

AMADA MIYACHI AMERICA

The World Leader in Hermetic Sealing Systems

Alpha Glovebox User Guide



Alpha Glovebox User Guide

© Amada Miyachi America
1820 S. Myrtle Ave
Monrovia, CA 91017
Phone 626.303.5676 • Fax 626.359.7930

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FOREWORD

The purpose of this manual is to supply operating, maintenance and service personnel with the information needed to operate the Alpha glovebox system.

For Technical Support, or if you have suggestions for improving this manual, please contact:

Amada Miyachi America
1820 S. Myrtle Ave
Monrovia, CA 91017 USA
Phone 626.303.5676 • Fax 626.359.7930
service@amadamiyachi.com
24/7 Tech Support: 1-866-751-7378

NOTICE

Amada Miyachi America may be released from all warranty obligations if repairs or modifications are made by persons other than its own service personnel, or its authorized representatives, unless such repairs or modifications are specifically authorized in writing by Amada Miyachi America.

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1.0 INTRODUCTION

The **ALPHA** system is a low cost fully operating Controlled Environment Glovebox designed for laboratory use or with various materials processing equipment. The system is equipped with a manually controlled workstation chamber, vacuum bakeout oven, and a flushing pass-thru interchange. The **ALPHA** system is designed for integration with any one of Amada Miyachi America's precision seamsealing, projection welding, laser marking systems, or other customer supplied materials processing equipment.

Alpha glovebox system is intended to be used for clean particle-free environment with low moisture level requirements down to at least -45dewpoint °C for critical processing operations in such industries as semiconductor, medical and pharmaceutical manufacturing. This Glovebox set up for 1 to 3 inch water column Positive pressure operations. This system is also equipped with a front loading dry gas flushing interchange and vacuum bakeout oven intended to extract moisture from process part to guarantee a moisture free device prior to the intended sealing or marking operation.

2.0 SYSTEM TECHNICAL SPECIFICATIONS

ENCLOSURE

Glove Ports:	Two (2) x 10"(254mm) (W) x 7"(178mm) (H) oval ports (oversized model: 2 x 8"(203mm) diameter ports
Enclosure size:	44½" (1130mm) (L) x 35" (889mm) (D) x 19½" (495mm) (H)
Pressure Control:	Manual set Rotameter
Lighting:	Fluorescent
Input Voltage:	208-240 Volts, 50 /60 Hz, Single Phase
Input Current:	15 Amperes
Inert Dry Gas Input:	40 PSIG (276 KPA) 200SCFH (5.6 SCMH)

FRONT LOADING INTERCHANGE

Type:	Front-loading, flush type Polycarbonate construction
Size (internal):	8¼" (210mm) (W) x 7½" (191mm) (H) x 12" (305mm) (L)
Flush Rate:	0 - 50 SCFH (0 - 2.83 SCMH)
Controls:	Flush Variable 0-50 SCFH

VACUUM BAKE OVEN:

Type:	Type 304 electro-polished stainless steel
Size (internal):	14.0" (356mm) (L) x 7 ¾" (197mm) (H) x 7 ¾" (197mm) (W)
Back Fill Rate (min):	10 SCFH .283 SCMH
Vacuum Level:	One ATM (27" Hg) 64.50cm Hg (optional: 20 mTorr)
Backfill Pressure:	4" Water Column 10.16cm Water Column
Max. Temp:	125° Centigrade (200° C. optional)

Safety Over Temperature
heater shutoff:

150° C +/-10°C (125°C model)
220°C +/- 10°C (200°C model)

Controls:

Manual Model:

- Push button Temp Setpoint Control Ambient to rated temperature
- Back Fill- manual push button air valve normally closed On/Off
- Vacuum - Electrical ON/OFF toggle switch

Microprocessor Model:

- Push button to start Vacuum Bakeout cycle (programmable up to 40 vacuum or backfill steps)

3.0 GENERAL SAFETY WARNING

THROUGHOUT THIS EQUIPMENT LETHAL VOLTAGES EXIST. IT IS OF UTMOST IMPORTANCE THAT THE ONLY AMADA MIYACHI AMERICA FACTORY TRAINED PERSONNEL BE ALLOWED TO SERVICE AND OPERATE THIS SYSTEM.

THIS SAFETY SECTION CONTAINS VALUABLE INFORMATION WHICH WILL PREVENT INJURY WHILE OPERATION OR WORKING ON THIS EQUIPMENT. ALL PERSONEL OPERATING OR SERVICING THIS EQUIPMENT IS STRONGLY URGED TO READ AND UNDERSTAND THIS SECTION.

A FINAL NOTE FOR GLOVEBOXES WITH INTEGRATED WORKSTATIONS:

During equipment setup or any diagnostic test involving mechanical motion, be sure hands are clear of all moving parts to avoid injury.

3.1 SAFETY PICTOGRAMS

This section will define the meaning of the safety pictograms indicated in this manual and safety stickers visibly attached throughout the system.

3.1.1 Hazard Pictogram

This symbol signifies a potential hazard to people in the vicinity of the equipment



3.1.2 Hot Surface Pictogram

This symbol signifies a potential burn hazard to people in the vicinity of the equipment due to hot surfaces



3.1.3 Lifting Hazard Pictogram

This symbol signifies a potential lifting hazard to personnel in intending to move or lift the equipment without assistance or equipment. This is also an indication that the said weight of the object is greater than 50lbs (22.6kg) which may require a 2-man lifting operation or a mechanical lifting device.



3.1.4 Electrical Warning Pictogram

This symbol signifies a potential electrical Hazard to people in the vicinity of the equipment. Proper LOCKOUT procedure must be observed when servicing or troubleshooting components with this label.



3.1.5 Finger Pinch or Hand Crush Warning Pictogram

For gloveboxes with integrated workstations with moving parts. This symbol signifies a potential finger pinch or hand crush warning hazard to people in the vicinity of the equipment.



3.1.5 Direct or Reflected Laser Beam Warning Pictogram

For gloveboxes with integrated laser workstations, This symbol signifies a potential source of direct or reflected laser beam exposure warning hazard to people in the vicinity of the equipment.



	<p style="text-align: center;">WARNING</p> <p>To prevent potential injuries, only duly trained operators and personnel are allowed to use the equipment.</p>
	<p style="text-align: center;">WARNING</p> <p>DO NOT disable or bypass safety features installed in the equipment in areas with moving parts.</p>
	<p style="text-align: center;">WARNING</p> <p>DO NOT disable or bypass safety features installed in the equipment in areas with laser beam emission.</p>
	<p style="text-align: center;">WARNING</p> <p>DO NOT not use corrosive solvents in cleaning the glovebox.</p>



WARNING

To prevent injury to personnel, fire and/or equipment failure, do not tamper with over-temperature safety devices installed in the equipment.



WARNING

Only Amada Miyachi America factory trained personnel should perform maintenance and/or equipment troubleshooting procedures



WARNING

Use only Amada Miyachi America recommended replacement parts.



WARNING

DO NOT use equipment other than its defined intended use.



WARNING

Do not disable or bypass Anti-tiedown switches or light curtains installed on systems with integrated workstations



WARNING

Proper machinery voltage and grounding must be applied to the system to prevent possible injury to personnel and or damage to equipment.



WARNING

To prevent puncturing the gloves, do not use jewelry and sharp objects while operating the glovebox.



WARNING

Do not attempt to energize, start, or use the equipment when it has been put into LOCKOUT condition.



WARNING

Always follow equipment LOCKOUT guidelines when maintaining, troubleshooting and recommissioning the equipment.

4.0 **INSTALLATION AND HOOK-UP**

4.1 **UNPACKING:**

The **ALPHA** system is shipped fully assembled. Remove all packing materials and visually inspect the system for obvious signs of shipping damage. Report any damage immediately to the carrier. The carrier claims agent must file a report with the user which can then be forwarded to:

Amada Miyachi America
1820 S. Myrtle Ave
Monrovia, CA 91017 USA
Phone 626.303.5676 • Fax 626.359.7930
service@amadamiyachi.com
24/7 Tech Support: 1-866-751-7378

The Service Department will advise the customer on the actions to be taken to repair or replace damaged equipment.



WARNING

If TILT and DROP indicators attached to the crate are compromised, DO NOT open the crate, inform the carrier and Amada Miyachi America immediately for further instructions.

4.2 POSITIONING:

When positioning the system, observe the following requirements:

Allow a minimum of 24 inches (61cm) behind the system ventilation and for access to the service inputs, and at least 18 inches (45cm) at each end of the system for service accessibility.

Front of the equipment must be clear for easy access to the enclosure's main power breaker.

Position the vacuum pump directly underneath the vacuum bakeout oven, and make all hose connections and electrical connection to the rear panel of the control console located above the vacuum oven on the right hand end of the system.



WARNING

For system accessibility and personnel's safety recommended clearance around the equipment must be observed.

4.3 ELECTRICAL and GASES SERVICE REQUIREMENTS

4.3.1 ELECTRICAL SERVICE

The electrical service input is located on the rear panel of the control console.

The service input is as follows: 208-240 VAC, 50/60 Hz, Single Phase, 15 Ampere



WARNING

Proper machinery voltage and grounding must be applied to the system to prevent possible injury to personnel and or damage to equipment.

4.3.2 GASES SERVICE

The inert gas input for the system is on the main gas rotameter located on the left side wall of the enclosure, above the interchange.

The service input is as follows:

Inert Gas @ 40 PSIG (240 kPa) min. Filtered & regulated supply 3/8 O.D. tube fitting.



WARNING

This glovebox is intended to be used for positive pressure inert gases only for applications which require controlled dry atmosphere. DO NOT USE volatile gas inside the enclosure.

5.0 ENCLOSURE CONTROLS & OPERATION

The *ALPHA* system is equipped with control devices which maintain an inert atmosphere within the work chamber enclosure and interchange, as well as optimal pressure and moisture conditions within the vacuum bakeout oven. A simplified sequence for utilizing the enclosure includes:

Purging the enclosure and interchange areas of moisture with dry inert gas like Nitrogen, Argon or CDA, The enclosure is equipped with 2 purge rotameters; both of are plumbed off of the main gas input.

ENCLOSURE PURGE

The enclosure is purged using the rotameter located on the left side wall of the enclosure labeled ENCLOSURE PURGE, manually adjustable from 0 to 50 SCFH. Recommended flow rate of 10-30SCFH is typically required to achieve and maintain a moisture level of $-45\text{dp}^{\circ}\text{C}$.



WARNING

This enclosure is equipped with an overpressure/purge flow ball valve rated to open at 3 inch water column. DO NOT tamper. Replace with AMYA recommended spare parts only.



WARNING

Insufficient ENCLOSURE purging will compromise the moisture level of the enclosure. Follow recommended purging procedure.

INTERCHANGE PURGE

The interchange is purged using the rotameter labeled INTERCHANGE PURGE also located on the left side of the enclosure. This rotameter is normally turned OFF when the interchange is empty. When introducing parts inside the glovebox, interchange must be purged with dry inert gas with a flow rate of 5 to 10SCFH for at least 2 minutes before opening the inner door to transfer parts into the enclosure. This will ensure that parts entering the enclosure are free from moisture. Insufficient purging will compromise the moisture level of the glovebox.



WARNING

The glovebox interchange is equipped with an overpressure/purge flow ball valve rated to open at 3 inch water column. DO NOT tamper. Replace with AMYA recommended spare parts only.



WARNING

Insufficient INTERCHANGE purging will compromise the moisture level of the enclosure. Follow recommended purging procedure.

5.1 ENCLOSURE CONTROL CONSOLE



WARNING

In the event of electrical component failure, USE ONLY Amada Miyachi America recommended spare parts to prevent fire, possible personnel injury and/or equipment failure.

All electrical components for environmental control processes are located in the control console located atop the vacuum bakeout oven. The "switches" on the front panel are circuit breakers which provide overload protection to the circuits they control, and to the control devices themselves. Front panel system controls are as follows:

MAIN POWER SWITCH / CIRCUIT BREAKER

MAIN POWER circuit breaker - acts as the enclosure system main "on / off" switch. This circuit breaker controls all ancillary components required for operation of the enclosure and vacuum bakeout oven.

	<p style="text-align: center;">WARNING</p> <p>Proper machinery voltage and grounding must be applied to the system to prevent possible injury to personnel and or damage to equipment.</p>
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	<p style="text-align: center;">WARNING</p> <p>Do not attempt to energize, start, or use the equipment when it has been put into LOCKOUT condition.</p>
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	<p style="text-align: center;">WARNING</p> <p>Always follow equipment LOCKOUT guidelines when maintaining, troubleshooting and recommissioning the equipment.</p>
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OVEN HEAT SWITCH / CIRCUIT BREAKER

OVEN HEAT circuit breaker- turns the oven heater circuit on / off.

	<p style="text-align: center;">WARNING</p> <p>Turning this switch ON will energize the heater elements of the vacuum bakeout ovens to the preset temperature setpoint on the temperature controller. ALWAYS use protective gloves to avoid possible burn injury when operating the oven and handling hot parts.</p>
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VACUUM PUMP SWITCH / CIRCUIT BREAKER

VACUUM PUMP circuit breaker- turns the vacuum pump on / off.

Subjecting the parts inside the vacuum bakeout chamber under vacuum and heat will remove moisture from the parts to guarantee a moisture free device prior to hermetic sealing. Depending on customer's process requirements, temperature and cycle time varies per device. For most cases a typical Vacuum bakeout process would be subjecting the parts under continuous vacuum at 85°C for at least 2 hours.

	<p>WARNING</p> <p>DO NOT operate vacuum pumps when inner and outer oven doors are open, this will result to premature vacuum pump failure.</p>
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OVEN HEAT CONTROL provides temperature control for the oven heater. Temperature is manually set prior to bakeout process and real-time oven temperature is displayed via digital display on the front of the controller. UP/DOWN arrow keys are used to program the desired temperature controller setpoint.

	<p>WARNING</p> <p>DO NOT operate ovens beyond its rated capacity.</p>
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VACUUM LEVEL provides real-time display of vacuum level inside the oven measured in inches of Mercury (Hg) or in high vacuum configurations (gauge in mTorr).

OVEN BACKFILL push-button pneumatic switch which activates the inert backfill purge gas to enter the vacuum bakeout oven.

Occasional inert gas backfill like Nitrogen is required during the vacuum bakeout process to facilitate radiant heat transfer from heaters to the parts inside the oven.

After the end of the bakeout cycle, backfilling the bakeout oven with inert dry gas is needed to break the vacuum seal of the oven. This will allow the operator to open the inner chamber door while maintaining the moisture-free environment of the baked-out parts coming from the oven.

5.2 ENCLOSURE SYSTEM START-UP

	<p>WARNING</p> <p>Proper machinery voltage and grounding must be applied to the system to prevent possible injury to personnel and or damage to equipment.</p>
	<p>WARNING</p> <p>Do not attempt to energize, start, or use the equipment when it has been put into LOCKOUT condition.</p>
	<p>WARNING</p> <p>Always follow equipment LOCKOUT guidelines when maintaining, troubleshooting and recommissioning the equipment.</p>

Before applying power to any portion of the system, be sure the following items are checked and or cleared. It is assumed that the system is in its final operating position, the weld head has been aligned, and the system is ready for welding.

Check to see that the vacuum bakeout oven and flush interchange doors are closed and latched.

Verify the electrical service input requirements are met, and all power connections are plugged in.

Verify the proper line pressures for all gases are correct and that all tube connections are tight.

Check to see that the vacuum hose connections are tight, and the power connection is made to the rear panel of the control console.

5.3 SYSTEM POWER-UP

Turn the enclosure system on by pushing the **MAIN POWER** circuit breaker to the ON position.

5.4 ENCLOSURE PURGE / FLUSH INTERCHANGE PURGE

The enclosure gas flow control allows dry nitrogen to flood the enclosure, displacing the moisture laden air through an exhaust check valve. The exhaust valve also bleeds off excess pressure when the operator moves the gloves into the enclosure. When the gloves are withdrawn from the enclosure, the exhaust valve prevents ambient air from being drawn back into the enclosure.

Before the enclosure can be purged, it must be fully secured from the ambient atmosphere. Close all oven and interchange doors. Be sure the gloves are secured to the access ports.

The enclosure inert environment is established by using the gas input rotameter located on the left side wall of the enclosure. With the main supply line connected, open the rotameter by turning the adjustment knob in the clockwise direction.

Monitor the flow of gas into the enclosure by viewing the vertical scale on the rotameter.

The exhaust check valve on the right side wall prevents the enclosure from over-pressurizing.

The flush interchange is also equipped with a gas flow rotameter for purging and a check valve located at the back wall of the interchange which prevents from over-pressurizing.

When introducing materials or components into the enclosure, or when removing materials or components from the enclosure, the interchange acts as the pass through between the room (ambient) environment and the inert environment of the enclosure. In order to keep the integrity of the inert environment, a quick purge of the interchange is required before items are moved into or out of the interchange.

This is accomplished by turning the adjustment knob on the rotameter located on the interchange clockwise until a flow of gas is established. Setting a higher flow rate will result in a quicker purge of the interchange. The interchange is also equipped with an exhaust check valve to prevent over-pressurizing. When removing materials from the enclosure, be sure that both interchange doors are closed and latched. Open the rotameter to establish gas flow. Once the interchange has purged, open the inner door between the interchange and the enclosure. Move the materials into the interchange and close and latch the inner door. Open the outer door, and remove the materials from the interchange. Close and latch the outer door. Before attempting to open the inner door again, a purge of the interchange is required. This prevents the ambient atmosphere from contaminating the enclosure inert atmosphere. For introducing materials into the enclosure, the same procedure must be followed.



WARNING

Although exhaust process gas from the glovebox are inert and are not harmful to equipment operator and personnel in the vicinity of the glovebox; it is highly recommendable to install all exhaust lines from the glovebox to a facility exhaust line or outside the clean room environment.

5.5 OVEN OPERATION

The *ALPHA* vacuum bake out oven is equipped with heat, vacuum, and gas backfill (purge) controls.

Oven temperature is strictly controlled by the solid state temperature controller which provides a continuous digital display of the bakeout process temperature. The temperature is maintained within +/- 5°C of programmed set point. A type J thermocouple probe imbedded in the oven wall provides monitoring of the temperature. The oven heater is a one-piece "wrap around" heater which completely blankets the outer walls of the oven. This provides uniform heat distribution over the entire oven body.

	<p>WARNING</p> <p>Turning this switch ON will energize the heater elements of the vacuum bakeout ovens to the preset temperature setpoint on the temperature controller. ALWAYS use protective gloves to avoid possible burn injury when operating the oven and handling hot parts.</p>
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To initiate a bakeout process, set the temperature controller to the desired process temperature (in degrees Celsius) by adjusting the temperature controller dial indicator. Place the to-be-welded components or materials into the oven and be sure that both inner and outer oven doors are closed and latched. Turn on the **OVEN HEAT** circuit breaker. The display on the temperature controller will indicate the current oven process temperature.

If specifications call for the oven to be pre-heated, wait until the temperature controller displays the preheat temperature before placing the components in the oven.

If specifications call for a timed bakeout process, the machine operator must monitor the time elapsed.

The vacuum pumping system can be initiated at any time prior to or during a bakeout cycle. The pump is controlled by the **VACUUM PUMP** circuit breaker located on the control console. The coarse vacuum gauge displays the vacuum level in inches of mercury (Hg). The gauge reads 0 in Hg @ 1 Atmosphere of pressure (29.9 in or 760 mm Hg). Vacuum increases as the indicator registers higher values in inches of Hg. The vacuum gauge will gradually register an increase in vacuum to approx. 27 inches Hg as the pump continues to operate. In high vacuum configurations, an analog gauge is used, which measures from atmosphere to 0 mTorr.

Activate the vacuum pump by turning on the **VACUUM PUMP** circuit breaker.



WARNING

DO NOT operate vacuum pumps when inner and outer oven doors are open, this will result to premature vacuum pump failure.

For timed vacuum pump down, the machine operator must monitor the time elapsed.

At the end of the bakeout or vacuum bakeout cycle, the oven must be backfilled (purged) with inert gas so that the materials in the oven can be introduced into the enclosure for processing without contaminating the inert enclosure atmosphere. The backfill is actuated by pushing the front panel **BACKFILL** push button. The button must be held until the vacuum gauge reads 0 in Hg (or “ATM” atmospheric pressure for high vacuum configuration) before the inner door can be opened.

Once 0 in Hg (or ATM for high vacuum configuration) has been reached, release the backfill push button. The materials in the vacuum oven can now be introduced into the enclosure. Open the inner oven door and remove the materials from the oven. Close the oven door and make sure that it is latched.

As with the flush interchange, always purge the oven with gas at some point after the outer door has been opened and closed, before the inner door is opened. This prevents enclosure environment contamination.



WARNING

NEVER LEAVE AN OVEN OR INTERCHANGE OUTER DOOR OPEN WHILE ITS INNER DOOR IS OPEN. THE ENCLOSURE ENVIRONMENT WILL BECOME CONTAMINATED WITH ROOM ATMOSPHERE AND COMPONENTS MAY NOT BE PROCESSED TO SPECIFICATION.



WARNING

There are no user serviceable parts for the oven assembly. Please contact the AMYA service department if component failure within the oven assembly is suspected.



WARNING

Do not attempt to remove the insulating material surrounding the oven without first consulting the AMYA service department.

6.0 SYSTEM MAINTENANCE

The *ALPHA CONTROLLED ENVIRONMENT GLOVEBOX* is designed to provide long, trouble free service. A regular schedule for preventive maintenance will minimize corrective maintenance problems.



WARNING

If trouble cannot be easily corrected, AMYA qualified service technicians should be called.

GENERAL SAFETY WARNING:



WARNING

Throughout this equipment, lethal voltages exist. It is of the utmost importance that the service or maintenance personnel be completely familiar with all aspects of this equipment and its operation prior to use.

6.1 ENCLOSURE MAINTENANCE

Regularly inspect all power cords, control leads, cables, and gas lines for signs of wear and loose connections.

6.1.1 WINDOW

The glass window in all systems is custom cut for each system. If the window is in need of replacement, it should be removed and brought to the nearest glass fabricator for measurement and replacement. The window is 1/4" thick laminated automotive safety glass, made up of two pieces of glass laminated together with an anti-shatter clear center core.

For systems with integrated laser workstations, consult AMYA service department for replacement laser safety window if needed.



WARNING

Use only Amada Miyachi America recommended replacement laser safety window.

6.1.2 ENCLOSURE GLOVES

The *Alpha* system employs nitrile gloves. The gloves should only be cleaned with mild soap and water solution. The life of the gloves is strictly related to the care used by the operator. They should be inspected at least once a week and replaced once a year.



WARNING

To prevent puncturing the gloves, do not use jewelry and sharp objects while operating the glovebox.

6.1.3 VACUUM OVEN DOOR SEALS

The vacuum oven employs 30 durometer, pigment-free silicone O-rings as the door seals. Under normal use, the seals will last 1-2 years, but should be examined every month. The seals are held in place by use of a dovetail groove machined into the door plate. In addition to examining the seal itself for signs of degradation, the sealing surface on the oven structure should be kept clean, and free of any foreign matter which could cause the seal to not mate flush to the oven.



WARNING

For 200°C model vacuum bakeout oven it is required to attach a water cooling recirculator to prevent premature oven gasket wear.

6.1.4 VACUUM PUMP

The vacuum pump requires very little maintenance. Visually inspect the pump and keep the motor cooling slots in the pump housing free from dirt, dust, or other obstructions. Check vacuum hose connections at least once a week for tightness. In high vacuum configuration, refer to vacuum pump manual for maintenance.

 **WARNING**
DO NOT operate vacuum pumps when inner and outer oven doors are open, this will result to premature vacuum pump failure.

 **WARNING**
Refer to third party vacuum pump manual for recommended scheduled maintenance to avoid premature pump wear.

7.0 GLOVEBOX ENCLOSURE WITH INTEGRATED WORKSTATIONS

The various workstations like projection welders, seam sealers and laser markers can be integrated to the ***ALPHA CONTROLLED ENVIRONMENT GLOVEBOX***. Please refer to accompanying workstation operating manual before operating the workstation.

 **WARNING**
DO NOT operate integrated workstations without proper training from AMYA trained personnel.

 **WARNING**
Do not disable or bypass Anti-tiedown switches or light curtains installed on systems with integrated workstations

Noise level of Gloveboxes with integrated projection welding workstation and dry vacuum pumps. Test performed using TES1351 Sound Level Meter

Test range Hi – 75 to 130dB

Response setting Fast Function A

- Glovebox With Model 300 vacuum pumps spec_70+/-2dB actual 60-65
- Glovebox With Model 315 vacuum pumps spec_80+/-2dB actual 70-75
- Glovebox With Model 328 vacuum pumps spec_85+/-2dB actual 75-80
- Glovebox With Model P9000 projection welder spec_90+/-2dB actual average 65dB during welding and 85dB during exhaust phase of SS1 pneumatic weld head controller

8.0 GLOVEBOX ENCLOSURE WITH INTEGRATED GAS MIXER & ANALYZERS

There are various gas mixers and analytical gas analyzers like MOISTURE MONITOR, OXYGEN MONITORS and HELIUM ANALYZER which can be integrated to the **ALPHA CONTROLLED ENVIRONMENT GLOVEBOX**. Please refer to accompanying third party operating manual before operating the analytical instruments and gas mixers.



WARNING

Refer to third party operating manual and recommended scheduled maintenance of analytical gas analyzers and mixers.



WARNING

Refer to third party operating manual for proper care and use of analytical instruments to prevent sensors from being exposed to excessive moisture.

9.0 GLOVEBOX ENCLOSURE WITH INTEGRATED BMI500 GAS DRYER

For **ALPHA CONTROLLED ENVIRONMENT GLOVEBOX** which require low Oxygen and moisture levels; the BMI500 gas dryer and recirculator is required. Please refer to accompanying BMI500 operating manual before operating the gas dryer.



WARNING

Refer to third party operating manual and recommended scheduled maintenance of analytical gas analyzers and mixers.



WARNING

Refer to AMYA BMI500 gas dryer operating manual for proper care and use of equipment. Exposing the gas dryer to ambient atmosphere will saturate the moisture and oxygen getter and will result to poor performance or even equipment failure.