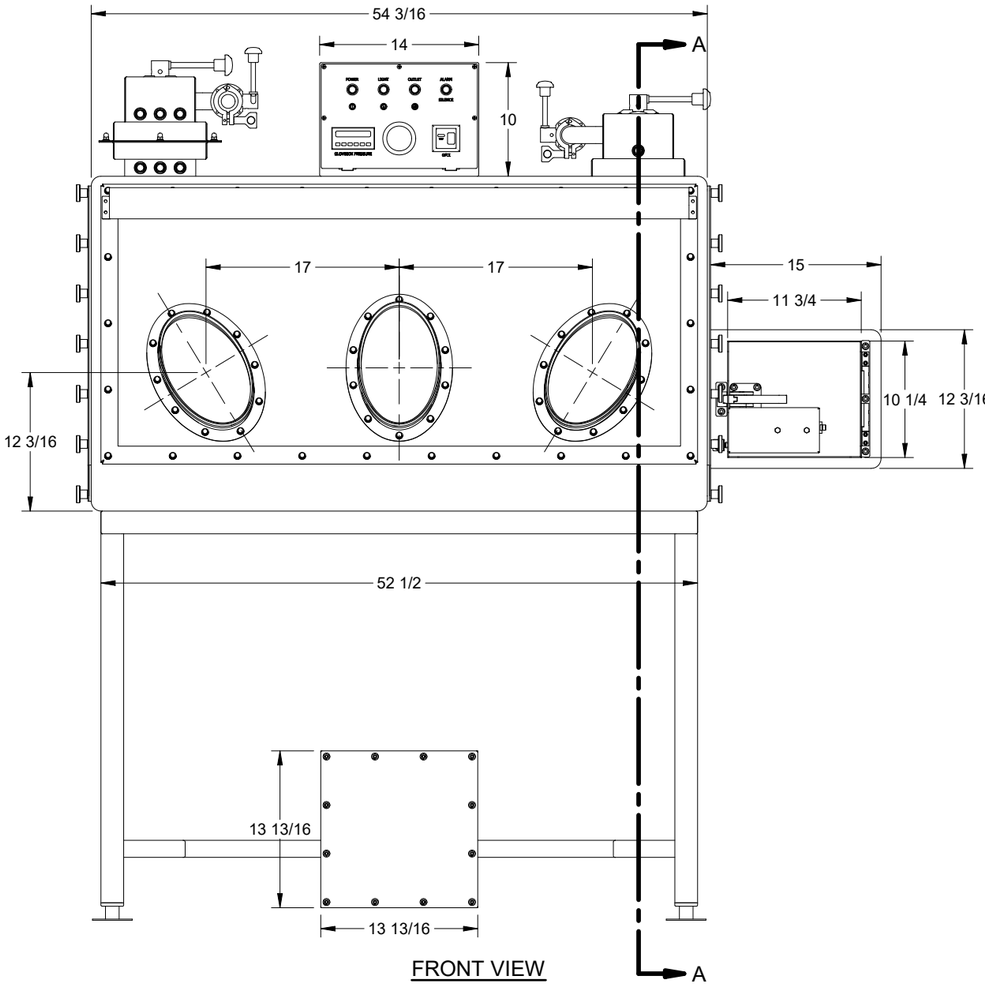


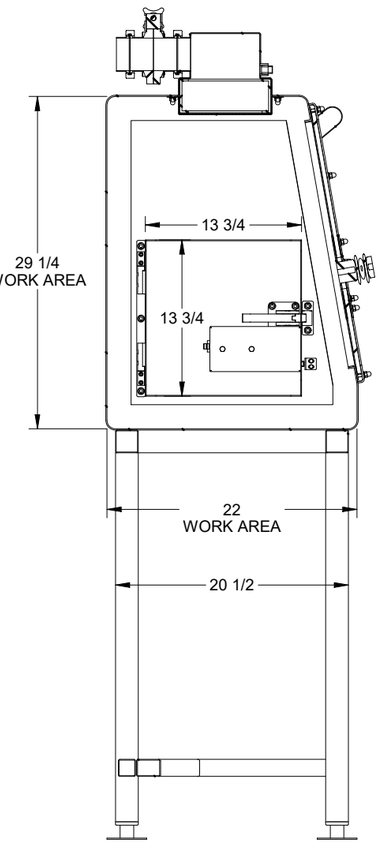
TOP VIEW



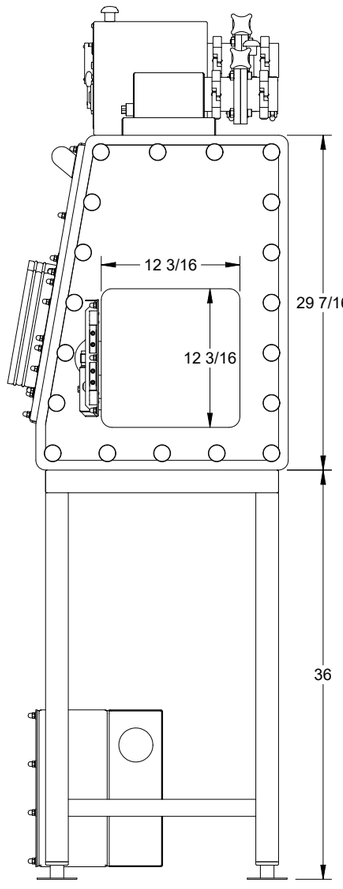
LEFT VIEW



FRONT VIEW



SECTION A-A



RIGHT VIEW

UNLESS OTHERWISE SPECIFIED: TOLERANCES ARE: .XX = ±.03 .XXX = ±.010 FRACTIONS = ±1/16 ANGLES = ±.5°	SIGNATURES	DATE	Germfree Laboratories
	DRAFTER: M.PACE	d mmm yyyy	
	ENG/DGNR: M.PACE	d mmm yyyy	SEA-III 3 GLOVE MODEL
	CHECKER: B.SERLE	d mmm yyyy	
	APPROVAL: J.SERLE	d mmm yyyy	DRAWING NO: XXX-XXXX-XX REV: A
DIMENSIONS ARE IN INCHES. DO NOT SCALE DRAWING.	THIS PRINT IS PROVIDED ON A RESTRICTED BASIS AND IS NOT TO BE USED IN ANY WAY DETRIMENTAL TO THE INTERESTS OF GERMFREE LABORATORIES		W.O: XXXXXX PROJECT: PXXXXXXX SCALE: N/A SHEET NAME: DETAILS SHEET: 2 of 2

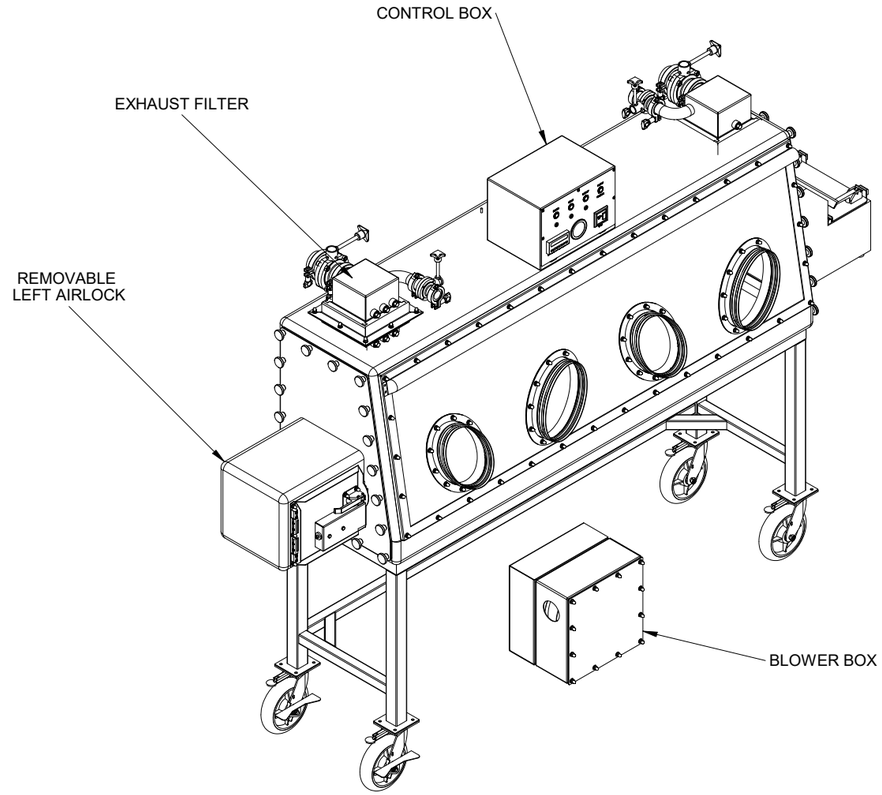
P:\Standard Products\Equipment\SEA-3 (3 GLOVE)\SEA-3 (3 Glove, Right Airlock, Feet)\Engineering\2D\Mechanical\SEA-3 (3 Glove, Right Airlock, Feet).dft

Germfree

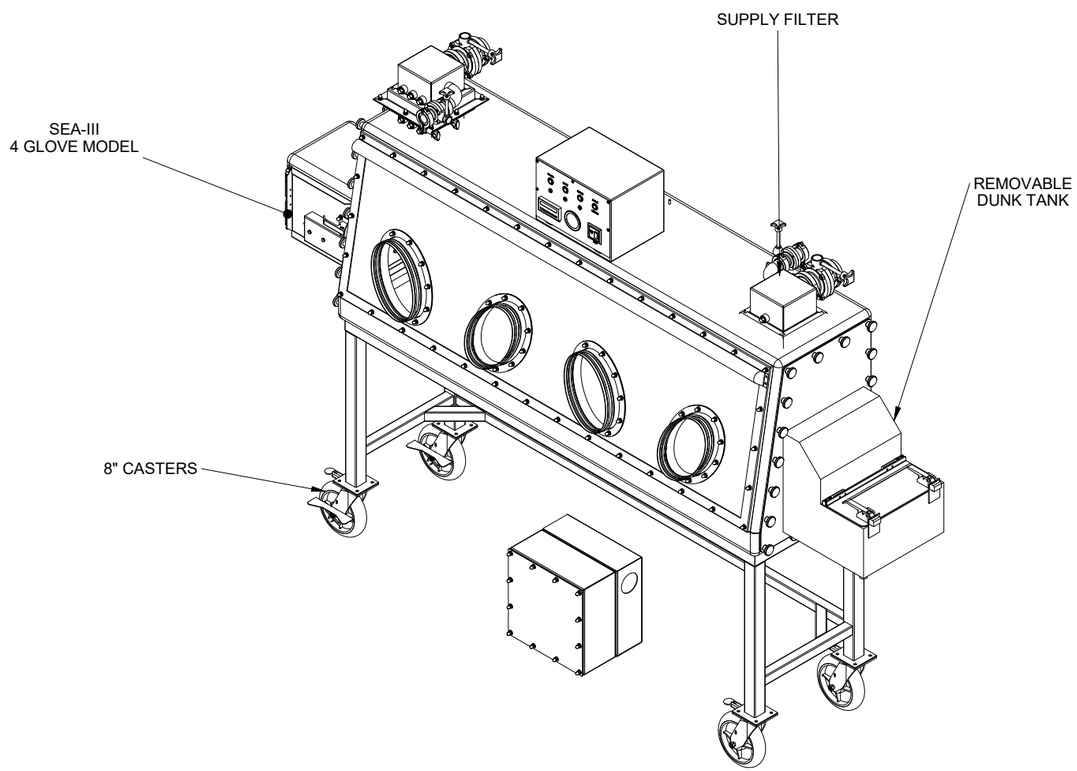
SEA-6 (4 Glove, Left Airlock, Casters)

NOTE:
1. DO NOT SCALE DRAWING
2. BREAK ALL SHARP EDGES
3. MARK GERMFREE PART NO./REV. ON ALL PARTS
4. WELD ALL JOINTS .13 FILLET
5. ALL WELDS GROUND AND POLISHED
6. REMOVE ALL WELD DISCOLORATION
7. DIMENSIONS IN PARENTHESIS "( )" ARE FOR REFERENCE
8. FLAT PATTERN DIMENSION DATA USE (.DXF) ELECTRONIC FILE

REVISIONS						
REV	DESCRIPTION	DATE	DGNR	DRFTR	CHKR	APRV
-	INITIAL RELEASE	d mmm yyyy	MSP	MSP	BAS	JQS



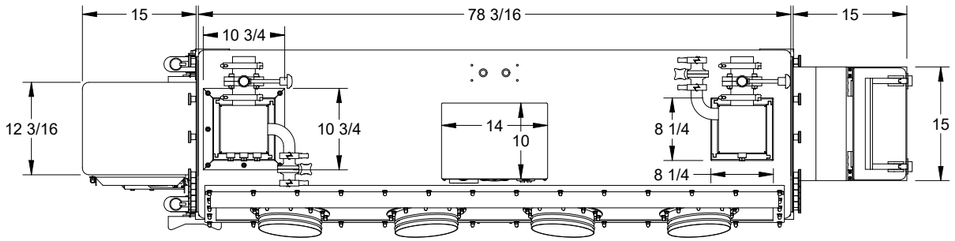
LEFT ISO VIEW



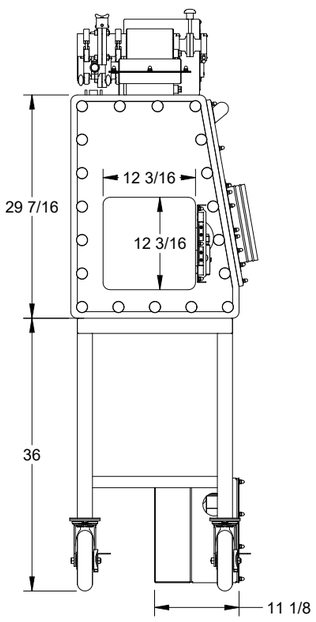
RIGHT ISO VIEW

UNLESS OTHERWISE SPECIFIED: TOLERANCES ARE: .XX = ±.03 .XXX = ±.010 FRACTIONS = ±1/16 ANGLES = ±.5°	SIGNATURES	DATE	Germfree Laboratories	
	DRAFTER: M.PACE	d mmm yyyy	SEA-III 4 GLOVE MODEL	
	ENG/DGNR: M.PACE	d mmm yyyy		
	CHECKER: B.SERLE	d mmm yyyy		
	APPROVAL: J.SERLE	d mmm yyyy	DRAWING NO: XXX-XXXX-XX	REV: A
DIMENSIONS ARE IN INCHES. DO NOT SCALE DRAWING.	THIS PRINT IS PROVIDED ON A RESTRICTED BASIS AND IS NOT TO BE USED IN ANY WAY DETRIMENTAL TO THE INTERESTS OF GERMFREE LABORATORIES		W.O: XXXXXX PROJECT: PXXXXXXX SCALE: N/A SHEET NAME: OVERVIEW	SHEET: 1 of 2

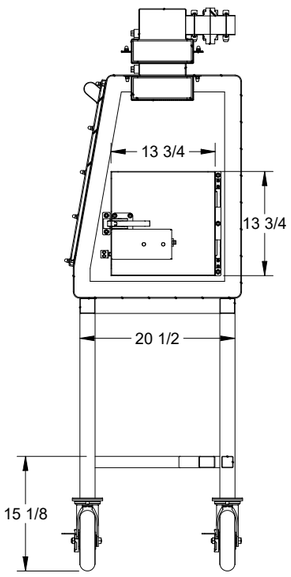
P:\Standard Products\Equipment\SEA-3 (4 GLOVE)\SEA-3 (4 Glove, Left Airlock, Casters)\Engineering\2D\Mechanical\SEA-3 (4 Glove, Left Airlock, Casters).dft



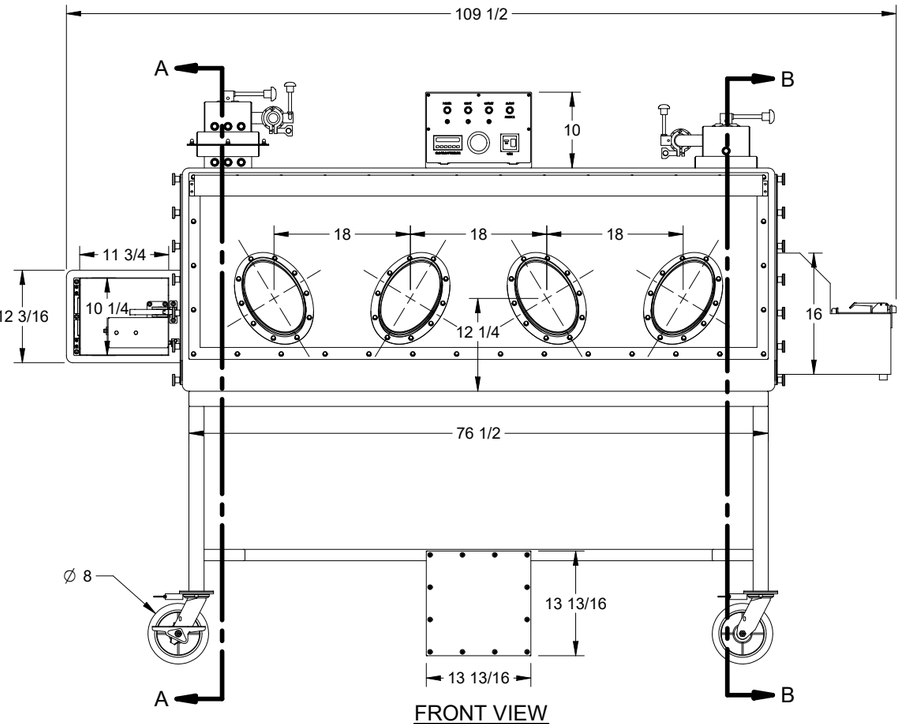
TOP VIEW



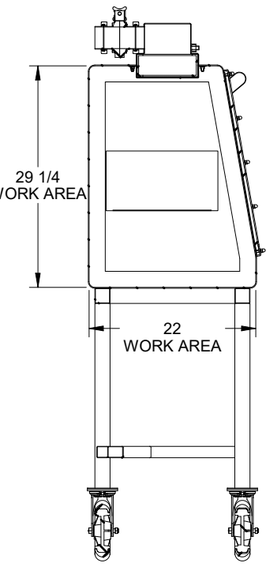
LEFT VIEW



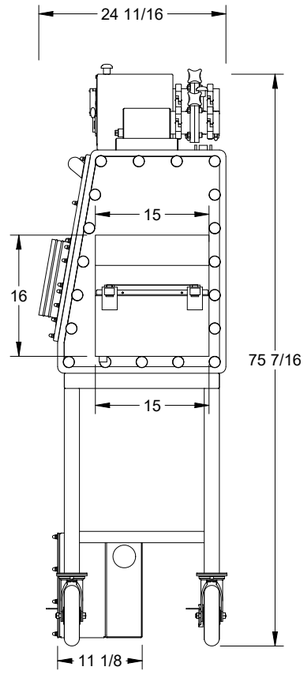
SECTION A-A



FRONT VIEW



SECTION B-B



RIGHT VIEW

UNLESS OTHERWISE SPECIFIED:
TOLERANCES ARE:
.XX = ±.03
.XXX = ±.010
FRACTIONS = ±1/16
ANGLES = ±.5°

DIMENSIONS ARE IN INCHES.
DO NOT SCALE DRAWING.

SIGNATURES		DATE
DRAFTER:	M.PACE	d mmm yyyy
ENG/DGNR:	M.PACE	d mmm yyyy
CHECKER:	B.SERLE	d mmm yyyy
APPROVAL:	J.SERLE	d mmm yyyy

Germfree Laboratories

SEA-III
4 GLOVE MODEL

DRAWING NO:	REV:
XXX-XXXX-XX	A

W.O:	PROJECT:	SCALE:	SHEET NAME:	SHEET:
XXXXXX	PXXXXXXX	N/A	DETAILS	2 of 2

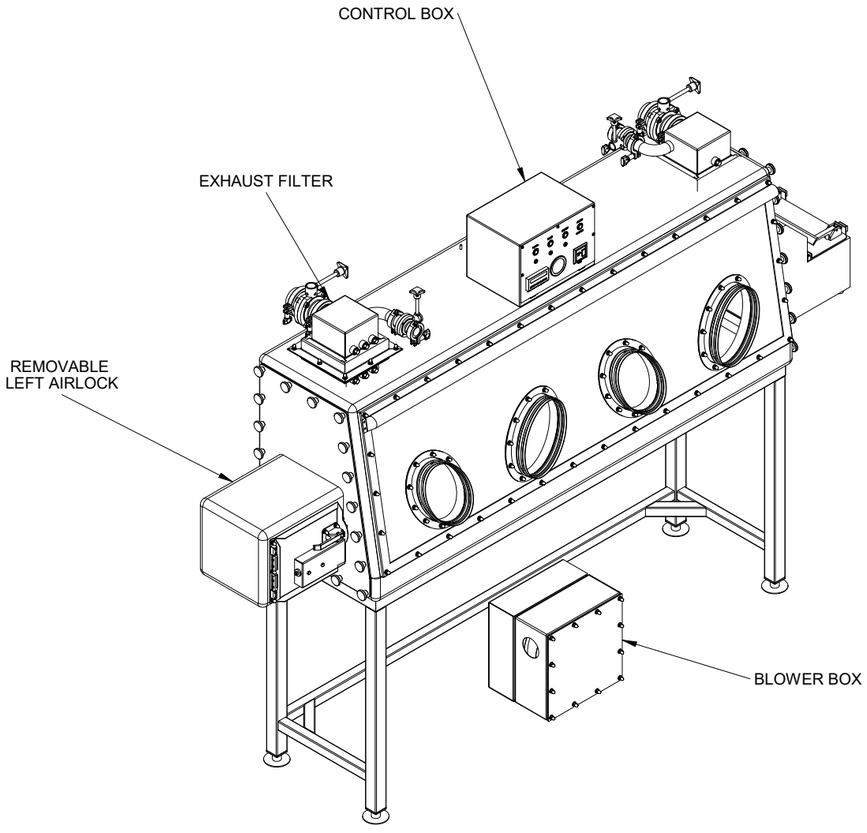
P:\Standard Products\Equipment\SEA-3 (4 GLOVE)\SEA-3 (4 Glove, Left Airlock, Casters)\Engineering\2D\Mechanical\SEA-3 (4 Glove, Left Airlock, Casters).dft

Germfree

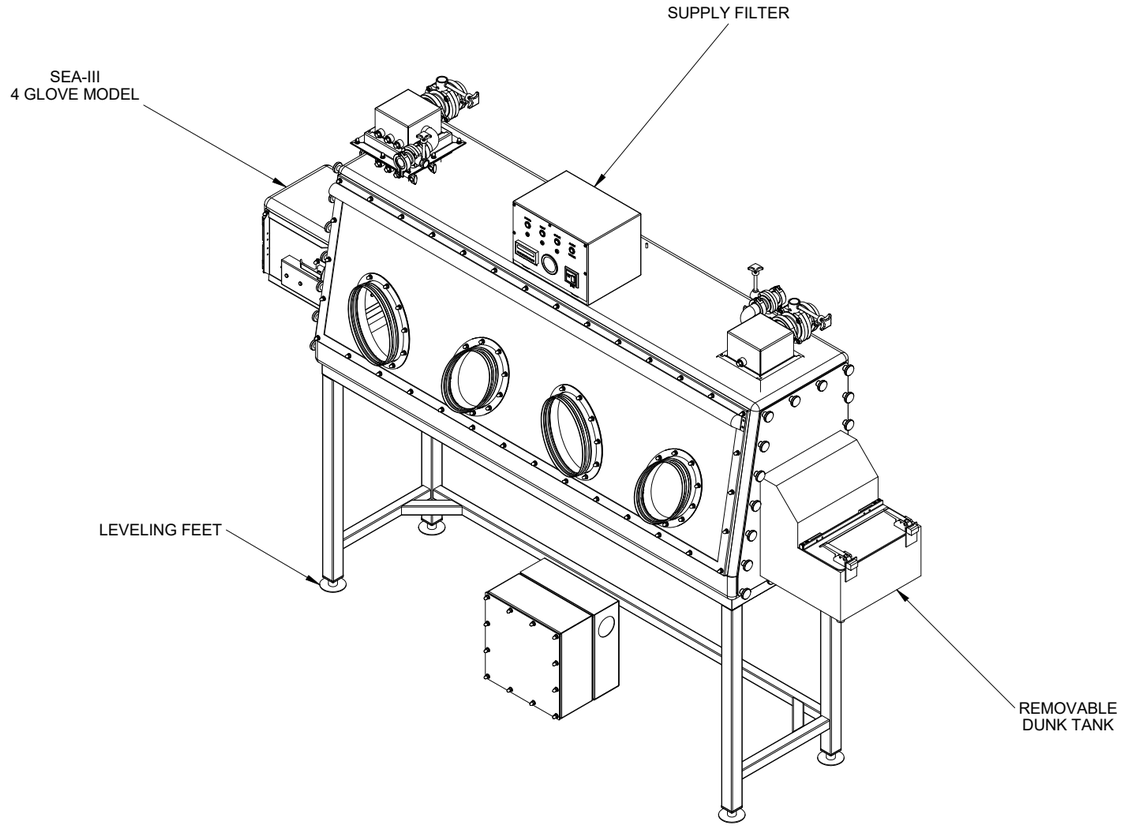
SEA-6 (4 Glove, Left Airlock)

NOTE:
1. DO NOT SCALE DRAWING
2. BREAK ALL SHARP EDGES
3. MARK GERMFREE PART NO./REV. ON ALL PARTS
4. WELD ALL JOINTS .13 FILLET
5. ALL WELDS GROUND AND POLISHED
6. REMOVE ALL WELD DISCOLORATION
7. DIMENSIONS IN PARENTHESIS "( )" ARE FOR REFERENCE
8. FLAT PATTERN DIMENSION DATA USE (.DXF) ELECTRONIC FILE

REVISIONS						
REV	DESCRIPTION	DATE	DGNR	DRFTR	CHKR	APRV
-	INITIAL RELEASE	d mmm yyyy	MSP	MSP	BAS	JQS



LEFT ISO VIEW



RIGHT ISO VIEW

UNLESS OTHERWISE SPECIFIED:
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XXX = ±.010
FRACTIONS = ±1/16
ANGLES = ±.5°

DIMENSIONS ARE IN INCHES.
DO NOT SCALE DRAWING.

SIGNATURES		DATE
DRAFTER:	M.PACE	d mmm yyyy
ENG/DGNR:	M.PACE	d mmm yyyy
CHECKER:	B.SERLE	d mmm yyyy
APPROVAL:	J.SERLE	d mmm yyyy

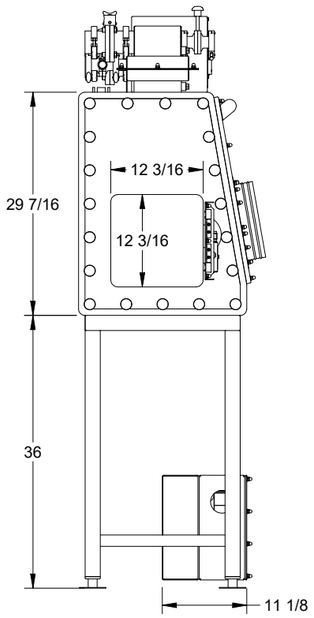
Germfree Laboratories

SEA-III
4 GLOVE MODEL

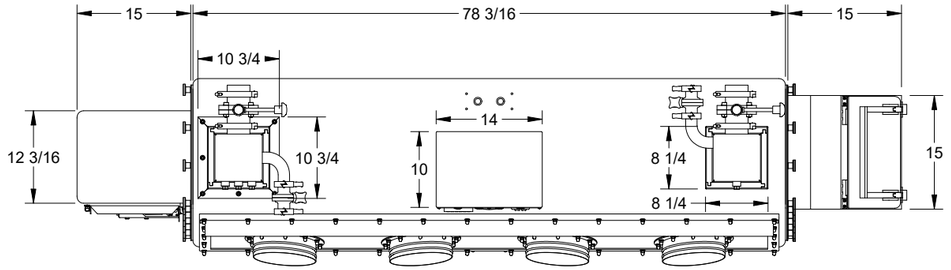
DRAWING NO:	REV:
XXX-XXXX-XX	A

W.O:	PROJECT:	SCALE:	SHEET NAME:	SHEET:
XXXXXX	PXXXXXXX	N/A	OVERVIEW	1 of 2

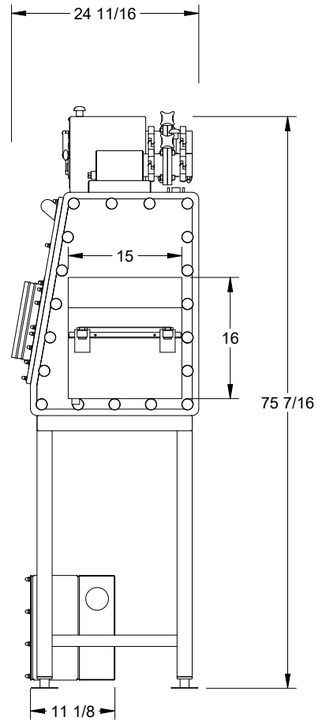
P:\Standard Products\Equipment\SEA-3 (4 GLOVE)\SEA-3 (4 Glove, Left Airlock, Feet)\Engineering\2D\Mechanical\SEA-3 (4 Glove, Left Airlock, Feet).dft



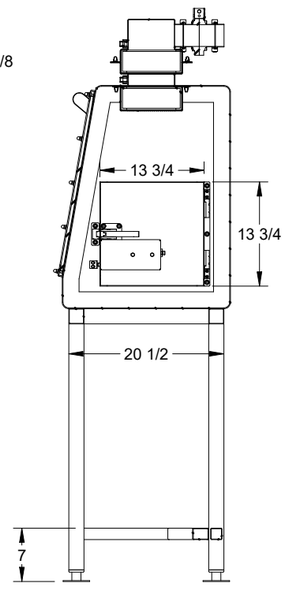
LEFT VIEW



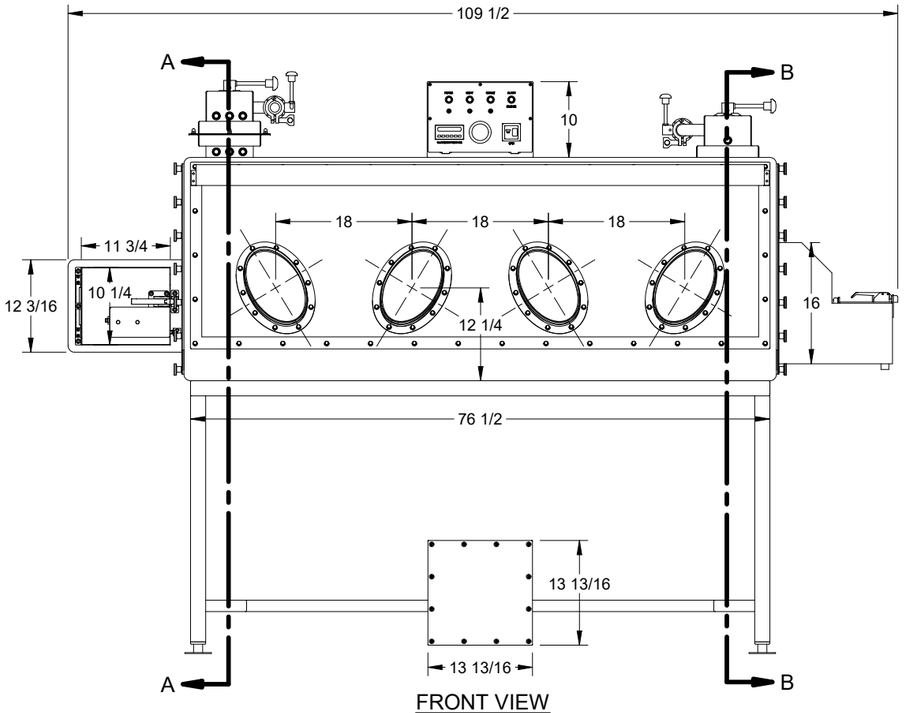
TOP VIEW



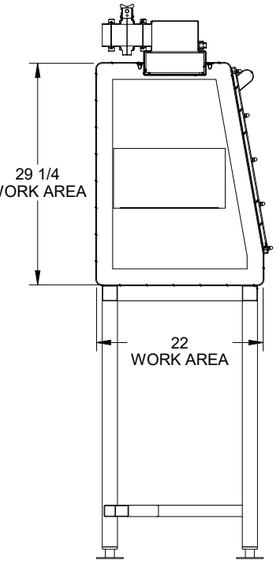
RIGHT VIEW



SECTION A-A



FRONT VIEW



SECTION B-B

UNLESS OTHERWISE SPECIFIED: TOLERANCES ARE: .XX = ±.03 .XXX = ±.010 FRACTIONS = ±1/16 ANGLES = ±.5°	SIGNATURES	DATE
	DRAFTER: M.PACE	d mmm yyyy
	ENG/DGNR: M.PACE	d mmm yyyy
	CHECKER: B.SERLE	d mmm yyyy
	APPROVAL: J.SERLE	d mmm yyyy
DIMENSIONS ARE IN INCHES. DO NOT SCALE DRAWING.	THIS PRINT IS PROVIDED ON A RESTRICTED BASIS AND IS NOT TO BE USED IN ANY WAY DETRIMENTAL TO THE INTERESTS OF GERMFREE LABORATORIES	

Germfree Laboratories

SEA-III
4 GLOVE MODEL

DRAWING NO:	REV:
XXX-XXXX-XX	A

W.O:	PROJECT:	SCALE:	SHEET NAME:	SHEET:
XXXXXX	PXXXXXXX	N/A	DETAILS	2 of 2

P:\Standard Products\Equipment\SEA-3 (4 GLOVE)\SEA-3 (4 Glove, Left Airlock, Feet)\Engineering\2D\Mechanical\SEA-3 (4 Glove, Left Airlock, Feet).dft

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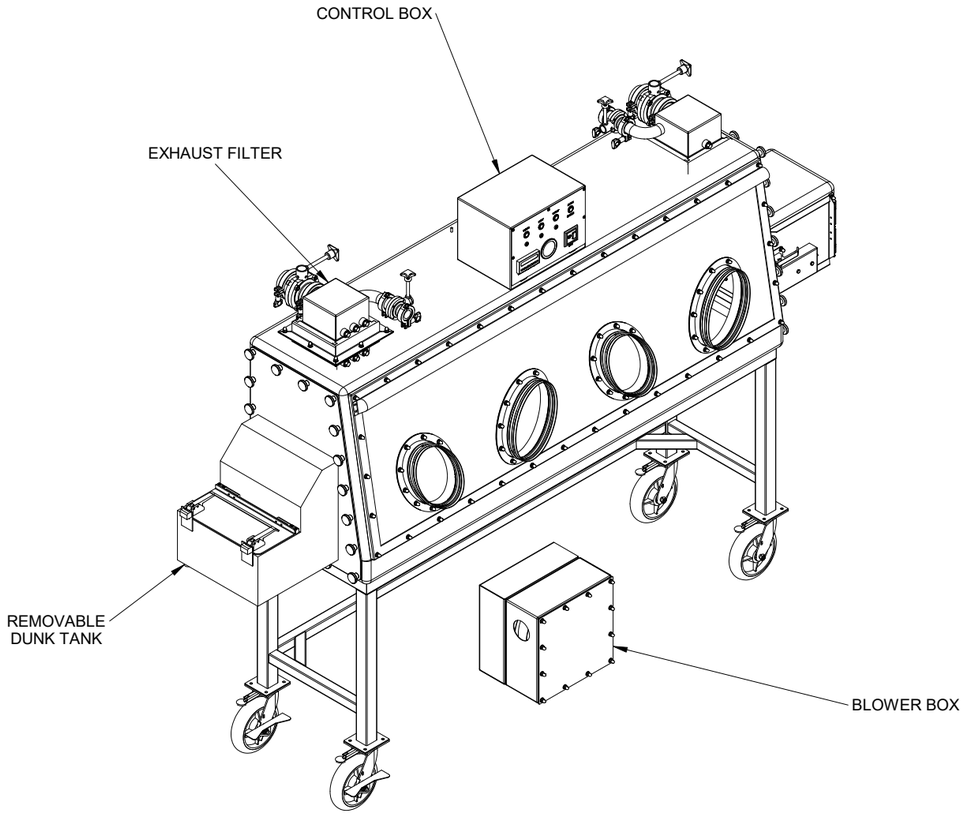
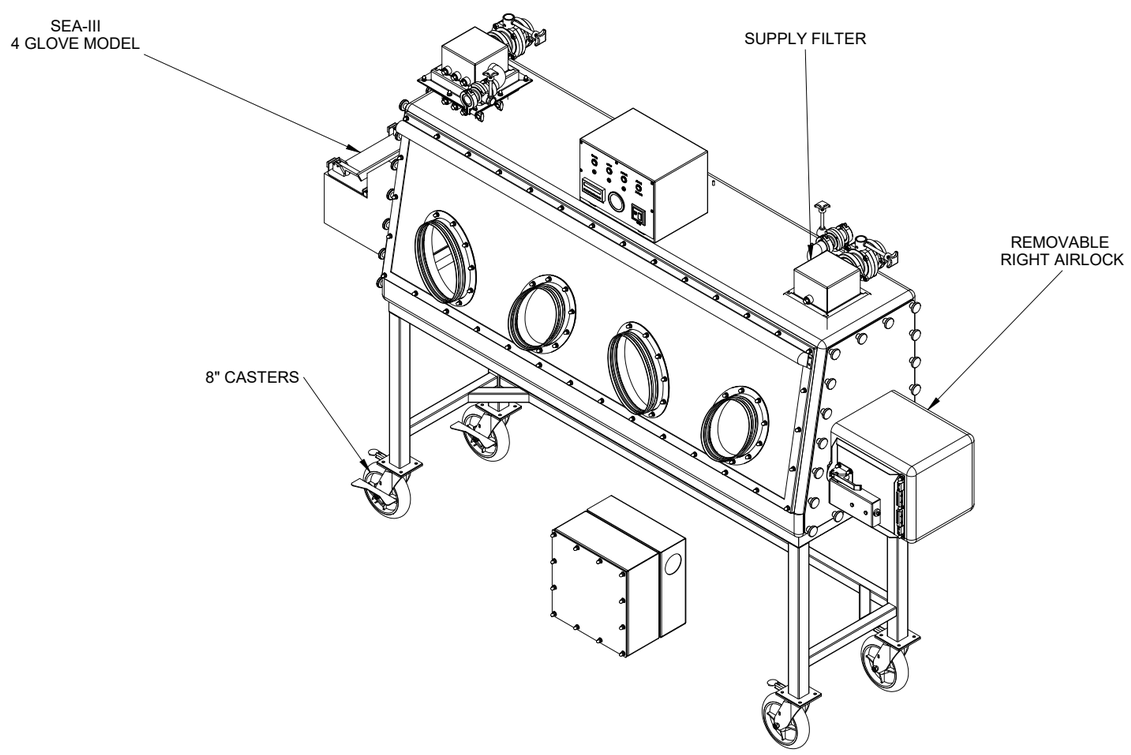
SEA-6 (4 Glove, Right Airlock, Casters)

NOTE:
1. DO NOT SCALE DRAWING
2. BREAK ALL SHARP EDGES
3. MARK GERMFREE PART NO./REV. ON ALL PARTS
4. WELD ALL JOINTS .13 FILLET
5. ALL WELDS GROUND AND POLISHED
6. REMOVE ALL WELD DISCOLORATION
7. DIMENSIONS IN PARENTHESIS "( )" ARE FOR REFERENCE
8. FLAT PATTERN DIMENSION DATA USE (.DXF) ELECTRONIC FILE

REVISIONS						
REV	DESCRIPTION	DATE	DGNR	DRFTR	CHKR	APRV
A	INITIAL RELEASE	d mmm yyyy	MSP	MSP	BAS	JQS



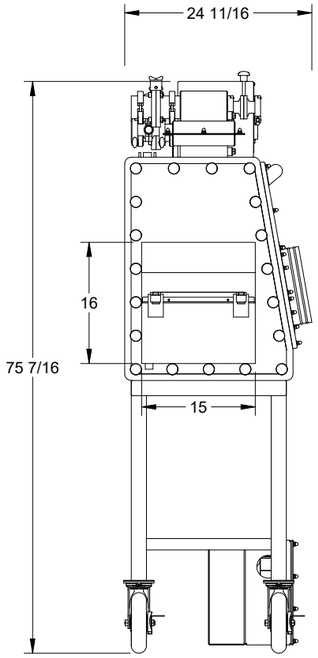
LEFT ISO VIEW



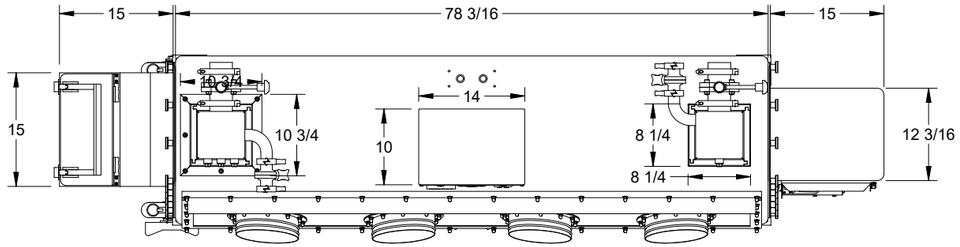
RIGHT ISO VIEW

UNLESS OTHERWISE SPECIFIED: TOLERANCES ARE: .XX = ±.03 .XXX = ±.010 FRACTIONS = ±1/16 ANGLES = ±.5°	SIGNATURES	DATE	Germfree Laboratories
	DRAFTER: M.PACE	d mmm yyyy	
	ENG/DGNR: M.PACE	d mmm yyyy	SEA-III 4 GLOVE MODEL
	CHECKER: B.SERLE	d mmm yyyy	
	APPROVAL: J.SERLE	d mmm yyyy	DRAWING NO: XXX-XXXX-XX REV: A
DIMENSIONS ARE IN INCHES. DO NOT SCALE DRAWING.	THIS PRINT IS PROVIDED ON A RESTRICTED BASIS AND IS NOT TO BE USED IN ANY WAY DETRIMENTAL TO THE INTERESTS OF GERMFREE LABORATORIES		W.O: XXXXXX PROJECT: PXXXXXXX SCALE: N/A SHEET NAME: OVERVIEW SHEET: 1 of 2

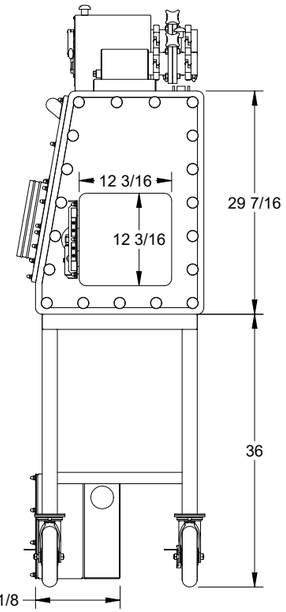
P:\Standard Products\Equipment\SEA-3 (4 GLOVE)\SEA-3 (4 Glove, Right Airlock, Casters)\Engineering\2D\Mechanical\SEA-3 (4 Glove, Right Airlock, Casters).dft



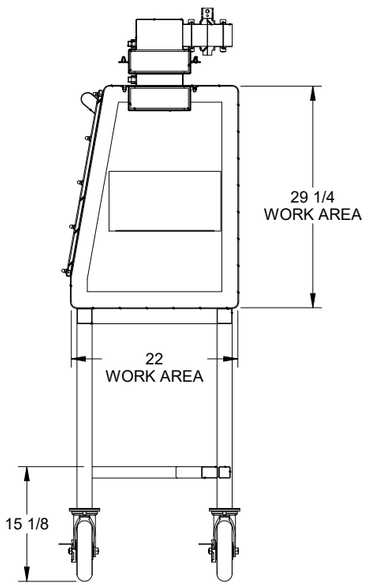
LEFT VIEW



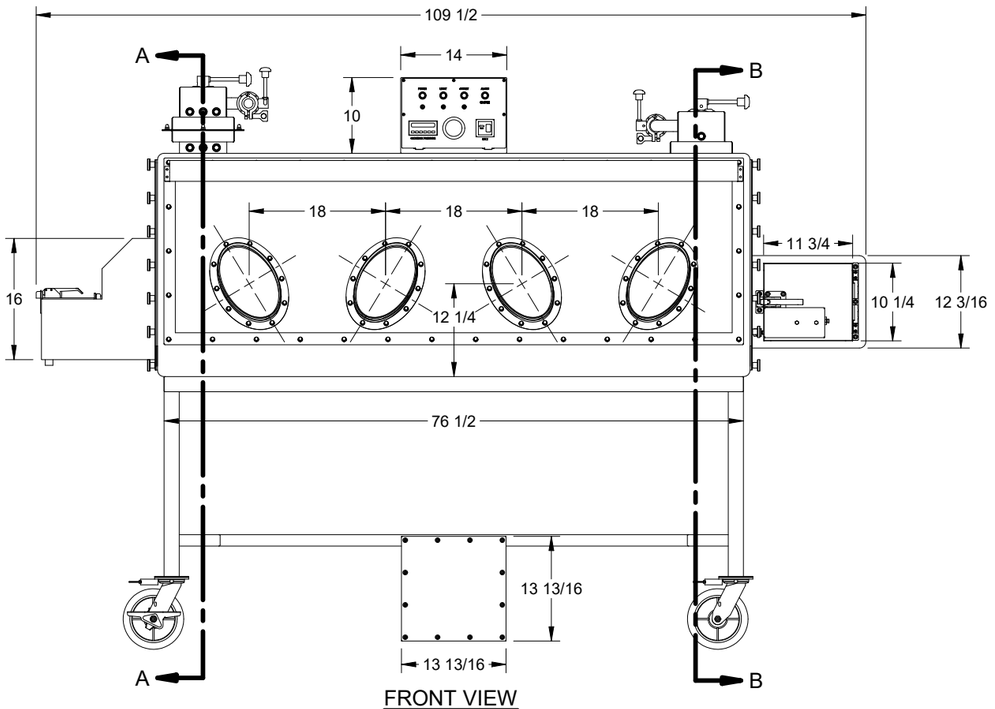
TOP VIEW



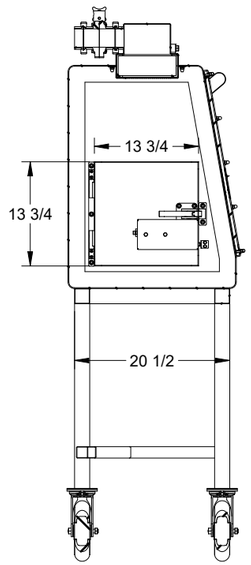
RIGHT VIEW



SECTION A-A



FRONT VIEW



SECTION B-B

UNLESS OTHERWISE SPECIFIED: TOLERANCES ARE: .XX = ±.03 .XXX = ±.010 FRACTIONS = ±1/16 ANGLES = ±.5°	SIGNATURES	DATE	Germfree Laboratories
	DRAFTER: M.PACE	d mmm yyyy	SEA-III 4 GLOVE MODEL
	ENG/DGNR: M.PACE	d mmm yyyy	
	CHECKER: B.SERLE	d mmm yyyy	
	APPROVAL: J.SERLE	d mmm yyyy	DRAWING NO: XXX-XXXX-XX REV: A
DIMENSIONS ARE IN INCHES. DO NOT SCALE DRAWING.	THIS PRINT IS PROVIDED ON A RESTRICTED BASIS AND IS NOT TO BE USED IN ANY WAY DETRIMENTAL TO THE INTERESTS OF GERMFREE LABORATORIES		W.O.: XXXXXX PROJECT: PXXXXXXX SCALE: N/A SHEET NAME: DETAILS SHEET: 2 of 2

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SEA-6 (4 Glove, Right Airlock)

NOTE:
1. DO NOT SCALE DRAWING
2. BREAK ALL SHARP EDGES
3. MARK GERMFREE PART NO./REV. ON ALL PARTS
4. WELD ALL JOINTS .13 FILLET
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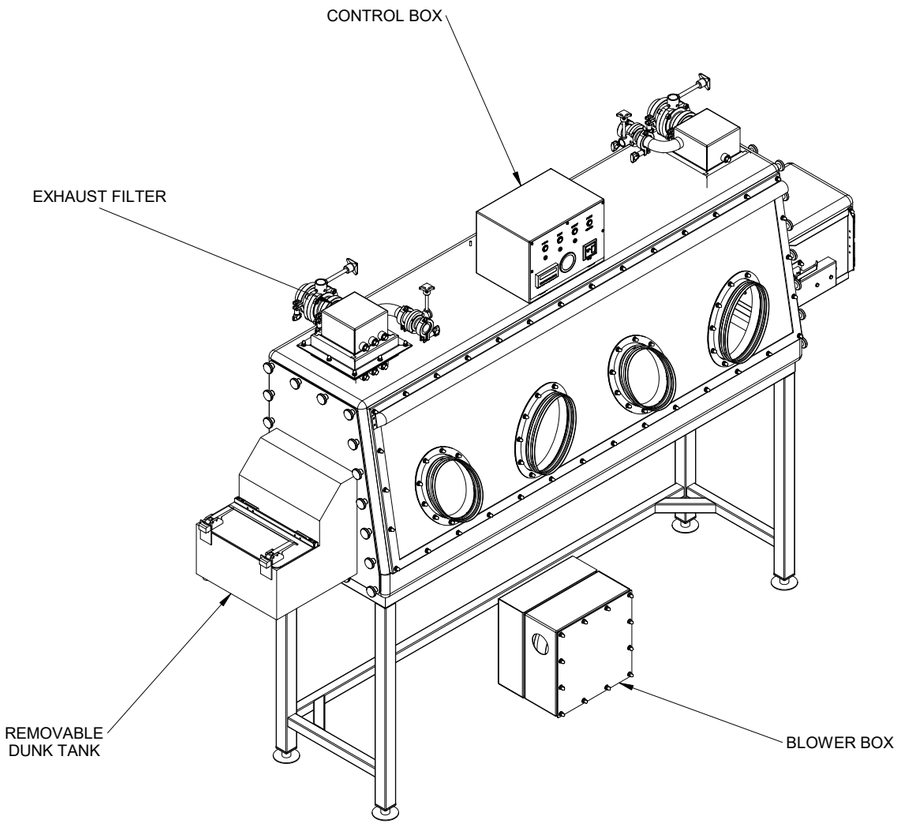
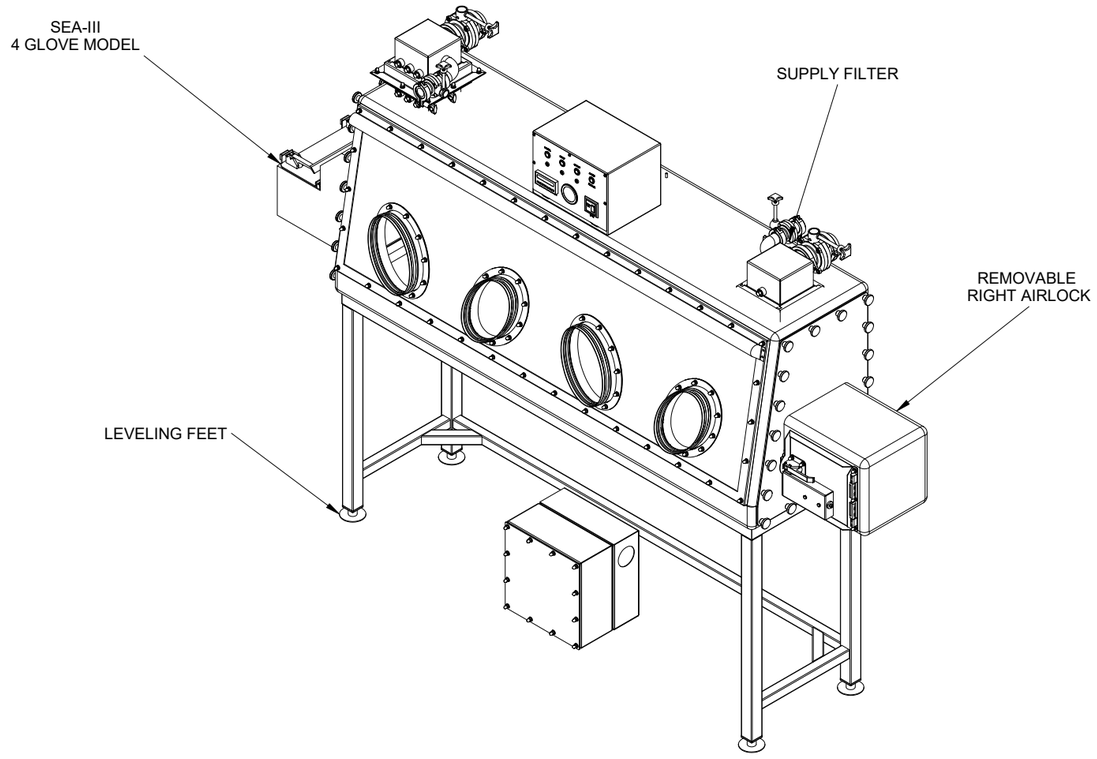
REVISIONS						
REV	DESCRIPTION	DATE	DGNR	DRFTR	CHKR	APRV
A	INITIAL RELEASE	d mmm yyyy	MSP	MSP	BAS	JQS



LEFT ISO VIEW



RIGHT ISO VIEW

UNLESS OTHERWISE SPECIFIED:
TOLERANCES ARE:
.XX = ±.03
.XXX = ±.010
FRACTIONS = ±1/16
ANGLES = ±.5°

DIMENSIONS ARE IN INCHES
DO NOT SCALE DRAWING.

SIGNATURES		DATE
DRAFTER:	M.PACE	d mmm yyyy
ENG/DGNR:	M.PACE	d mmm yyyy
CHECKER:	B.SERLE	d mmm yyyy
APPROVAL:	J.SERLE	d mmm yyyy

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SEA-III
4 GLOVE MODEL

W.O:	PROJECT:	SCALE:	SHEET NAME:	SHEET:
XXXXXX	PXXXXXXX	N/A	OVERVIEW	1 of 2

DRAWING NO: XXX-XXXX-XX
REV: A

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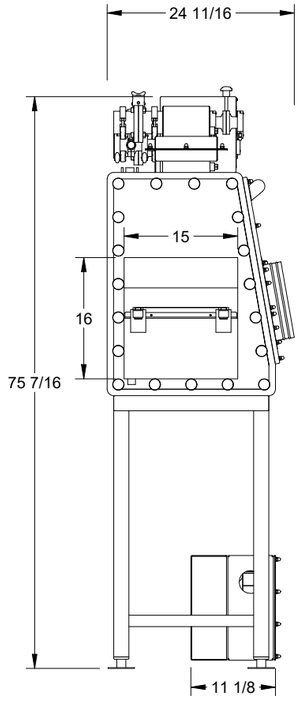
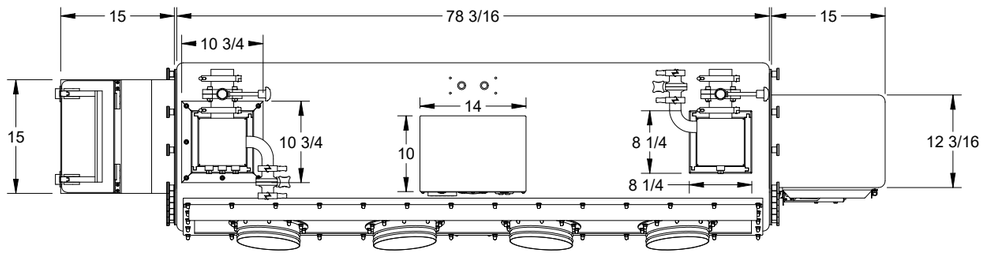
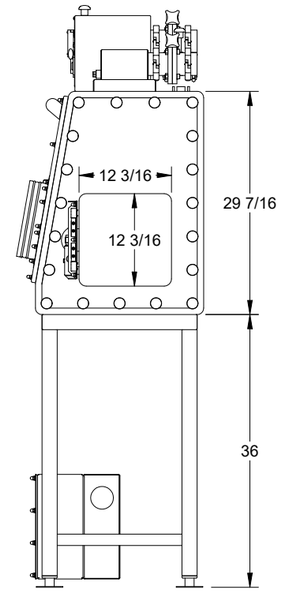


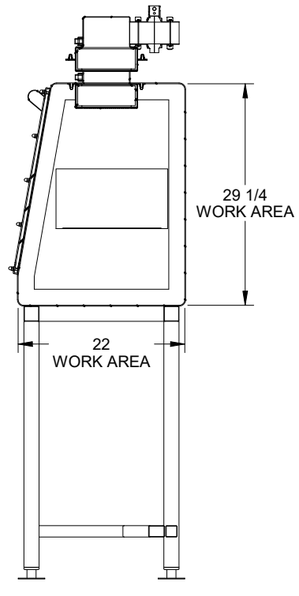
LEFT VIEW



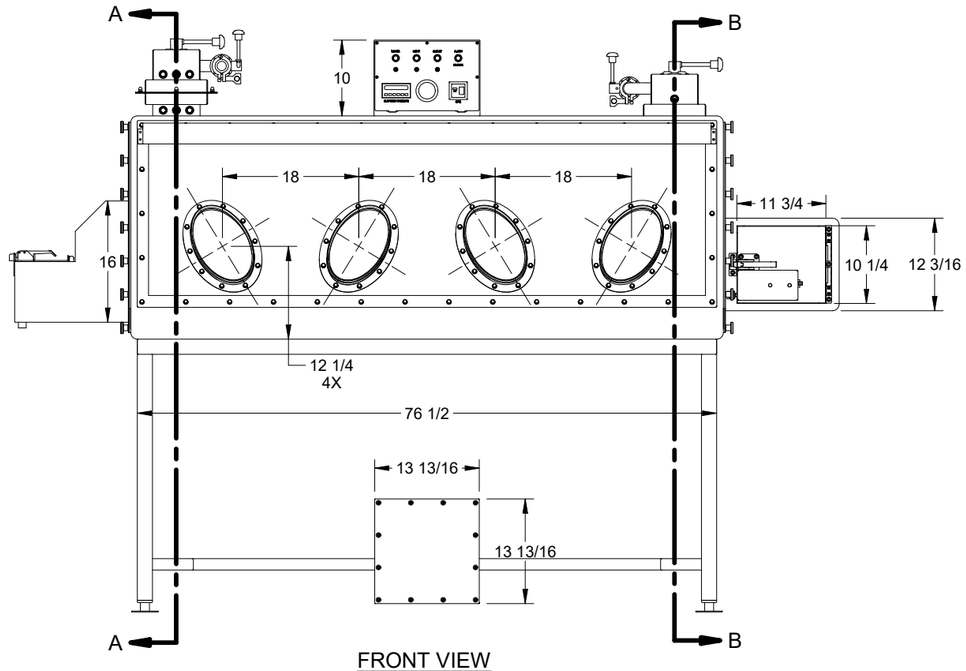
TOP VIEW



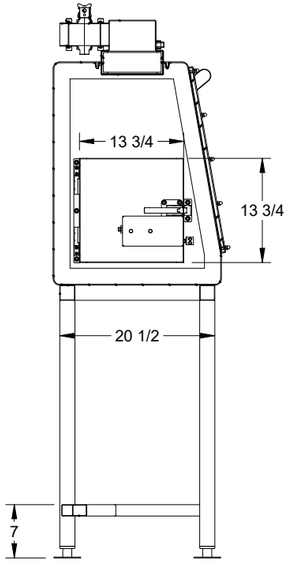
RIGHT VIEW



SECTION A-A



FRONT VIEW



SECTION B-B

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	DRAFTER: M.PACE	d mmm yyyy
	ENG/DGNR: M.PACE	d mmm yyyy
	CHECKER: B.SERLE	d mmm yyyy
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SEA-III
4 GLOVE MODEL

DRAWING NO:	REV:
XXX-XXXX-XX	A

W.O:	PROJECT:	SCALE:	SHEET NAME:	SHEET:
XXXXXX	PXXXXXXX	N/A	DETAILS	2 of 2

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