

MIYACHI AMERICA CORPORATION

The World Leader in Hermetic Sealing Systems

AX5000 Operational Manual

AX5000 Operational Manual

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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 Miyachi America AX5000 gloveboxes.

Should questions arise, or if you have suggestions for improving this manual, please contact:

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Getting Started with the GLOVEBOX

Powering up the GLOVEBOX

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 power connection is made.

Verify that all component circuit breakers are in the “OFF” position, and proceed to energize the system by turning on the “CB1” main circuit breaker. Then turn on all the remaining component circuit breakers.

Next turn on the computer power and log on to the system.

Powering down the GLOVEBOX

Stop all oven cycles.

Close down the Windows application software. Shut down the computer. Wait for the computer to shut down.

De-energize the system by turning off the “CB1” main circuit breaker.

Next turn on the computer power and log on to the system.

Running the GLOVEBOX

Start the GLOVEBOX application

Double-click the GloveBox icon on the desktop to start up the GLOVEBOX user interface. The Login Window will be presented (see Figure 1 Login Screen).

Log in using your assigned username and password.

Different user groups have different levels of access to the GLOVEBOX system. The administrator users can access all the GLOVEBOX functions, whereas the operator users only have access to very limited functions. The system is configured on shipment with a single administrator account with user name of “admin”. Other user names can be added by starting the GloveBox software and logging on to the system using this user name and the associated password. The details are explained in the log on section.

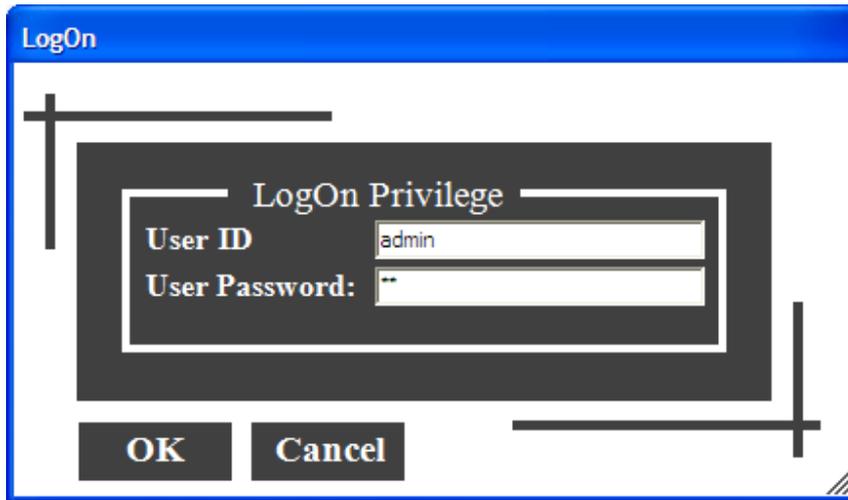


Figure 1 Login Screen

GloveBox Status Window Information

After entering a valid User Name and Password, the GLOVEBOX application establish communication with the system's controller, which monitors and controls all GloveBox status. Then it tries to turn on the oven temperature controllers and puts them in the standby mode.

The main Glovebox display window will be presented which has five pull down menu choices: File, Logon, Glovebox, Batch and Help (see Figure 2).

The oven temperatures, oven vacuum pressures, enclosure pressure, moisture, Oxygen and Helium levels are displayed on this window. If the communications with the Galil controller and the oven temperature controllers are established successfully, these parameters are updated dynamically.

In addition, the environment enclosure purging status (on or off), the left and right chamber working statuses (Pumping Down, Backfilling or Standby), the chamber cleanness status (clean or need pump down) and the inner/outer door statuses (open or close) are also updated dynamically on this window.

At the bottom of this status window, there are four square-shaped alarms designed to alert the operator of any unfavorable moisture, oxygen, helium and process conditions of the enclosure. Under normal conditions, the color of these alarms is green. If any one of these four parameters goes beyond the preset safe limits, the color of the corresponding alarm turns red.

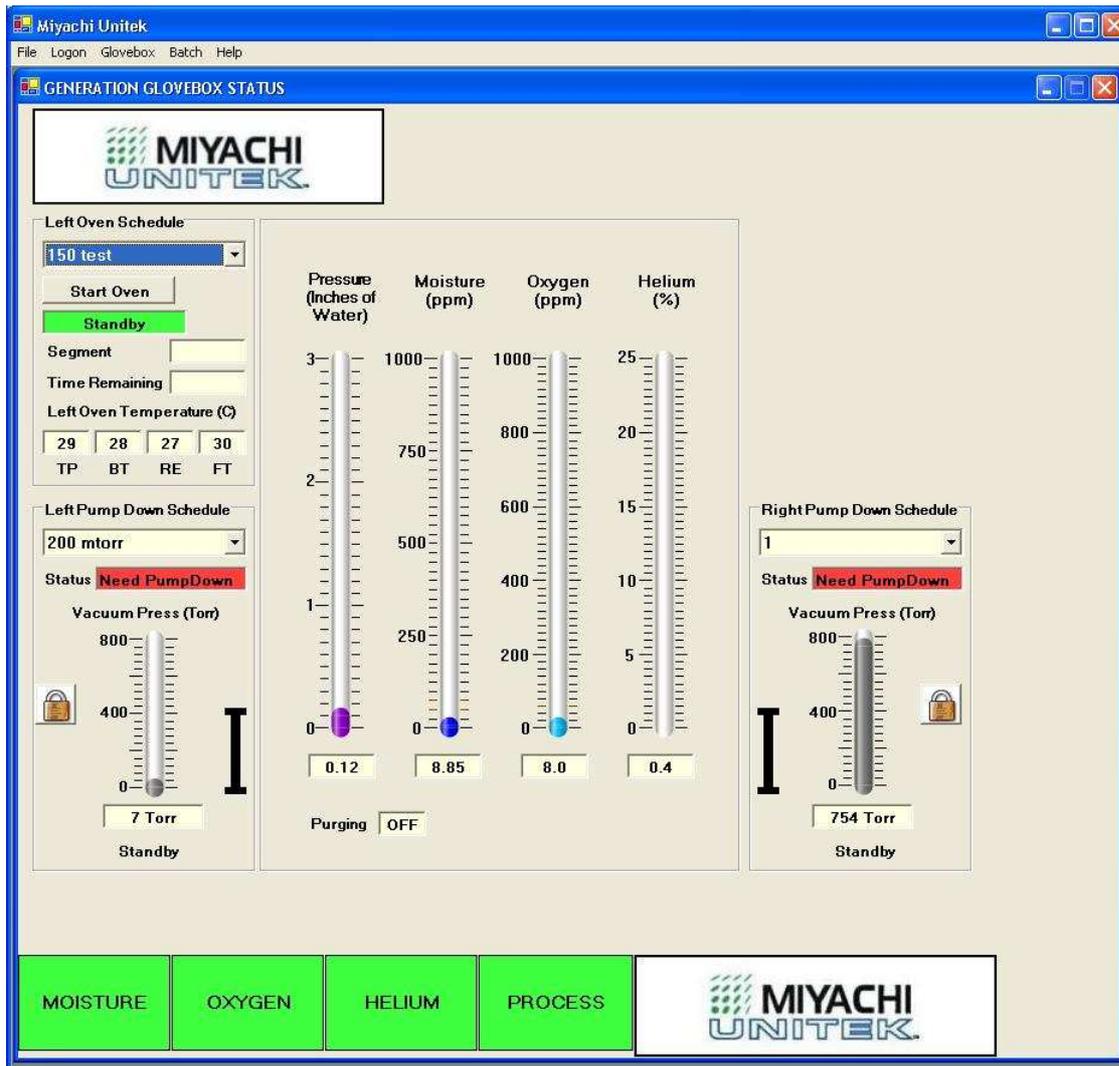


Figure 2 GLOVEBOX Main window and the GloveBox Status window.

At the upper center of the GloveBox status window is information on GloveBox activities, controls and errors. If none of these are present or happening, this area of the window is blank.

For each chamber, the status of the outer door and inner door is shown. If the outer door lock is engaged, a closed lock icon is shown to the left of the graphical pressure level. If the outer door lock is disengaged, the lock icon is open. If the inner door is closed, a graphical line is in the lower position to the right of the graphical pressure level. If the inner door is not closed, then the graphical line is above the lower position.

Run an oven Schedule

When the GLOVEBOX program is started, as mentioned previously, the oven temperature controllers are turned on and are put in the standby mode. The left or right oven can be started by first selecting an oven schedule and then click the corresponding Start Oven button. To select an oven schedule for the left or right oven, click the drop down list box under the Label “Left Oven Schedule” or “Right Oven Schedule” and then highlight the schedule you would like to use. The

selected oven schedule will become active. If batch report is not active, the oven will start immediately after the Start Oven button is pressed. If batch report is active, the user will be prompted to enter the operator name and batch id.

As soon as the oven is started, the text for the Start Oven button changes to Stop Oven. The current segment number in the schedule and the time remaining for that segment are displayed in the corresponding text boxes under the Stop Oven button.

An oven schedule is a series of programmed steps that complete an entire vacuum bake-out process.

For a wall heated oven, there are four temperatures displayed just under the label “Left Oven Temperatures” or “Right Oven Temperatures” for the left or right oven, each representing the temperature of side (left or right), top, bottom and rear walls of the oven. The temperatures are updated every second.

The oven stops when the oven schedule is done or when the Stop Oven button is pressed. The text of the Stop Oven button changes back to “Start Oven” after the oven stops.

If the user presses the Start Oven Button when the selected oven schedule is empty, a message will be issued telling the operator that the schedule is empty and ask the operator to select a different oven schedule to run.

If an oven is currently running an oven schedule, any attempt to open the inner or outer door of that oven is denied and a message is displayed. At the completion of the oven schedule, the operator is allowed to open the oven’s inner door to pass the parts in the oven to the enclosure. Access to the outer door is allowed only after the inner door is opened at least once at the completion of an oven schedule.

If the oven is stopped prematurely by pressing the Stop Oven button, then access to either the inner door or the outer door is allowed.

Create and Edit an Oven Schedule

An oven schedule defines the required oven states and the time duration for each state for a particular bake-out cycle. The oven states in an oven schedule include oven temperature, oven vacuum or backfill condition, and oven chamber vacuum pressure. Each oven state and its time duration in an oven schedule are called a segment. Generally, an oven schedule contains one or more segments.

A segment consists of four to five parameters depending on the Segment Condition parameter setting. The first parameter in a segment is the Segment Number starting from one for the first segment in the schedule. The second parameter is the Temperature Set Point in degree centigrade for the segment. The third parameter is the Time Duration of the segment in hours. The fourth parameter is the Segment Condition parameter. The Segment Condition can be set to Vacuum or Backfill. The last parameter is the Vacuum Pressure Set Point, with pressure units of Torr, and is only valid if the Segment Condition for the segment is set to Vacuum.

There is one more parameter in an oven schedule called Oven Control Method, which controls how the time duration for each segment is calculated. This parameter can be set to one of three

choices; Time or Temperature or Temperature & Pressure. This parameter applies to all the segments in a given oven schedule. If this parameter is set to Time, the time duration is counted from the start of the oven schedule (for the first segment) or from the completion of the previous segment (for segments other than the first segment). If this parameter is set to Temperature, the time duration is counted from the time when the oven temperature, averaged over the oven walls or heated shelves, depending on if the oven has wall or shelf heating, rises above the Temperature Set point. If this parameter is set to Temperature & Pressure, the time duration is counted from the time when both the oven temperature and pressure reach their respective set points.

Oven Type determines which type of oven the glovebox currently have. Depending on the types of oven, there are usually 3-5 heating zones.

OverTemp SP Abort can be set to a certain temperature where the oven schedule will abort if the oven temperature overshoots by the amount of the temperature value. To disable this feature, simply put 0 as the temperature value.

Check the Batch Log to generate batch report for the selected schedule.

Oven Assignment determines which oven can use the selected schedule. Selecting all means all ovens can use the schedule.

The following (Figure 3) is an example oven schedule containing one segment and the control method is set to Time. The Segment Condition is set to Backfill for 1 hour and then Vacuum for another hour.

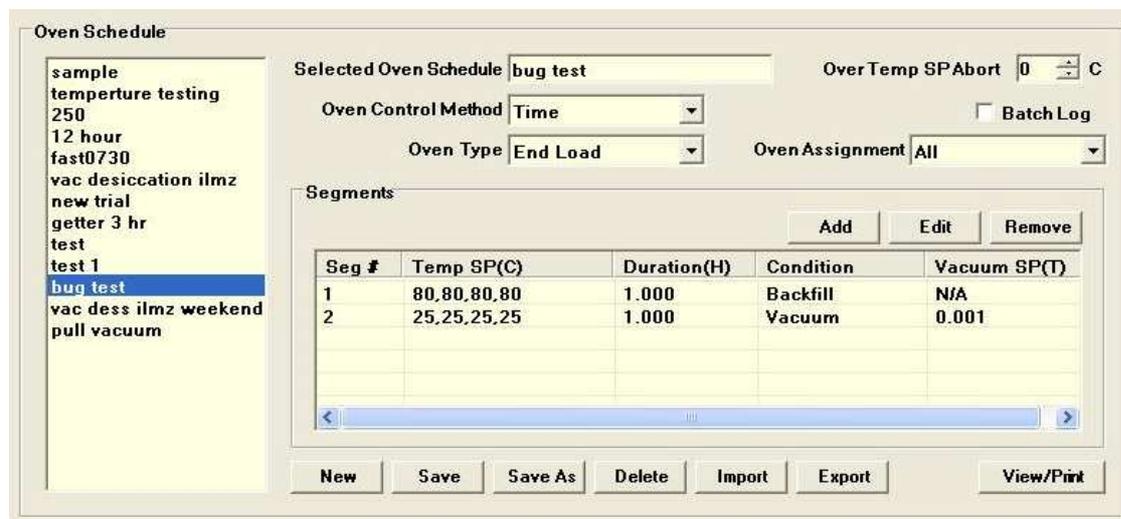


Figure 3 Example Oven Schedule

Editing and Creating Oven Schedule

Oven schedules are created and edited using a visual schedule editor (Figure 4). The Schedule Editor is accessed by clicking the “GloveBox” Main window menu, then select “Pump Down and Oven Settings”. The user must have schedule editing “password rights” to be able to change the oven schedule parameters or create new schedules.

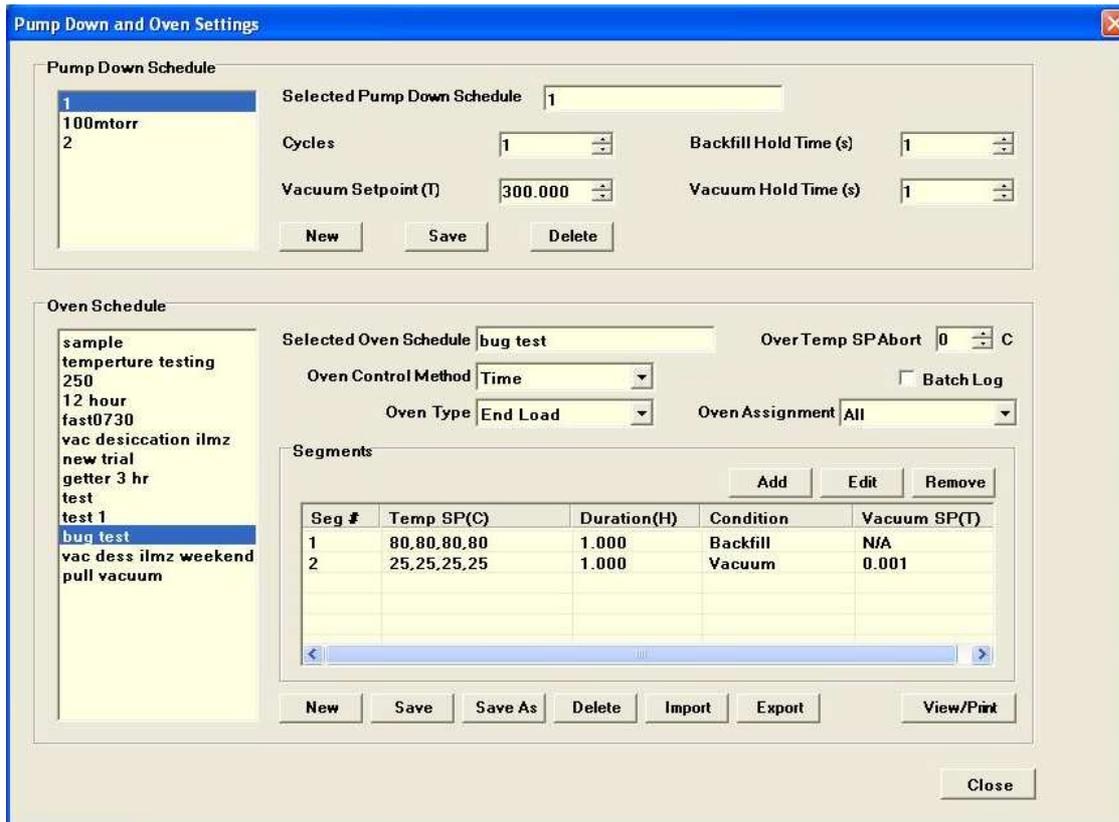


Figure 4 Pump Down and Oven Settings Screen

Please note that the Oven Schedule Editor and the Pump Down Schedule Editor are both located on the same USER INTERFACE SCREEN shown above.

To edit an existing oven schedule, first select the schedule by highlighting it in the Oven Schedule list box located at the lower left part of the USER INTERFACE SCREEN. The selected oven schedule is then displayed next to it on the right on the USER INTERFACE SCREEN. Each segment in an oven schedule can be removed (deleted) or edited and a new segment can also be added to the schedule using the Remove, Edit and Add buttons.

After you have made all the desired changes, click the SAVE button located at the bottom of the Pump Down and Oven Settings USER INTERFACE SCREEN to save the changes to the oven schedule.

Click the Save As button to generate a new schedule using with the parameters of the current schedule.

The import button is used to create a new schedule from a .TXT file created by user. The export button is used to save as the selected schedule into a .TXT file.

Click the View/Print button to display the schedule information as shown below. This can also be used to print the schedule information.

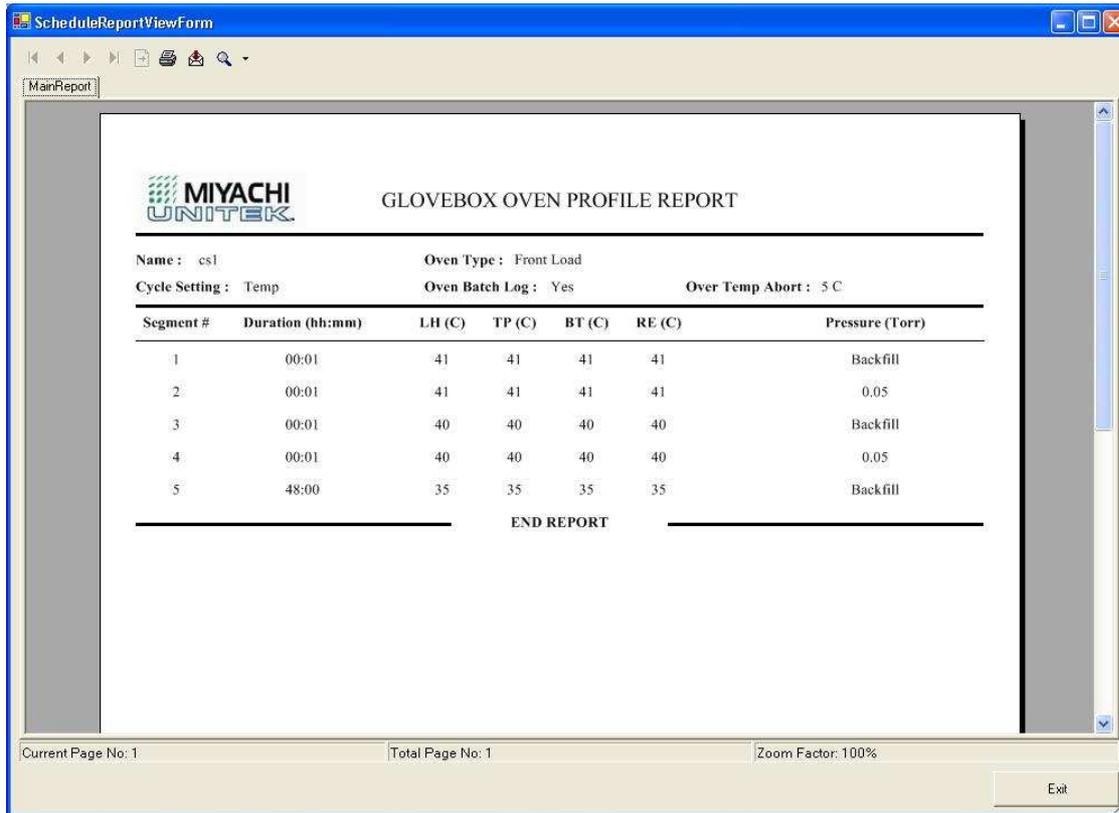


Figure 5 Schedule Report Screen

Add a New Segment

Click the Add button to add a new segment at the selected segment position and push the selected segment one position lower in the schedule. If no segment is selected before clicking the Add button, the new segment will be appended at the end of the schedule. Clicking the Add button opens the following Add New Segment Dialog box:

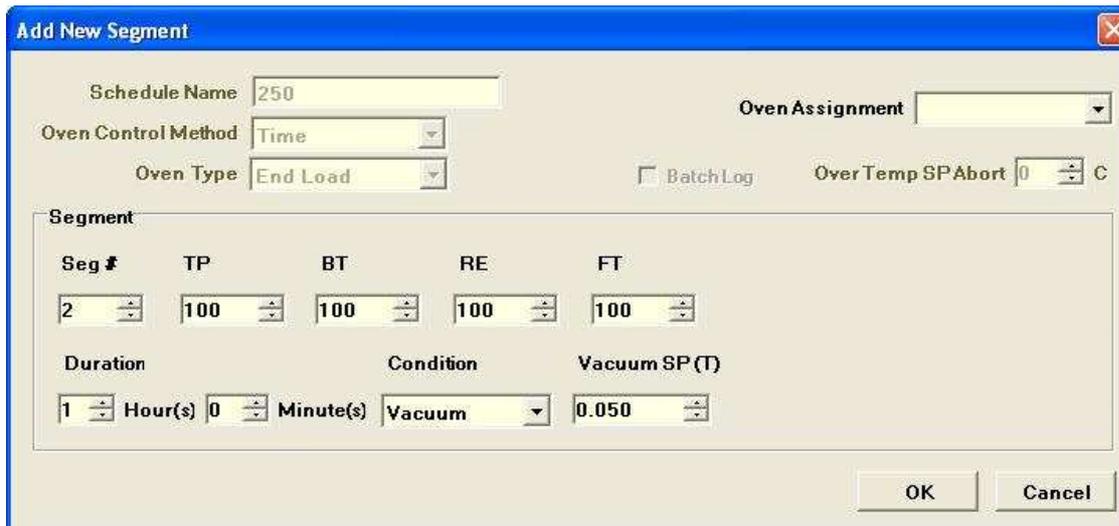


Figure 6 Add New Segment

Change the default parameters as necessary and then click the “OK” button to finish.

Edit an Existing Segment

Select the segment to be edited by highlighting that segment and then click the Edit button. The following edit window shows up as a result:

Seg #	TP	BT	RE	FT
1	200	200	200	200

Duration: 1 Hour(s) 0 Minute(s) Condition: Backfill

Figure 7 Edit Segment Screen

Select the numeric up-down control or the drop down list desired and use the middle mouse button or the keyboard or the up and down arrow of the control to change the value for that parameter. Then click the OK button to end the segment editing. Please note that changing the segment number will move the segment up or down in the schedule.

Delete an Existing Segment

Select the segment to be removed and then click the Remove button. The selected segment will be removed from the oven schedule.

Create a New Schedule

If you wish to create a new schedule, press the New button on the Pump Down and Oven Setting USER INTERFACE SCREEN. The following dialog window with all the default parameter values appears.

Seg #	LH	TP	BT	RE	Duration	Condition	Vacuum SP (T)
1	100	100	100	100	1 Hour(s) 0 Minute(s)	Vacuum	0.050

Figure 8 Create New Oven Schedule Screen

Enter a name for the new oven schedule and make changes to the default parameter values as necessary. Then click OK. A new oven schedule with the specified name and containing a single segment is created and added to the GLOVEBOX schedule database. The new schedule will be displayed in the list box under the “Oven Schedule” label located at the lower left part of the Pump Down and Oven Setting USER INTERFACE SCREEN.

After this point, you can edit this new oven schedule to add more segments or to change the parameters in an existing segment or even delete an existing segment as described in the previous sections.

Important: Save Schedule After Entry of 500 New Schedule Steps

The Microsoft Windows XP Operating System has a memory limitation. The user should execute the following steps when entering a schedule with a large number of steps:

After entering 500 schedule steps, user must save the schedule, close the Schedule Edit Screen and then reopen the Schedule Edit Screen to enter additional schedule steps.

If the user enters more than 500 schedule steps without saving, a Windows Operating System error may occur. If that error occurs user should then close the Glovebox software application and then restart the Glovebox software.

Delete an Existing Oven Schedule

To delete an existing schedule in the GLOVEBOX schedule database, highlight the schedule in the Oven Schedule list box and click the Delete button located at the bottom of the USER INTERFACE SCREEN. A dialog box shows up asking you if you are sure to delete this oven schedule. Click OK will delete this oven schedule from the GLOVEBOX schedule database.

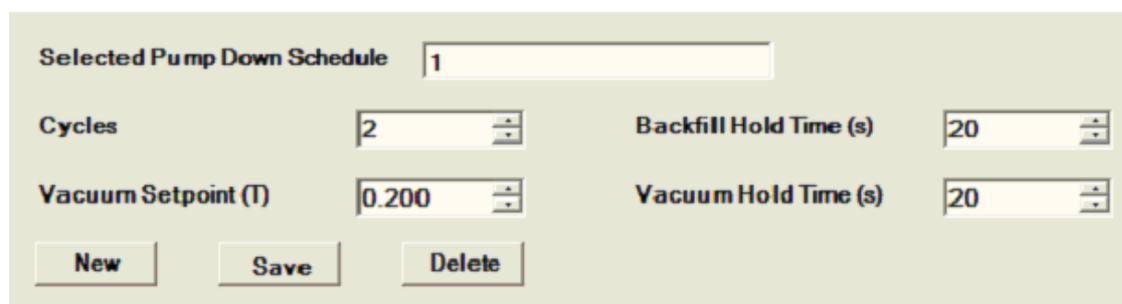
Create and Edit a Pump Down Schedule

A Pump Down schedule is used to evacuate gas in an oven/interchange chamber with vacuum, and backfill the chamber with process gas to prevent contamination of the enclosure environment. In order to completely get rid of the wet gas in an oven/interchange chamber, multiple evacuate and backfill cycles may be needed.

The two important parameters in a Pump Down schedule are the Vacuum Set Point, which is used in the evacuate process, and the Evacuate/Backfill Cycles. In order to effectively remove wet gas from the oven/interchange chamber, two additional parameters are included in a pump down schedule, namely the Backfill Hold Time and the Vacuum Hold Time. See Figure 8 for an example of the pump down schedule.

Backfill Hold Time – the time duration that a backfill process lasts.

Vacuum Hold Time – the time duration from the time that the chamber vacuum level reaches the preset vacuum set point to the time when a subsequent backfill starts.



The screenshot shows a configuration window for a Pump Down Schedule. It features a text input field for the schedule name, currently containing '1'. Below this are four spinners: 'Cycles' set to 2, 'Backfill Hold Time (s)' set to 20, 'Vacuum Setpoint (T)' set to 0.200, and 'Vacuum Hold Time (s)' set to 20. At the bottom are three buttons: 'New', 'Save', and 'Delete'.

Figure 9 Example Pump Down Schedule

Create a New Pump Down Schedule

Pump Down schedules are created and edited using a visual schedule editor (Figure 4). The visual schedule editor is accessed by clicking the “GloveBox” main window menu, and select “Pump Down and Oven Settings”. The user must have schedule editing “rights” to be able to change the pump down schedule parameters or create new schedules.

To create a new pump down schedule, click the New button located on the upper half of the Pump Down and Oven Settings USER INTERFACE SCREEN (see Figure 4). The Create New Pump Down Schedule dialog window (Figure 9) with all default settings shows up. Enter a schedule name, change the default parameter values as necessary and click OK to add this new schedule to GLOVEBOX database. After the OK button is clicked, the new schedule will be displayed in the Pump Down Schedule list box on the upper-left part of the visual schedule editor USER INTERFACE SCREEN.

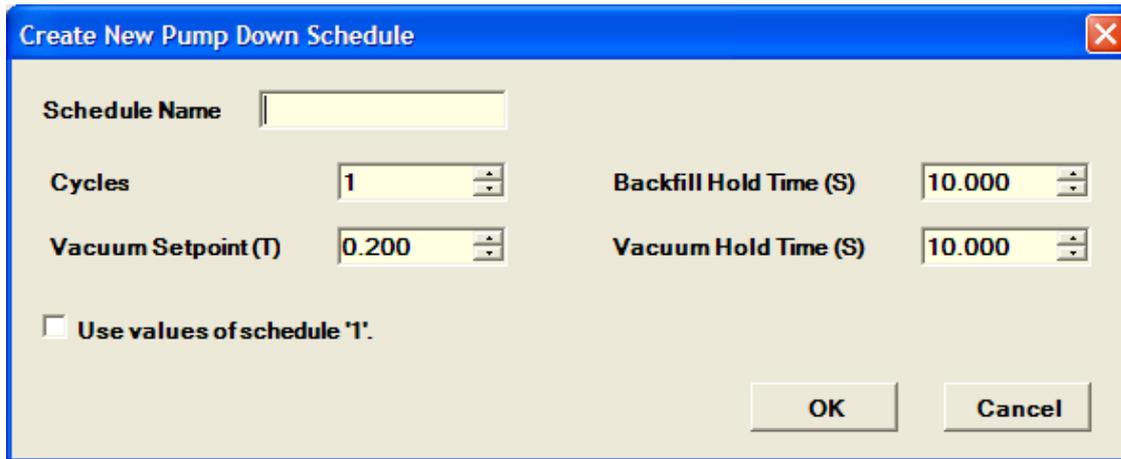


Figure 10 Create New Pump Down Schedule Screen

Edit an Existing Pump Down Schedule

Select the pump down schedule to be edited from the Pump Down list box in the Schedule editor USER INTERFACE SCREEN. The selected pump down schedule is displayed on the USER INTERFACE SCREEN. Then change the schedule parameter as necessary and click the Save button to save the changes to the GLOVEBOX database.

Delete an Existing Pump Down Schedule

To delete an existing pump down schedule in the GLOVEBOX database, highlight the schedule in the Pump Down Schedule list box and click the Delete button. A dialog box shows up asking you if you are sure to delete this pump down schedule. Click OK will delete this pump down schedule from the GLOVEBOX database.

Environment Settings

The Environment Settings dialog window is accessed by clicking the “GloveBox” Main window menu and select “Environment Settings”. The user must have proper “rights” to be able to change the environment setting parameters.

Parameter	Value
Environment Pressure (In of Water Column)	
High Limit	0.0
Low Limit	-0.5
Oxygen (ppm)	
Alarm Level	0
Purge On Setpoint	1025
Purge Off Setpoint	1024
Weld Inhibit Level	0
Moisture (Dewpoint Degrees C)	
Alarm Level	0
Purge On Setpoint	0
Purge Off Setpoint	-1
Weld Inhibit Level	0
Helium (%)	
Alarm Level	0.0
Weld Inhibit Level	0.0

Figure 11 Environment Settings Screen

The Environment Settings USER INTERFACE SCREEN is shown in Figure 10. There are as many as 14 environment control parameters that can be set from this USER INTERFACE SCREEN. These parameters are stored in the GLOVEBOX database and downloaded to the controller when the GLOVEBOX program is started or when the settings are updated. To update these settings, enter the new values in the desired fields and then press the OK button.

The following is a description of these parameters.

Environment Pressure Settings:

Control Capability: The GloveBox maintains an over pressure condition inside the GloveBox.

High Limit – The enclosure over pressure valve opens when the differential enclosure pressure exceeds this setting. The units are inches of water column.

Low Limit – The enclosure gas inlet valve opens when the differential enclosure pressure drops below this setting. The units are inches of water column.

NOTE:

The High Limit setting is always at least 0.5 greater than the Low Limit setting. This is enforced by the GLOVEBOX software to ensure that the system works smoothly.

Moisture Settings:

Alarm Level – The color of the moisture alarm turns red when the dew point temperature of the enclosure exceeds this setting and turns back to green when the dew point temperature drops below this setting.

Purge On Setpoint – The purging process starts when the dew point temperature of the enclosure goes above this setting.

Purge Off Setpoint - The purging process stops when the dew point temperature of the enclosure drops below this setting.

Weld Inhibit Level – GLOVEBOX software will send out a HIGH signal if the dew point temperature exceeds this setting to stop production equipment, such as a seam welder, from conducting further operation under the unfavorable condition.

NOTE:

The moisture Purge On Setpoint is always greater than the moisture Purge Off Setpoint and smaller than the Weld Inhibit Level. The GLOVEBOX software prevents the user from entering moisture purge settings that do not follow this sequence, to ensure the smooth operation of the system.

Oxygen Settings:

Note: An optional oxygen analyzer needs to be installed for these parameters to be active.

Alarm Level – The color of the Oxygen alarm turns red when the Oxygen level in the enclosure exceeds this setting, and turns back to green when Oxygen level drops below this setting.

Purge On Setpoint – The purging process starts when the Oxygen level in the enclosure goes above this setting.

Purge Off Setpoint - The purging process stops when the Oxygen level in the enclosure drops below this setting.

Weld Inhibit Level – GLOVEBOX software will send out a HIGH signal if the Oxygen level in the enclosure exceeds this setting to stop production equipment, such as a seam welder, from conducting further operation under the unfavorable condition.

NOTE:

The Oxygen Purge On Setpoint is always greater than the Oxygen Purge Off Setpoint and smaller than the Weld Inhibit Level. The GLOVEBOX software prevents the user from entering oxygen purge settings that do not follow this sequence, to ensure the smooth operation of the system. The unit for the values are either in % or ppm depending on the type of oxygen analyzer installed.

Helium Settings:

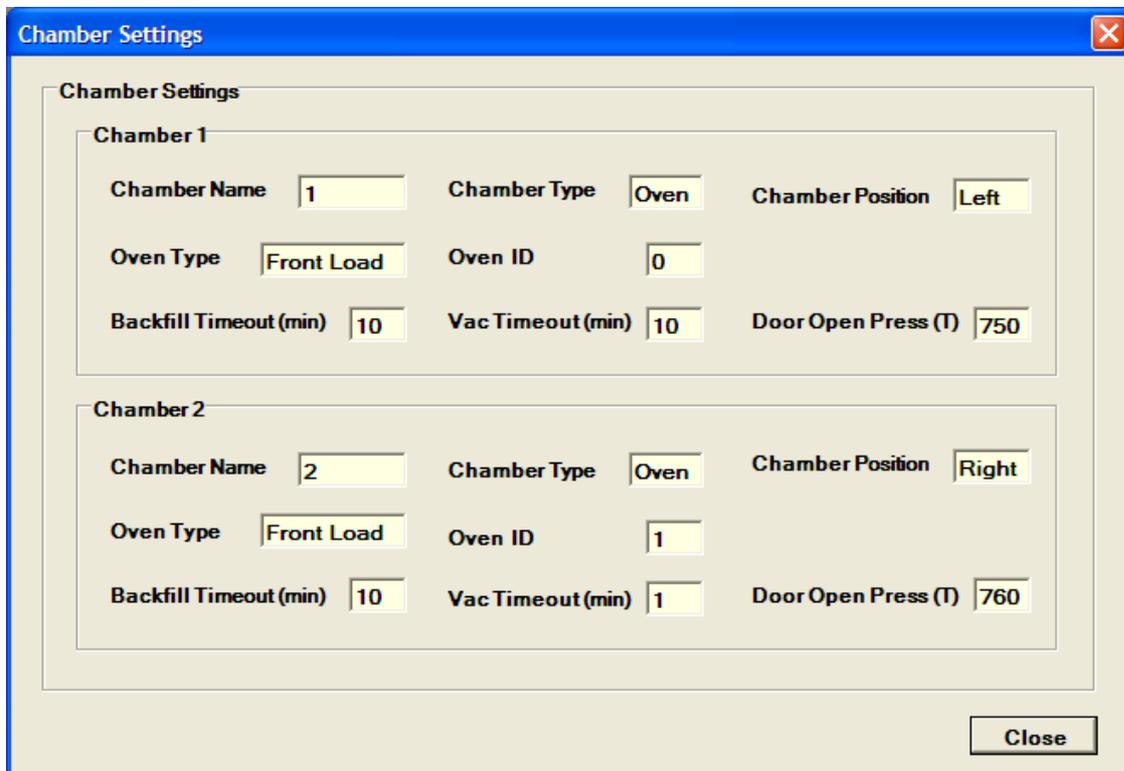
Note: An optional helium analyzer needs to be installed for these parameters to be active.

Alarm Level – The color of the Helium alarm turns red when the Helium level in the enclosure drops below this setting, and turns back to green when the Helium level exceeds this setting.

Weld Inhibit Level – GLOVEBOX software will send out a HIGH signal if the Helium level in the enclosure drops below this setting to stop production equipment, such as a seam welder, from conducting further operation under the unfavorable condition.

Chamber Settings

The current system oven/interchange chamber settings can be viewed by clicking the “GloveBox” menu from the GLOVEBOX main window and selecting the “Chamber Settings” menu item. The following is an example Chamber Setting screen (Figure 12):



The screenshot shows a window titled "Chamber Settings" with a close button in the top right corner. The window contains two sections for configuring chambers. Each section has a title and several input fields for different parameters.

Chamber 1					
Chamber Name	1	Chamber Type	Oven	Chamber Position	Left
Oven Type	Front Load	Oven ID	0		
Backfill Timeout (min)	10	Vac Timeout (min)	10	Door Open Press (T)	750

Chamber 2					
Chamber Name	2	Chamber Type	Oven	Chamber Position	Right
Oven Type	Front Load	Oven ID	1		
Backfill Timeout (min)	10	Vac Timeout (min)	1	Door Open Press (T)	760

A "Close" button is located at the bottom right of the window.

Figure 12 The Chamber Settings Screen

The settings can only be viewed from here. If you would like to update the settings please use the GloveBox Configurator tool explained in a previous section to do so.

Graphical Data Display

GLOVEBOX monitors the statuses of the oven/interchange chambers and GloveBox enclosure, and logs the relevant important parameters. These parameters include enclosure environment pressure, enclosure Helium level, enclosure Oxygen level, enclosure moisture level, left chamber vacuum pressure, left oven temperature, right chamber vacuum pressure and right oven temperature. Some of these parameters may not be available depending on the configuration of the system. All these time dependent parameters can be viewed graphically from the GLOVEBOX graph data viewer.

To access the GLOVEBOX Graph data viewer, select the “Graph Data” item from the File menu of the GLOVEBOX main window. The following is a graph data viewer screen:



Figure 13 The GLOVEBOX Graph Data Viewer Screen

View Real Time Graph Data

To view the current process parameters in real time, click the Real Time button and the environment pressure parameter will be displayed automatically. Then you can select any other parameters to display from the Process Parameter list box located at the lower-right corner of the Graph Data Viewer window. Re-select an already selected process parameter from the Process Parameter list box will un-display that parameter. The most recent 10 minutes graph data are displayed and the graphs are updated dynamically.

View History Graph Data

To view history graph data, click the history button, then select the year, month and date of the graph data you would like to view from the Year, Month and Date list box respectively. Finally select the process parameters of interest. The entire graph data for the selected date will be displayed.

Please note that today's graph data can also be accessed this way. A static graph of today's data will be displayed if today's date is selected from the Year, Month and Date list boxes.

Export to CSV Format

The graph data can be exported to CSV format by pressing the "Export to CSV" button. CSV format is the comma separated value file format and can be opened and processed by Microsoft's Excel program.

Batch Report

Batch Report

When creating an oven schedule, Batch Log can be checked to generate a batch report. A batch report is a series of data for each segment where certain parameters of the temperature and pressure are recorded.

Click on Batch then Report to display the Batch Log Report Viewer as displayed below. The average, standard deviation, maximum, time at maximum, minimum and time at minimum temperature and pressure are recorded for each segment.

Use the menu on the top to navigate between pages. The report can also be printed if a printer is installed on the computer. Use the export report button to save the report as pdf file.

Use the Delete Report button on the lower right corner to delete the selected report.

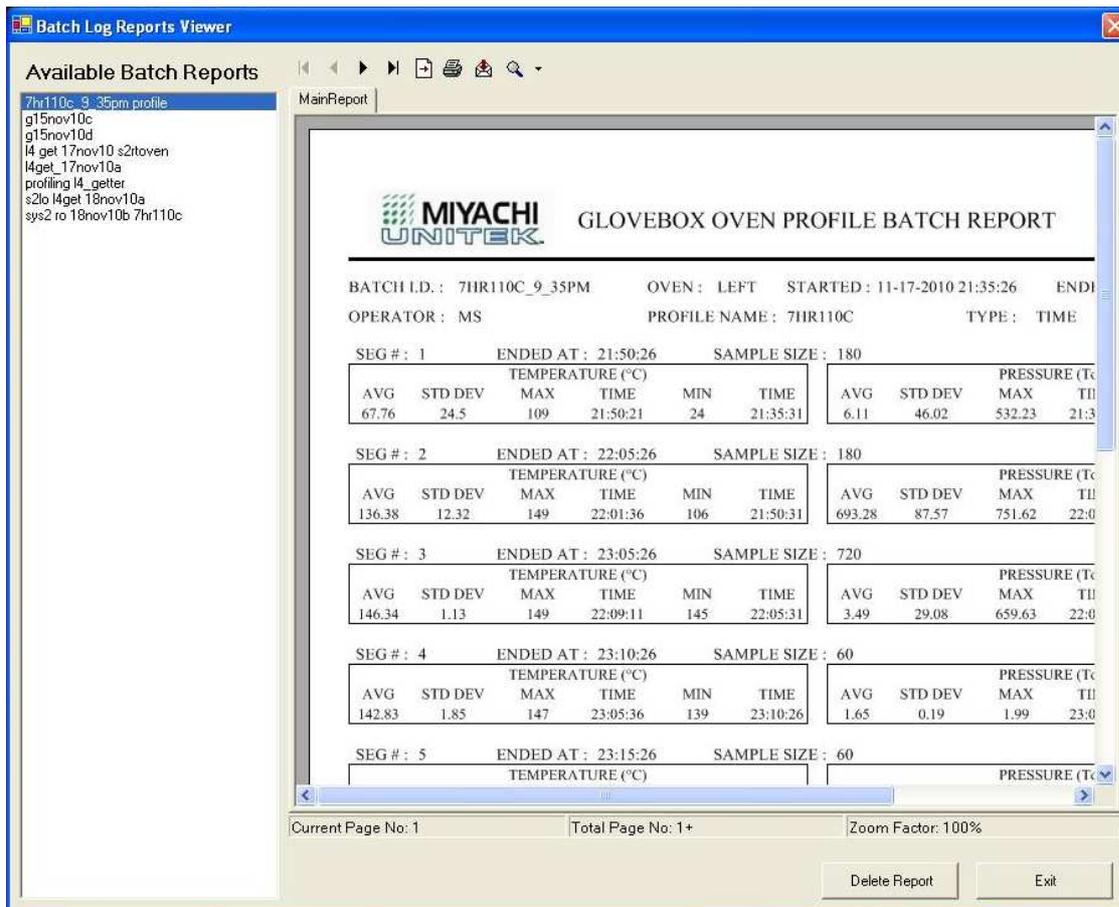


Figure 14 Batch Log Reports Viewer Screen

Batch Setting

Click on Batch then Setting to display the batch report setting as shown in the figure below. Maximum Files determines the maximum number of batch report that can be stored. When the maximum number of files is reached and a new report is created, the oldest report will be automatically deleted. Log Interval determines the time interval the data is being logged.



Figure 15 Batch Setting Screen

Version



Figure 16 Version

On the glovebox software main menu, click on Help and Version to display the version number of the currently installed software.

Using the Login Administrator (Password Administration)



Figure 14: Main Screen

The Logon menu contains four options:

- 1_ Add User
- 2_ Edit User
- 3_ Change User
- 4_ Delete User

Add User

The screenshot shows a dialog box titled "LogOn" with a blue header. The main area is light beige and contains three distinct sections, each enclosed in a thin black border. The first section, "User Information", has a label "User Name:" followed by a white text input field. The second section, "LogOn Privilege", contains three labels: "User ID:", "User Password:", and "Retype Password:", each followed by a white text input field. The third section, "Access Privilege", lists three options: "Administrator:", "High Level Access:", and "Operator:", each followed by an unselected radio button. At the bottom of the dialog, there are two buttons: "OK" and "Cancel".

Figure 15: Add/Edit User Screen

The User Name is a reference field to identify the user and is entered as the users full name in many instances. The user name cannot match any other user name in the database, the user name must be unique. After the Add User screen (Figure 15) is filled in, and the OK button is clicked, the SM8500 application will search for any match in database. If a match is found, the user must enter another name which is unique to the application.

An "Administrator" can create "High Level Access" users and "Operator" users. A "High Level Access" user can only create "Operator" users.

Once a new user is added, the Administrator or High Level Access user selects the privilege options from the Access Privilege Options screen.

Edit User

The User ID and Password can be edited (changed) by using the Add/Edit User Screen (Figure 15). The access privileges can also be changed.

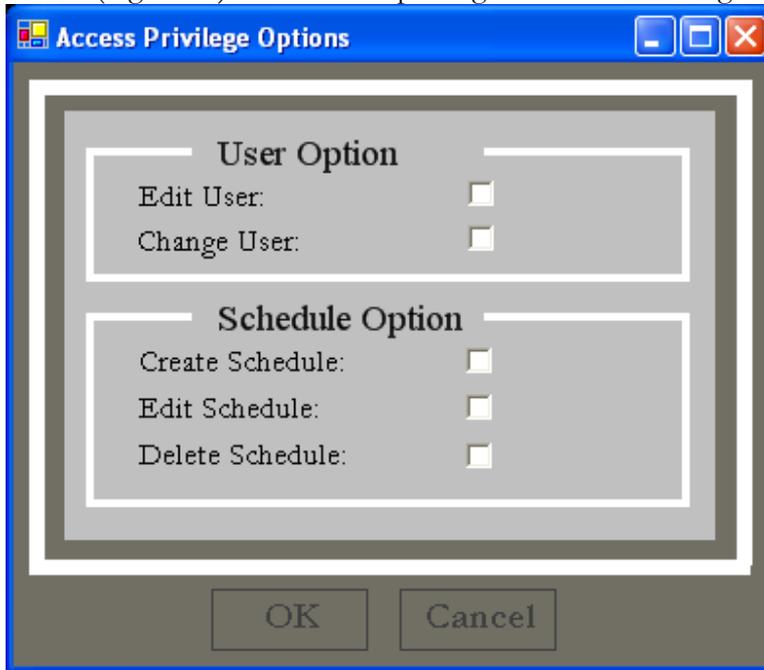


Figure 16: User access privilege choices

Delete user

When deleting a user from the list of different users, the rules are as follows:

1. An “Administrator” user cannot delete a different “Administrator” user
2. An “Administrator” user can delete “High Level Access” or “Operator” users
3. A “High Level Access” user cannot delete any user

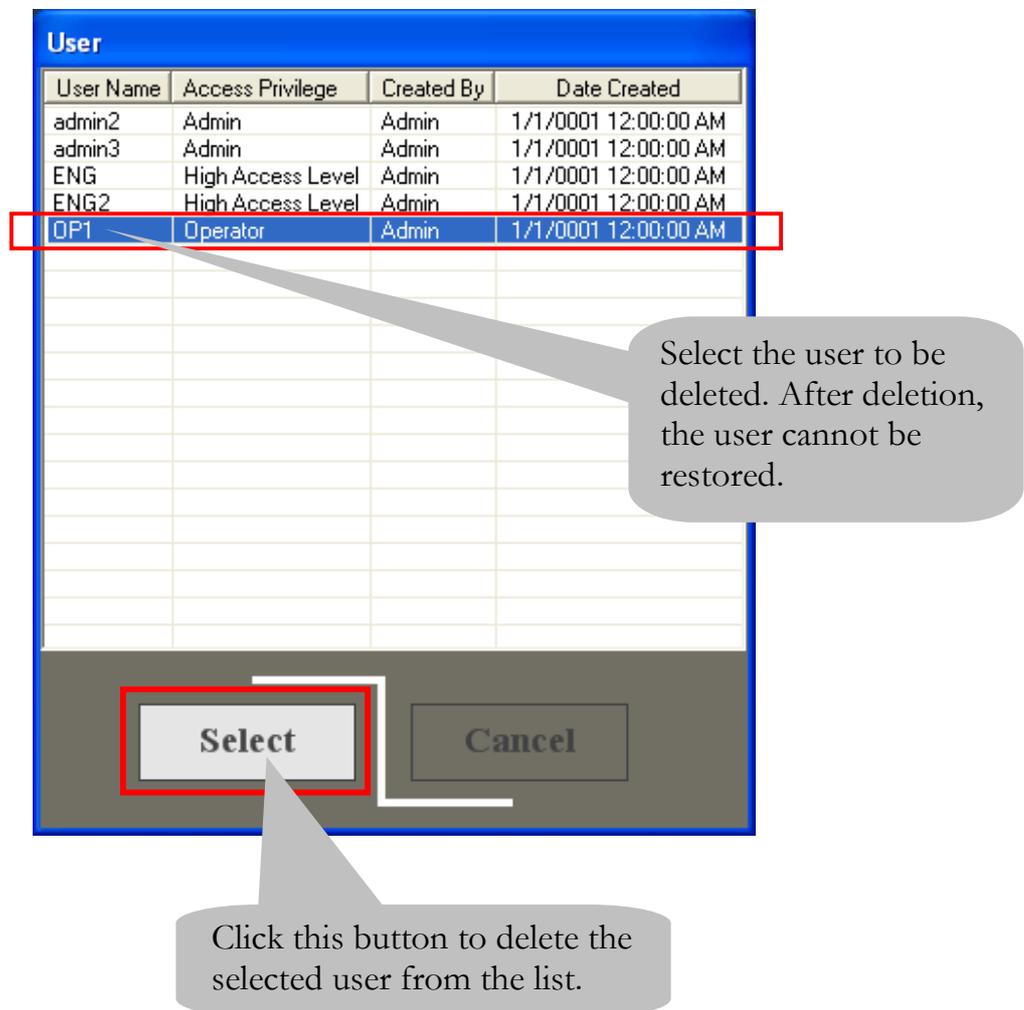


Figure 19 User Delete selection Screen

GloveBox Configurator

Typically, the GloveBox configurator parameters are entered during initial set up of this system and then do not need to be changed.

The GloveBox Configurator is an independent software program which establishes GLOVEBOX system configuration information and saves the information in a format that can be accessed by the GloveBox program. The information gathered includes oven/interchange chamber settings and environment analyzer and welder settings. The following is a GloveBox Configurator screen (Figure 11):

Chamber Settings

New Chamber

Chamber Name

Chamber Position

Chamber Type

Oven Type Oven ID

Vacuum Timeout (min) Temp SP (C)

Backfill Timeout (min) Door Open Press (Torr)

Outer Door Close Vacuum

Analyzer and Welder Settings

Weld Inhibit Active

Helium Analyzer Present

He Dosing Valve Present

Max He %

Oxygen

Oxygen Analyzer Present

Oxygen Type

Pressure Transducer

Type

Hardware Version / COM Port

Hardware Version COM Port

Figure 11 The GENERATION GloveBox Configurator Screen

The GENERATION GloveBox program uses the configuration information gathered from this configurator to hide or display some of the USER INTERFACE SCREEN items and send some of the settings to the appropriate components in the system.

Create a New Chamber

A chamber is defined as either an interchange or oven. Chamber 1 and 2 are already created by default. To create a new chamber, first enter a new chamber name in the text box next to the label “New Chamber” and click Create. Change the default values for all other fields as necessary then click the Save button. An information message box pops up. Click OK to finish.

Remove an Existing Chamber

To remove an existing chamber from the GLOVEBOX database, first select the chamber to be removed from the dropdown list box next to the label “Chamber Name” and then press the Remove button. An information message box pops up. Click OK to finish.

New Chamber - The number for the chamber to be created.

Chamber Name - The name of an existing chamber.

Chamber Position – The physical location of the chamber in the GENERATION system. It can be either Left, Right or Optional 1-4.

Chamber Type - The chamber type can be either Oven or Antechamber.

Oven Type - Oven Type can be any of the following: Front Load, Shelf (2/3/4) or End Load.

Oven ID – The oven ID should be 0 if the Chamber Position is Left, 1 if the Chamber Position is Right and the number increment for every consecutive oven.

Vacuum Timeout - The maximum time duration allowed for a vacuum process to reach the specified process value.

Temp SP (C) - The maximum temperature of the oven. Set to either 200C or 300C

Backfill Timeout - The maximum time duration allowed for a backfill process to reach the specified process value.

Door Open Press – The pressure threshold for the inner oven door. The inner door will not open if the pressure inside the oven chamber is less than this threshold.

Outer Door Close Vacuum – If this box is checked, pump down schedule will run everytime the outer door is closed because the interchange has been exposed to atmosphere.

Weld Inhibit Active – Check this box if a seamsealer is present in the system.

Helium Analyzer Present – Check this box if a Helium analyzer is present in the system.

He Dosing Valve Present – Check this box if a Helium dosing valve is present in the system.

Max He % - Set the maximum percentage of the Helium.

Oxygen Analyzer Present – Check this box if an Oxygen analyzer is present in the system.

Oxygen Type – Select the Oxygen analyzer present in the system. Standard oxygen analyzer used for AX5000 is Teledyne (PPM)

Pressure Transducer Type – Select the pressure transducer present in the system. Standard pressure transducer used for current AX5000 is 4-20mA

Hardware Version - Select the control file for the glovebox. By default, Gen6 is selected.

COM Port – Select the COM Port for the temperature controller.

Error Table

ERRORS	REMEDY	POSSIBLE FAULTY COMPONENTS
Could not get a response from left temperature controller	The temperature controller is not powered up or the the RS232 cable is not connected securely. Check the RS232 cable and the oven circuit breaker. Close the AX5000 program and restart it.	oven temperature controller, galil output card, galil controller, power on relay for the oven temperature controller.
The selected oven schedule is empty! Please select a different schedule	The selected oven schedule contains zero segment. Please select a different oven schedule.	none
Left oven over-temperature condition occurred. Left oven operation aborted	The oven temperature exceeded the maximum temperature allowed. The oven operation stopped.	over temperature relay, over temperature switch, associated heater relays, or a short in oven heater or heater wires
Left inner door is open! Please close it	Oven cannot be started with inner door open. Please close the inner door and re-start the oven.	none
Left outer door is open! Please close it	Oven cannot be started with outer door open. Please close the outer door and re-start the oven.	none
Schedule xxx already exists. Please use a different name	Use a different oven schedule name	none
Left oven is on, all Left oven door actions are denied	Stop the oven cycle in order to open the door.	none
Left outer door is open, Left oven inner door action is denied	It is not allowed to open both inner door and outer door at the same time.	none
Left outer door is open, backfill action is denied	Can not start backfill with either the inner door or the outer door open	none
Left oven bake cycle is done. Please remove the parts before opening the outer door	Please remove the parts before opening the outer door to avoid contaminating the parts	none
Close Left Inner Door Control Failed	The door was not closed successfully in the allotted time. Check for a physical obstruction preventing door to close. Check for insufficient pressure or no pressure into gas supply for doors.	inner door solenoids, galil output or input card, galil controller, or door sensors.

Open Left Inner Door Control Failed	The door was not open successfully in the allotted time. Check for a physical obstruction preventing door to open. Check for insufficient pressure or no pressure into gas supply for doors.	inner door solenoids, galil controller output or input card, galil controller, or door sensors.
Left Chamber Purge Failed	The door open pressure was not reached in the allotted time. Check for insufficient pressure or no pressure into environmental gas supply. Decrease the door open pressure.	vacuum sensor, backfill solenoid, galil controller, galil output card or analog card.
Left Chamber Backfill Failed	The door open pressure was not reached in the allotted time. Check for insufficient pressure or no pressure into environmental gas supply. Decrease the door open pressure.	vacuum sensor, backfill solenoid, galil controller, galil output card or analog card.
Close Right Inner Door Control Failed	The door was not closed successfully in the allotted time. Check for a physical obstruction preventing door to close. Check for insufficient pressure or no pressure into gas supply for doors.	inner door solenoids, galil output or input card, galil controller, or door sensors.
Open Right Inner Door Control Failed	The door was not open successfully in the allotted time. Check for a physical obstruction preventing door to open. Check for insufficient pressure or no pressure into gas supply for doors.	inner door solenoids, galil controller output or input card, galil controller, or door sensors.
Right Chamber Purge Failed	The door open pressure was not reached in the allotted time. Check for insufficient pressure or no pressure into environmental gas supply. Decrease the door open pressure.	vacuum sensor, backfill solenoid, galil controller, galil output card or analog card.
Right Chamber Backfill Failed	The door open pressure was not reached in the allotted time. Check for insufficient pressure or no pressure into environmental gas supply. Decrease the door open pressure.	vacuum sensor, backfill solenoid, galil controller, galil output card or analog card.
Close Left Inner Door Sequence Failed	Check the inner doors for any mechanical obstructions. Check the compressed air supply for the doors.	inner door solenoids, galil controller output or input card, galil controller, or door sensors.
Open Left Inner Door Sequence Failed	Check the inner doors for any mechanical obstructions. Check the compressed air supply for the doors.	inner door solenoids, galil controller output or input card, galil controller, or door sensors.
Close Right Inner Door Sequence Failed	Check the inner doors for any mechanical obstructions. Check the compressed air supply for the doors.	inner door solenoids, galil controller output or input card, galil controller, or door sensors.
Open Right Inner Door Sequence Failed	Check the inner doors for any mechanical obstructions. Check the compressed air supply for the doors.	inner door solenoids, galil controller output or input card, galil controller, or door sensors.
Left Chamber Backfill Sequence Timeout	The door open pressure was not reached in the allotted time. Check for insufficient pressure or no pressure into environmental gas supply. Decrease the door open pressure.	vacuum sensor, backfill solenoid, galil controller, galil output card or analog card.
Right Chamber Backfill Sequence Timeout	The door open pressure was not reached in the allotted time. Check for insufficient pressure or no pressure into environmental gas supply. Decrease the door open pressure.	vacuum sensor, backfill solenoid, galil controller, galil output card or analog card.

Left Vacuum Sequence Timeout	The vacuum setpoint was not reached in the allotted time. Check for vacuum leaks such as the doors not sealing. Increase the vacuum timeout value.	vacuum pump, vacuum sensor, galil controller, galil output or analog card.
Right Vacuum Sequence Timeout	The vacuum setpoint was not reached in the allotted time. Check for vacuum leaks such as the doors not sealing. Increase the vacuum timeout value.	vacuum pump, vacuum sensor, galil controller, or galil analog card.
Environment Pressure Reading Error	The value is out of bounds. Check the connection to the measuring device. Check the analog output of the measuring device.	pressure transducer, galil controller, or galil analog card.
Moisture Level Reading Error	The value is out of bounds. Check the connection to the measuring device. Check the analog output of the measuring device.	moisture monitor or sensor, galil controller, or galil analog card.
Oxygen Level Reading Error	The value is out of bounds. Check the connection to the measuring device. Check the analog output of the measuring device.	oxygen monitor or sensor, galil controller, or galil analog card.
Left Vacuum Pressure Reading Error	The value is out of bounds. Check the connection to the measuring device. Check the analog output of the measuring device.	vacuum sensor, galil controller, galil analog card.
Right Vacuum Pressure Reading Error	The value is out of bounds. Check the connection to the measuring device. Check the analog output of the measuring device.	vacuum sensor, galil controller, or galil analog card.
Helium Level Reading Error	The value is out of bounds. Check the connection to the measuring device. Check the analog output of the measuring device.	helium analyzer, galil controller, or galil analog card.

Digital and Analog I/O

DESCRIPTION	IN/OUT	CHANNEL	PIN	MODULE	SIGNAL TYPE
LEFT INNER DOOR PUSH TO OPEN/CLOSE SW	INPUT	0	0	IOM-70016	DIGITAL
LEFT INNER DOOR CLOSED REED SWITCH	INPUT	1	1	IOM-70016	DIGITAL
LEFT INNER DOOR OPEN REED SWITCH	INPUT	2	2	IOM-70016	DIGITAL
LEFT OUTER DOOR PUSH TO OPEN SWITCH	INPUT	3	3	IOM-70016	DIGITAL
LEFT OUTER DOOR LIMIT SWITCH	INPUT	4	4	IOM-70016	DIGITAL
LEFT OVEN OVER TEMP SWITCH	INPUT	5	5	IOM-70016	DIGITAL
LEFT INNER DOOR SENSOR 1	INPUT	6	6	IOM-70016	DIGITAL
LEFT INNER DOOR SENSOR 2	INPUT	7	7		
RIGHT INNER DOOR PUSH TO OPEN/CLOSE SW	INPUT	8	8	IOM-70016	DIGITAL
RIGHT INNER DOOR CLOSED REED SWITCH	INPUT	9	9	IOM-70016	DIGITAL
RIGHT INNER DOOR OPEN REED SWITCH	INPUT	10	10	IOM-70016	DIGITAL
RIGHT OUTER DOOR PUSH TO OPEN SWITCH	INPUT	11	11	IOM-70016	DIGITAL
RIGHT OUTER DOOR LIMIT SWITCH	INPUT	12	12	IOM-70016	DIGITAL
RIGHT OVEN OVER-TEMP SWITCH	INPUT	13	13		
RIGHT INNER DOOR SENSOR 1	INPUT	14	14	IOM-70016	DIGITAL
RIGHT INNER DOOR SENSOR 2	INPUT	15	15	IOM-70016	DIGITAL
ENCLOSURE GAS INLET SOLENOID	OUTPUT	32	0	IOM-70508	DIGITAL
LEFT INNER DOOR TRAVEL SOLENOID	OUTPUT	33	1	IOM-70508	DIGITAL
LEFT OUTER DOOR SOLENOID	OUTPUT	34	2	IOM-70508	DIGITAL
LEFT CHAMBER BACKFILL SOLENOID	OUTPUT	35	3	IOM-70508	DIGITAL
LEFT VACUUM PUMP CONTROL	OUTPUT	36	4	IOM-70508	DIGITAL
LEFT INNER DOOR PUSH SOLENOID	OUTPUT	37	5	IOM-70508	DIGITAL
COOLANT RECIRCULATOR CONTROL	OUTPUT	38	6	IOM-70508	DIGITAL
LEFT TEMP CONTROLLER POWER-UP	OUTPUT	39	7	IOM-70508	DIGITAL
ENCLOSURE PRESSURE TRANSDUCER SIGNAL	INPUT	64	0	IOM-70808	ANALOG
ENCLOSURE MOISTURE MONITOR SIGNAL	INPUT	65	1	IOM-70808	ANALOG
ENCLOSURE OXYGEN ANALYZER SIGNAL	INPUT	66	2	IOM-70808	ANALOG
LEFT CHAMBER VACUUM SIGNAL	INPUT	67	3	IOM-70808	ANALOG
RIGHT CHAMBER VACUUM SIGNAL	INPUT	68	4	IOM-70808	ANALOG
ENCLOSURE HELIUM ANALYZER SIGNAL	INPUT	69	5	IOM-70808	ANALOG
TOOLING INTERCHANGE VACUUM SIGNAL	INPUT	70	6	IOM-70808	ANALOG
NOT USED	INPUT	71	7	IOM-70808	ANALOG
ENCLOSURE GAS OUTLET SOLENOID	OUTPUT	96	0	IOM-70508	DIGITAL
RIGHT INNER DOOR TRAVEL SOLENOID	OUTPUT	97	1	IOM-70508	DIGITAL
RIGHT OUTER DOOR SOLENOID	OUTPUT	98	2	IOM-70508	DIGITAL
RIGHT CHAMBER BACKFILL SOLENOID	OUTPUT	99	3	IOM-70508	DIGITAL
RIGHT VACUUM PUMP CONTROL	OUTPUT	100	4	IOM-70508	DIGITAL
RIGHT INNER DOOR PUSH SOLENOID	OUTPUT	101	5	IOM-70508	DIGITAL
ENCLOSURE OVERPRESSURE SOLENOID	OUTPUT	102	6	IOM-70508	DIGITAL
RIGHT TEMP CONTROLLER POWER-UP	OUTPUT	103	7	IOM-70508	DIGITAL

TOOLING INN. DR PUSH TO OPEN/CLOSE SW	INPUT	128	0	IOM-70016	DIGITAL
TOOLING INNER DOOR LIMIT SWITCH	INPUT	129	1	IOM-70016	DIGITAL
NOT USED	INPUT	130	2	IOM-70016	DIGITAL
TOOLING OUTER DOOR PUSH TO OPEN SWITCH	INPUT	131	3	IOM-70016	DIGITAL
TOOLING OUTER DOOR LIMIT SWITCH	INPUT	132	4	IOM-70016	DIGITAL
TOOLING OVEN OVER-TEMP SWITCH	INPUT	133	5	IOM-70016	DIGITAL
NOT USED	INPUT	134	6	IOM-70016	DIGITAL
NOT USED	INPUT	135	7	IOM-70016	DIGITAL
NOT USED	INPUT	136	8	IOM-70016	DIGITAL
NOT USED	INPUT	137	9	IOM-70016	DIGITAL
NOT USED	INPUT	138	10	IOM-70016	DIGITAL
NOT USED	INPUT	139	11	IOM-70016	DIGITAL
NOT USED	INPUT	140	12	IOM-70016	DIGITAL
NOT USED	INPUT	141	13	IOM-70016	DIGITAL
NOT USED	INPUT	142	14	IOM-70016	DIGITAL
NOT USED	INPUT	143	15	IOM-70016	DIGITAL
HELIUM FILL SOLENOID	OUTPUT	160	0	IOM-70508	DIGITAL
TOOLING INNER DOOR SOLENOID	OUTPUT	161	1	IOM-70508	DIGITAL
TOOLING OUTER DOOR SOLENOID	OUTPUT	162	2	IOM-70508	DIGITAL
TOOLING INTERCHANGE BACKFILL SOLENOID	OUTPUT	163	3	IOM-70508	DIGITAL
TOOLING INTERCHANGE VACUUM PUMP	OUTPUT	164	4	IOM-70508	DIGITAL
NOT USED	OUTPUT	165	5	IOM-70508	DIGITAL
WELD INHIBIT (0-INHIBIT; 1-ALLOW)	OUTPUT	166	6	IOM-70508	DIGITAL
NOT USED	OUTPUT	167	7	IOM-70508	DIGITAL
LEFT CHAMBER VACUUM SIGNAL (-)	INPUT	192	0	IOM-70808	ANALOG
RIGHT CHAMBER VACUUM SIGNAL (-)	INPUT	193	1	IOM-70808	ANALOG
TOOLING INTERCHANGE VACUUM SIGNAL (-)	INPUT	194	2	IOM-70808	ANALOG
ENCLOSURE OXYGEN ANALYZER SIGNAL (-)	INPUT	195	3	IOM-70808	ANALOG
NOT USED	INPUT	196	4	IOM-70808	ANALOG
NOT USED	INPUT	197	5	IOM-70808	ANALOG
NOT USED	INPUT	198	6	IOM-70808	ANALOG
ENCLOSURE OXYGEN ANALYZER RANGE ID	INPUT	199	7	IOM-70808	ANALOG

Digital and Analog I/O Galil DMC Smart Terminal Display Data Record Screen

7007 Digital IO

0	1	2	3	4	5	6	7	8
left inner door push to open/close switch	left inner door closed reed switch	left inner door open reed switch	left outer door push to open switch	left outer door limit switch	left oven over temp swith	left inner door sensor 1	left inner door sensor 2 (not used with new systems)	right inner door push to open/close switch
enclosure gas outlet solenoid	left inner door travel solenoid	left outer door solenoid	left chamber backfill solenoid	left vacuum pump control	left inner door push solenoid	coolant recirculator control	left temp controller power up	
enclosure gas outlet solenoid	right inner door travel solenoid	right outer door solenoid	right chamber backfill solenoid	right vacuum pump control	right inner door push solenoid	enclosure over pressure solenoid	right temp controller power up	
helium fill solenoid	tooling inner door solenoid	tooling outer door solenoid	tooling interchange backfill solenoid	tooling interchange vacuum pump	NC	weld inhibit (0 - inhibit; 1 - allow)	tooling temp controller power up	

9	10	11	12	13	14	15	
right inner door closed reed switch	right inner door open reed switch	right outer door push to open switch	right outer door limit switch	right oven over temp swith	right inner door sensor 1	right inner door sensor 2	IOM Slot 0
							IOM Slot 1
							IOM Slot 3
							IOM Slot 5

7007 Analog IO

0	1	2	3	4	5	6	7	
enclosure pressure transducer signal	enclosure moisture monitor signal	enclosure oxygen analyzer signal	left chamber vacuum signal	right chamber vacuum signal	enclosure helium analyzer signal	tooling interchange vacuum signal	not used	IOM Slot 2
left chamber vacuum signal (-)	right chamber vacuum signal (-)	tooling interchange vacuum signal (-)	enclosure oxygen analyzer signal (-)	not used	not used	not used	enclosure oxygen analyzer range ID	IOM Slot 6