

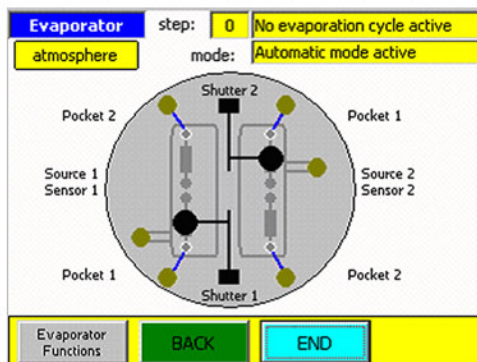
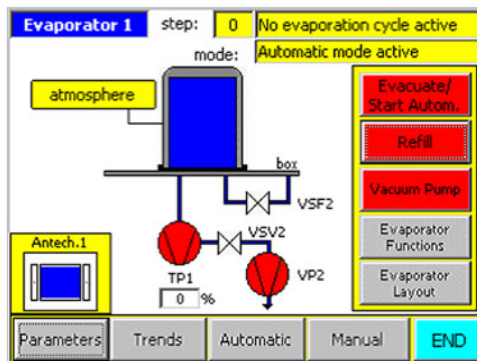
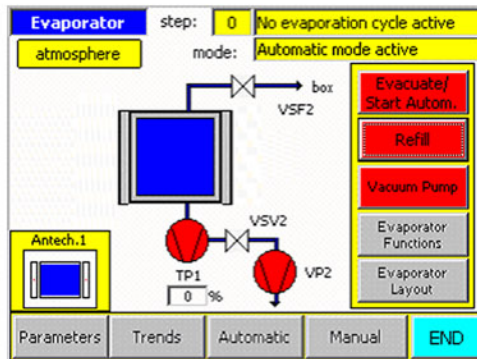


Supplement A

MB-Evap Operation

Section A1 - Panel Functions

Section A2 - Evaporator Operation



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Supplement A

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Section A1

Panel Functions

- A1.1 General Information....A1-1
- A1.2 Screen Overview....A1-1
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SECTION A1: PANEL FUNCTIONS

A1.1 General Information

This supplement is to be used as an addition to the standard TP170 Touch Screen Manual and provides information regarding the operation of the M.Braun Evaporator (MB-Evap) system.

This system is equipped with a Sigma Instruments Thin Film CoDeposition controller which is used to set the parameters, etc. for the actual evaporation processes. Operating the MB-Evap and setting the parameters for the glovebox related evaporator functions is performed using the touch screen panel located on the system.

For additional information regarding operation of the glovebox system or touch screen operation panel, please refer to the standard TP170 Touch Screen Manual supplied on the CD-Rom included in the information binder. Please refer to the Touch Screen Manual Chapter 6: Touch Panel Operation for information regarding changing the parameter settings.





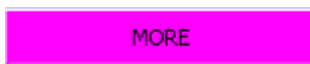
For further information regarding the Sigma Instruments Thin Film CoDeposition controller, please refer to the vendor supplied manual also included on the information CD.

A1.2 Screen Overview

Below is a reference guide to the various screens, buttons and icons which are used during the MB-Evap operation. Red or white icons represent inactive components or processes. Green or blue icons represent active components or processes. Processes or components that are unavailable are shown in a gray blanked out format.

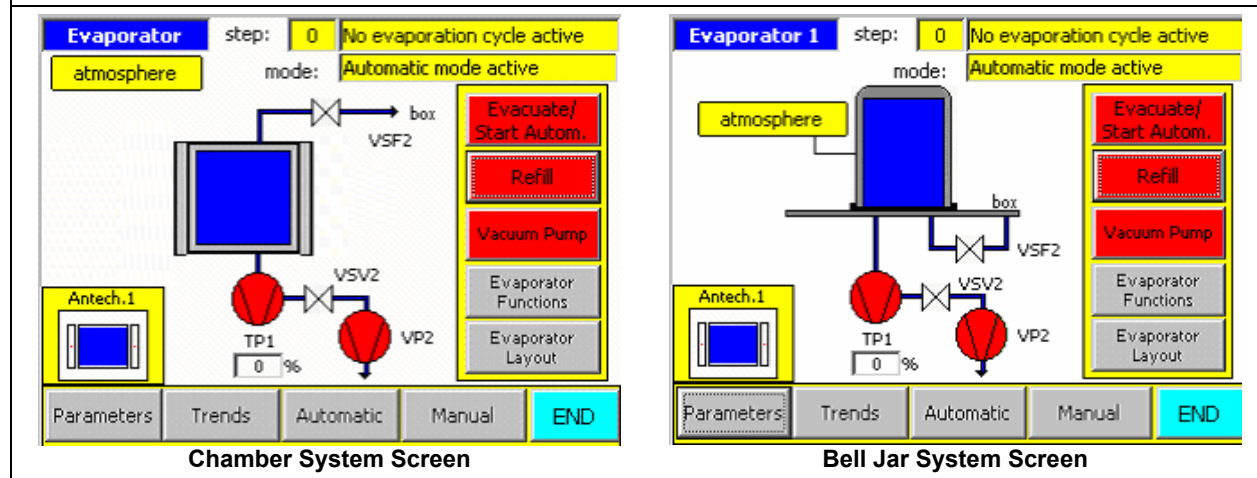
The following sections provide information regarding the various screens that the user will access during operation of the MB-Evap system.

The list below displays the buttons which are located and can be used on every screen associated with the MB-Evap.


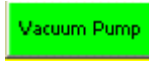
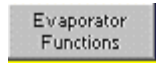


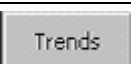
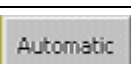
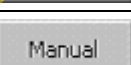
Button / Icon	Description
	Displays the Start Screen.
	Displays the Alarm Screen. Blinks black & red when an alarm is present.
	Displays the previous screen.
	Displays the MB-Evap Functions Screen.
	Displayed on the MB-Evap Parameters screens, this displays the next screen.

A1.3 Evaporator Screen

Accessed via the antechamber screen by touching the Evaporator icon.



Icon / Button	Description
	Displays the actual pressure inside the chamber.
step: 12 Refill up to atmosphere mode: Automatic mode active	Displayed on the Evaporator and Evaporator Layout Screens. <ul style="list-style-type: none"> Identifies which mode the system is being run in. Displays the active step number and step description when the system is being run.
 Chamber System Screen	Displays the status of the pressure level inside the chamber.
 Bell Jar System Screen	
 TP1 22 %	Displays the status of the turbo pump (on or off) and the rotational speed percentage.
 TP1 100 %	
 VP2	Displays the status of the roughing pump (on or off).
 VP2	
 VSV2	Displays the status of the evacuation valve.
 VSV2	
 box VSF2	Displays the status of the refill valve.
 box VSF2	
 Evacuate/ Start Autom.	Automatically activated by the Sigma controller in Automatic mode. Used to evacuate the chamber in Manual Mode.
 Refill	

Icon / Button	Description
 	Used to activate and deactivate the vacuum pump in Manual Mode.
	Displays the Evaporator Functions screen.
	Displays the Evaporator Layout screen.
	Displays the Evaporator Parameters screen.
	Displays the Evaporator Trends screen.
	Used to operate the system in Automatic Mode.
	Used to operate the system in Manual Mode.

A1.4 Evaporator Functions

Accessed via the evaporator screen by touching the Evaporator Functions button.

H2O ##### off Press: 6.5 mbar END
 O2 ##### off

Evaporator Functions

BACK

Evaporator Inner Door	Evaporator Shutter 1
Evaporator Outer Door	Evaporator Shutter 2
Evaporator Rotary Holder	

Chamber System Screen


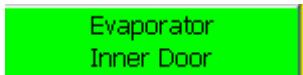



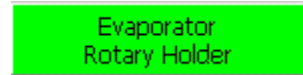

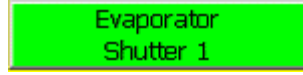

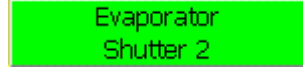
H2O ##### off Press: 6.5 mbar END
 O2 ##### off

Evaporator Functions

BACK

Evaporator Shutter 1	Evaporator Shutter 2
Evaporator Rotary Holder	

Bell Jar System Screen

Icon / Button	Description
 	Used to open and close the inner chamber door.
 	Used to open and close the outer chamber door.
 	Used to turn the rotary holder on and off.
 	Used to move shutter 1 from one pocket to another.
 	Used to move shutter 2 from one pocket to another.

A1.5 Evaporator Parameter Screens

Evaporator Parameters Screen 1

Accessed via the evaporator screen by touching the Parameters button.

Parameters Evaporator	BACK	END
MORE		
Intermediate refilling level:	400 mbar	
Setpoint vacuum leaktest:	5x10 ⁻¹ mbar	
Setpoint endvacuum:	5x10 ⁻¹ mbar	
Pumping/refilling cycles:	1	
Max. evacuation time [min]:	5	
Max. leakrate [step value]:	3	

Message Button / Icon	Description
Intermediate refilling level: 400 mbar	Level at which the MB-Evap chamber refills during the automatic evac/refill cycle.
Setpoint vacuum leaktest: 5x10 ⁻¹ mbar	The level at which the chamber will perform a leak test in automatic mode.
Setpoint endvacuum: 5x10 ⁻¹ mbar	Level at which the vacuum valve shuts off and the refill valve opens to begin refilling the MB-Evap chamber. This is also used to designate the level at which the heating process begins.
Pumping/refilling cycles: 1	Number of intermediate refill cycles performed in automatic mode.
Max. evacuation time [min]: 5	The maximum amount of time allowed for the MB-Evap chamber to evacuate to the vacuum set point.
Max. leakrate [step value]: 3	Level at which the system alarm will display, above the vacuum leak test set point value. For example if the set point is 5x10 ⁻¹ mbar and the maximum leak rate value is 3, the alarm will not display until the set point reaches 8x10 ⁻¹ mbar.

Evaporator Parameters Screen 2

Accessed via the evaporator parameters screen 1 by touching the More button.

Icon / Button	Description
	Used to select the rotary work holder spin function (yes-on or no-off) during an evaporation process.
	Used to set the speed at which the rotary work holder will spin during an evaporation process.
	Used to select the evaporation process (yes-on or no-off) during Automatic Mode.

A1.6 Evaporator Layout Screen

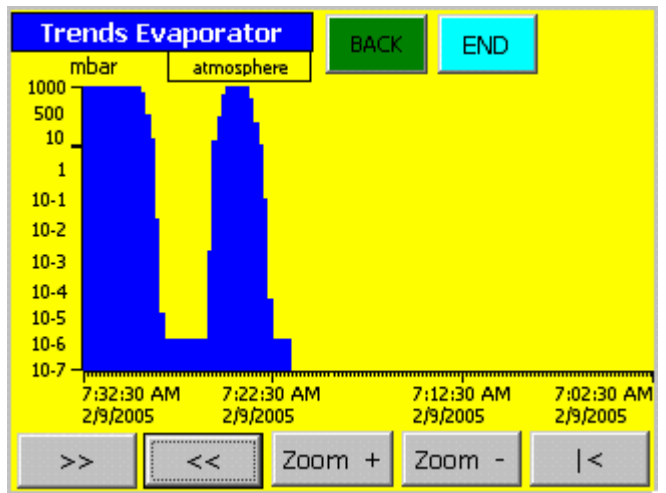
Accessed via the evaporator screen by touching the Evaporator Layout button.
 Displays the status of the evaporator unit and the current shutter positions.

Icon / Button	Description
	Displays the Alarm Setpoints screen.
	Displays the previous screen.

A1.7 Evaporator Trends Screen

Accessed via the evaporator screen by touching the Trends button.

Use the various buttons on the screen to scroll through the designated time period and also to zoom in on a selected range over a 24 hour period.



Section A2

Evaporator Operation - Chamber System

A2.1 General Information....A2-1

A2.2 Preparing the Chamber....A2-1

A2.3 Adjusting the Parameters....A2-2

A2.4 Automatic Mode....A2-4

A2.5 Manual Mode....A2-6



SECTION A2: EVAPORATOR OPERATION – CHAMBER SYSTEM

A2.1 General Information

The evaporator can be operated in Automatic Mode or Manual Mode.

Automatic Mode is the default mode during which the evaporator will run through all cycles automatically according to the set parameters. In Manual Mode the user initiates each cycle, using the buttons on the Evaporator Screen, according to the set parameters.

Automatic Mode is the recommended mode of operation for this system. It includes safety features that will automatically stop the process if something goes wrong.

Manual Mode allows the user to evacuate and refill the chamber without adjusting the set point parameters in advance. These functions are performed using the touch panel to activate and deactivate each process.

A2.2 Preparing the Chamber

NOTICE

Depending on the material to be evaporated and the type of substrate to be coated, the evaporator may be loaded using the inside chamber door or the door on the rear side of the glovebox.

Open the chamber door.



Load the material to be evaporated into the boat or crucible to be used.

Affix the substrate to the rotary work holder.



Close the chamber door.



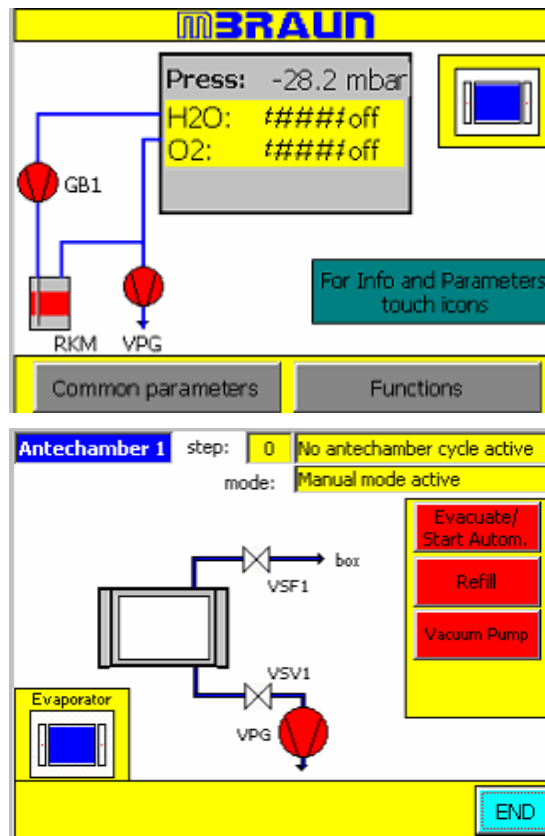
A2.3 Adjusting the Parameters

Follow the steps below to change the default parameter settings prior to operating the evaporator.

NOTICE

To return to the evaporator screen at anytime without adjusting more than one parameter, touch the **End** button.

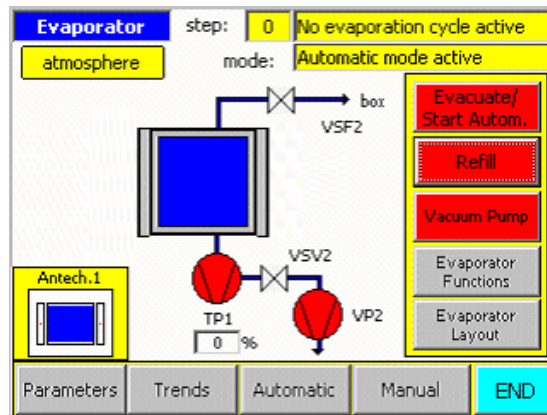
Touch the **Antechamber** icon on the start screen.



Touch the **Evaporator** icon on the Antechamber screen to access the Evaporator screen.

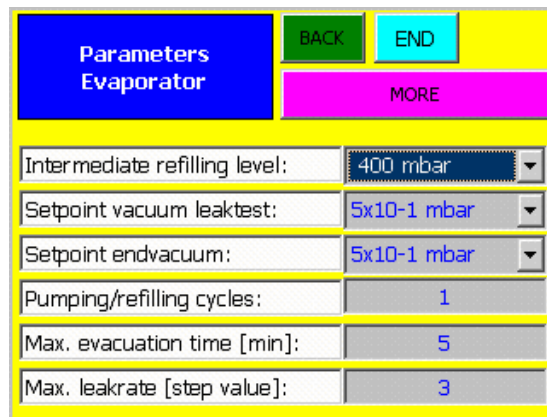
Operating Instructions – MB-Evaporator
Instruction Manual Supplement A
Section A2: Evaporator Operation – Chamber System

Touch the **Parameters** button on the Evaporator Screen to display the Evaporator Parameters Screen 1 for the primary evaporator parameter settings.



Adjust the settings for the desired items listed on the Evaporator Parameters Screen 1.

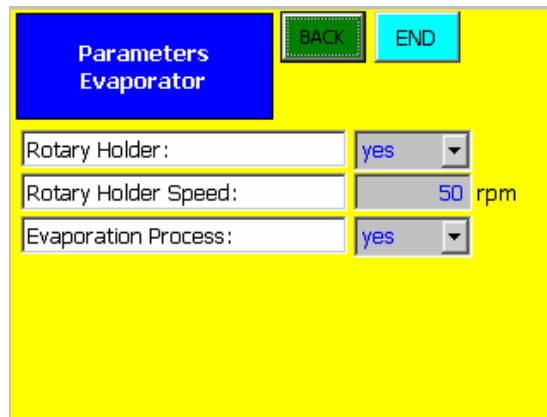
Touch the **More** button to display Evaporator Parameters Screen 2.



NOTICE	<p>If the chamber was loaded using the rear door, it is recommended at least one (1) pumping/refilling cycle is selected. This will completely purge the chamber of any room atmosphere and allow the turbo pump to operate at an optimal performance level using the working glovebox gas.</p>
--------	---

Adjust the settings for the desired items listed on the Evaporator Parameters screen 2 for rotary holder and evaporation process related settings.

Touch the **Back** button to display the previous parameters Screen or touch the **End** button to display the Evaporator screen.



Adjust the various required settings on the Sigma controller. Refer to the user manual for instructions on operating the controller.



A2.4 Automatic Mode

Process Summary

After initiating an automatic evaporation cycle via the Sigma controller, the evaporator chamber will cycle through the pumping/refill cycles according to the set parameters. On the last evacuation the evaporation process will activate (the rotary work holder if selected will start spinning, the shutters will open and close as needed to evaporate material from the selected source pocket) and run according to the settings input in the Sigma controller. Once the process is complete, the turbo pump is vented and the chamber is backfilled with box atmosphere.

Cycle List

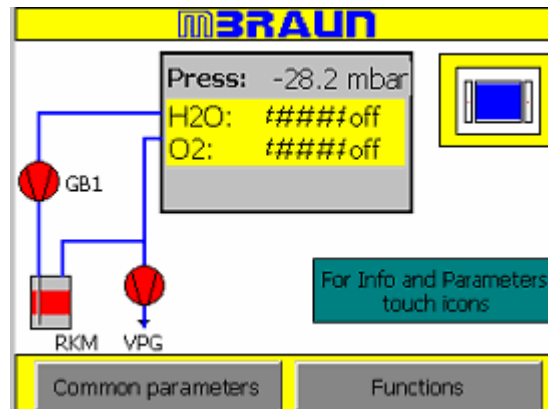
Below is a listing of the steps displayed on the screen which the evaporator cycles through in Automatic Mode operation.

Step Number	Display	Description/Action
0	No evaporation cycle active.	Message displayed prior to activating a cycle process.
1	Check if doors are closed	System checks to ensure both evaporator chamber doors are closed.
2	Lock doors	System disables the push button and switch so the chamber doors cannot be opened.
3	Evacuate	Initial evacuation of the evaporator chamber.
4	Measuring time – ON	Max. evacuation time parameter setting is initiated.
5	Differential pressure measurement	Leak test is performed according to the set point vacuum leak test parameter.
6	Refill	Evaporator chamber is refilled via box atmosphere valve VSF2.
7	Evacuate	Evaporator chamber is evacuated to the set point end vacuum parameter.
8	Evacuate down to end vacuum	Final evacuation of the evaporator chamber prior to the evaporation process commencing.
9	Evaporation process start	Sigma controller activates the evacuation process.
10	Evaporation process active	Indicates the process is currently running.
11	Evaporation process complete	Sigma controller deactivates the evacuation process.
12	Refill up to atmosphere	Evaporator chamber is refilled to atmosphere.
13	Unlock doors	Evaporator chamber doors are unlocked automatically.
14	Cycle completed	Message displayed when the automatic cycle is completed.
15	Default stop	Message displayed when the automatic cycle stops at anytime prior to completion.

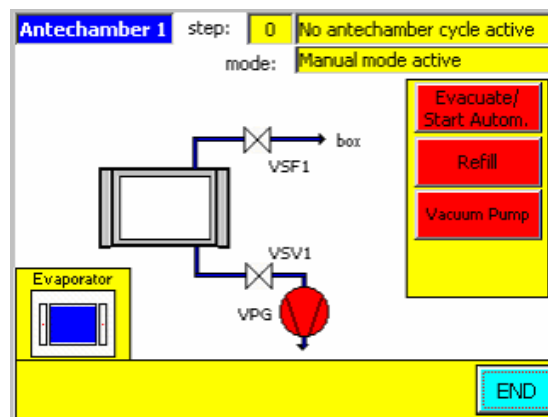
Automatic Mode Operation

Follow the steps below to operate the oven automatically.

Touch the **Antechamber** icon on the start screen.



Touch the **Evaporator** icon on the Antechamber screen to access the Evaporator screen.



Touch the **Start Layer** button on the Sigma controller.

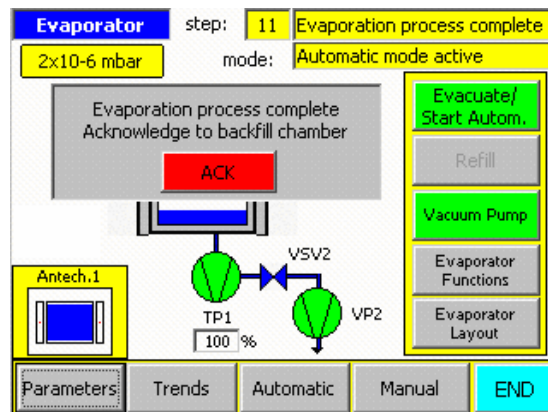
The system will cycle through all steps involved in the evaporation process as listed above.



After the evaporation process is completed, a message is displayed on the screen. This must be acknowledged by the user before the system will complete the automatic cycle.

Message:

*Evaporation process complete
 Acknowledge to backfill chamber*



NOTICE

If Pumping/refilling cycles has been set to zero (0), the system will perform all steps excluding numbers 6 and 7 regarding the refill and evacuate procedures.

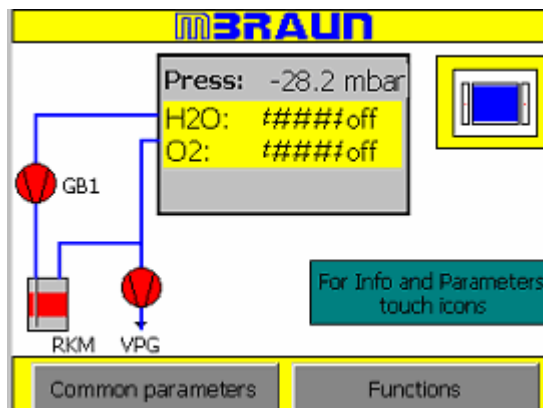
A2.5 Manual Mode



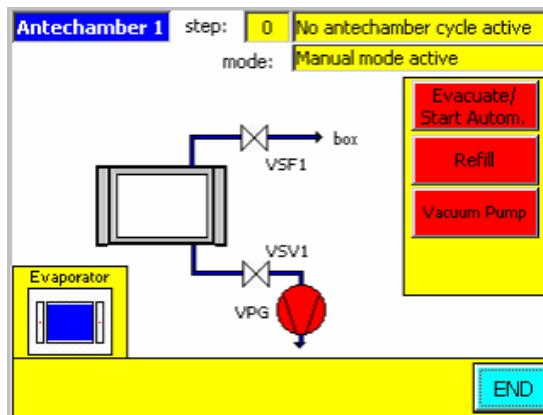
Manual operation of the system should only be performed by experienced users.

Follow the steps below to operate the evaporator manually.

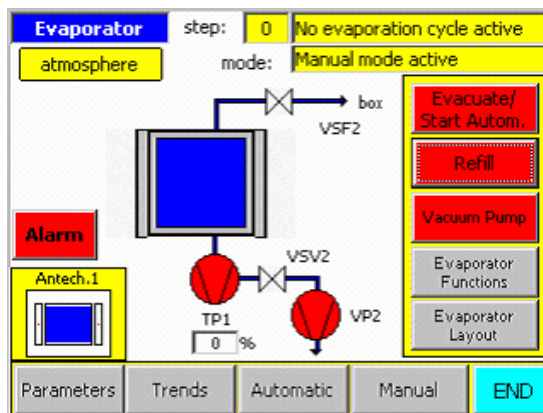
Touch the **Antechamber** icon on the start screen.



Touch the **Evaporator** icon on the Antechamber screen to access the Evaporator screen.

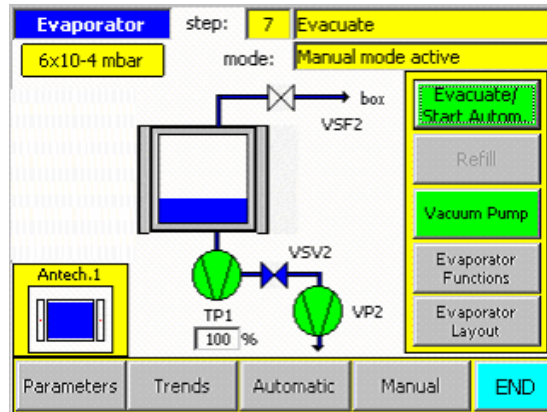


Touch the **Manual** button.



Touch the **Evacuate/Start Autom.** button to evacuate the chamber to the desired level.

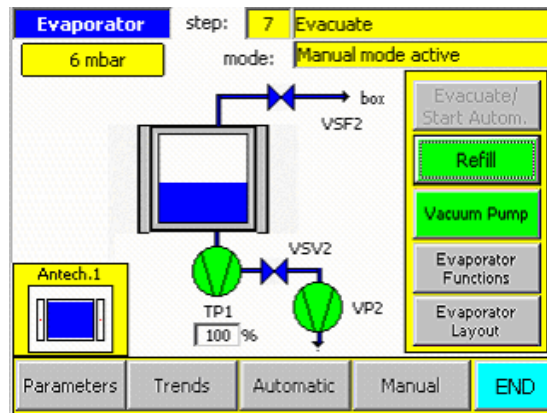
Touch the **Evacuate/Start Autom.** button again to deactivate the evacuation process when the desired level has been reached.



NOTICE The following two steps are not necessary, but may be performed if the user wishes.

Touch the **Refill** button to refill the chamber to the desired level.

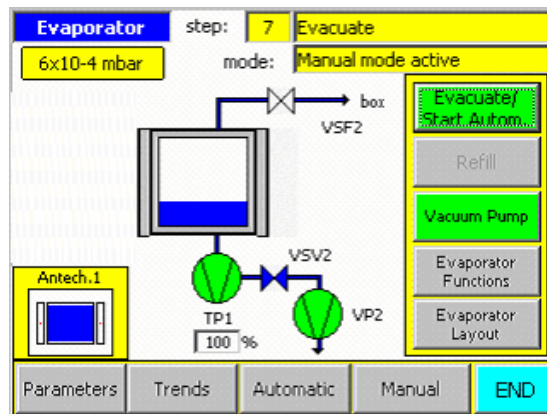
Touch the **Refill** button again to deactivate the refill process when the desired level has been reached.



Touch the **Evacuate/Start Autom.** button to evacuate the chamber to the desired level.

Touch the **Evacuate/Start Autom.** button again to deactivate the evacuation process when the desired level has been reached.

Repeat the evacuation and refill processes as needed.



Touch the **Automatic** button and then immediately touch the **Evacuate/Start Autom.** button.

Touch the **Start Layer** button on the Sigma controller.

The system will cycle through all steps involved in the evaporation process only (Steps 9-14).



Section A3

Evaporator Operation - Bell Jar System

A3.1 General Information....A3-1

A3.2 Preparing the Bell Jar...A3-1

A3.3 Adjusting the Parameters....A3-2

A3.4 Automatic Mode....A3-4

A3.5 Manual Mode....A3-6



SECTION A3: EVAPORATOR OPERATION – BELL JAR SYSTEM

A3.1 General Information

The evaporator can be operated in Automatic Mode or Manual Mode.

Automatic Mode is the default mode during which the evaporator will run through all cycles automatically according to the set parameters. In Manual Mode the user initiates each cycle, using the buttons on the Evaporator Screen, according to the set parameters.

Automatic Mode is the recommended mode of operation for this system. It includes safety features that will automatically stop the process if something goes wrong.

Manual Mode allows the user to evacuate and refill the chamber without adjusting the set point parameters in advance. These functions are performed using the touch panel to activate and deactivate each process.

A3.2 Preparing the Bell Jar

Open the bell jar.



Load the material to be evaporated into the boat or crucible to be used.

Affix the substrate to the rotary work holder.



Close the bell jar.



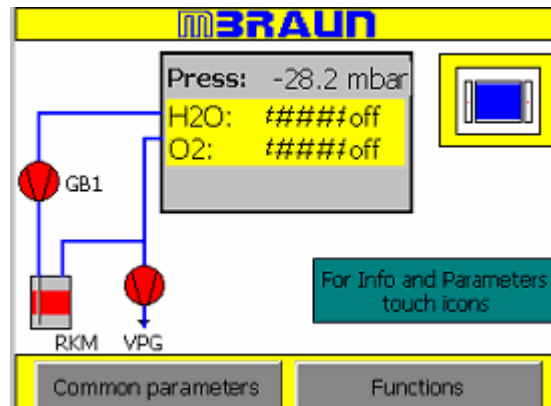
A3.3 Adjusting the Parameters

Follow the steps below to change the default parameter settings prior to operating the evaporator.

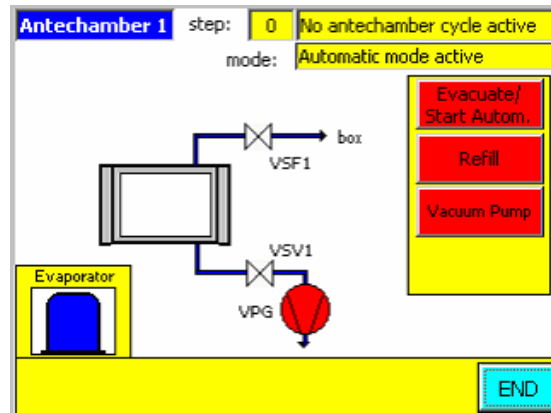
NOTICE

To return to the evaporator screen at anytime without adjusting more than one parameter, touch the **End** button.

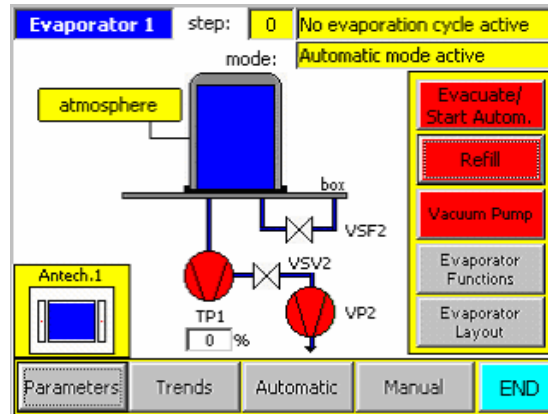
Touch the **Antechamber** icon on the start screen.



Touch the **Evaporator** icon on the Antechamber screen to access the Evaporator screen.

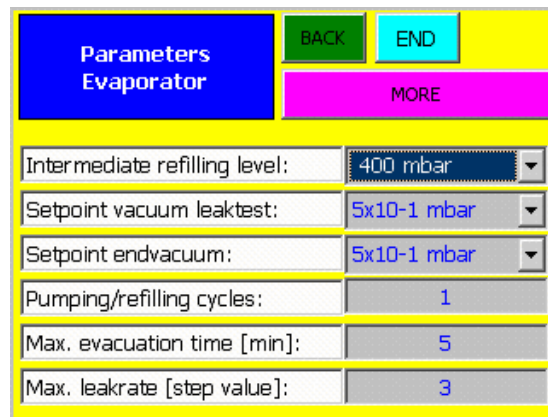


Touch the **Parameters** button on the Evaporator Screen to display the Evaporator Parameters Screen 1 for the primary evaporator parameter settings.



Adjust the settings for the desired items listed on the Evaporator Parameters screen.

Touch the **More** button to display Evaporator Parameters Screen 2.



NOTICE	<p>If the chamber was loaded using the rear door, it is recommended at least one (1) pumping/refilling cycle is selected. This will completely purge the chamber of any room atmosphere and allow the turbo pump to operate at an optimal performance level using the working glovebox gas.</p>
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Adjust the settings for the desired items listed on the Evaporator Parameters screen 2 for rotary holder and evaporation process related settings.

Touch the **Back** button to display the previous parameters Screen or touch the **End** button to display the Evaporator screen.



Adjust the various required settings on the Sigma controller. Refer to the user manual for instructions on operating the controller.



A3.4 Automatic Mode

Process Summary

After initiating an automatic evaporation cycle via the Sigma controller, the bell jar will cycle through the pumping/refill cycles according to the set parameters. On the last evacuation the evaporation process will activate (the rotary work holder if selected will start spinning, the shutters will open and close as needed to evaporate material from the selected source pocket) and run according to the settings input in the Sigma controller. Once the process is complete, the turbo pump is vented and the chamber is backfilled with box atmosphere.

Cycle List

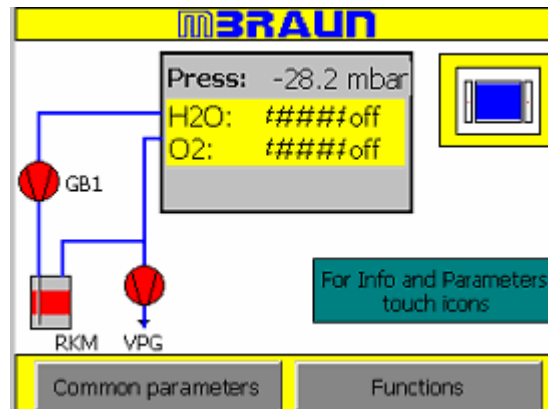
Below is a listing of the steps displayed on the screen which the evaporator cycles through in Automatic Mode operation.

Step Number	Display	Description/Action
0	No evaporation cycle active.	Message displayed prior to activating a cycle process.
1	Check if bell jar closed	System checks to ensure bell jar is in the fully down position.
2	Lock bell jar	System disables the push button and switch so the bell jar cannot be opened.
3	Evacuate	Initial evacuation of the bell jar.
4	Measuring time – ON	Max. evacuation time parameter setting is initiated.
5	Differential pressure measurement	Leak test is performed according to the set point vacuum leak test parameter.
6	Refill	The bell jar is refilled via box atmosphere valve VSF2.
7	Evacuate	The bell jar is evacuated to the set point end vacuum parameter.
8	Evacuate down to end vacuum	Final evacuation of the bell jar prior to the evaporation process commencing.
9	Evaporation process start	Sigma controller activates the evacuation process.
10	Evaporation process active	Indicates the process is currently running.
11	Evaporation process complete	Sigma controller deactivates the evacuation process.
12	Refill up to atmosphere	Bell jar is refilled to atmosphere.
13	Unlock bell jar	System enables the push button and switch so the bell jar can be opened.
14	Cycle completed	Message displayed when the automatic cycle is completed.
15	Default stop	Message displayed when the automatic cycle stops at anytime prior to completion.

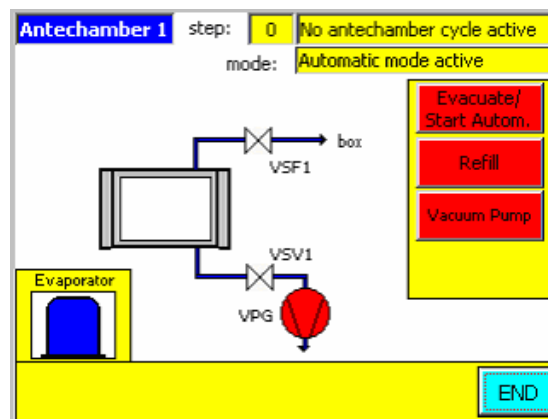
Automatic Mode Operation

Follow the steps below to operate the oven automatically.

Touch the **Antechamber** icon on the start screen.



Touch the **Evaporator** icon on the Antechamber screen to access the Evaporator screen.



Touch the **Start Layer** button on the Sigma controller.

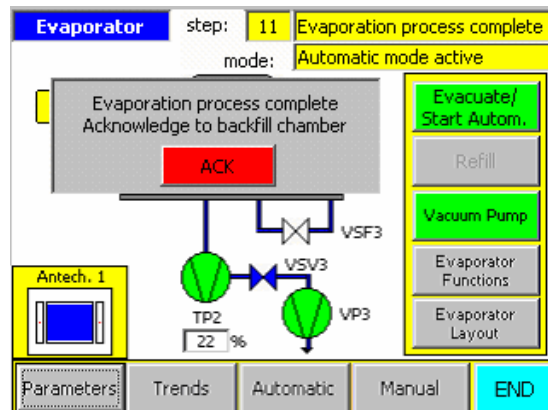
The system will cycle through all steps involved in the evaporation process as listed above.



After the evaporation process is completed, a message is displayed on the screen. This must be acknowledged by the user before the system will complete the automatic cycle.

Message:

*Evaporation process complete
 Acknowledge to backfill chamber*



NOTICE

If Pumping/refilling cycles has been set to zero (0), the system will perform all steps excluding numbers 6 and 7 regarding the refill and evacuate procedures.

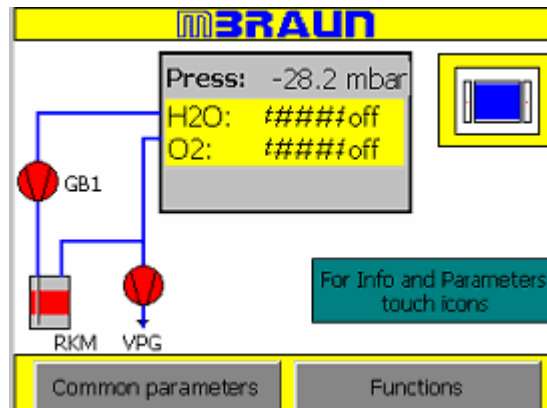
A3.5 Manual Mode



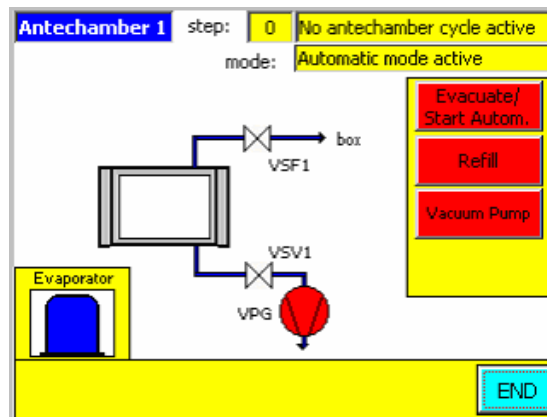
Manual operation of the system should only be performed by experienced users.

Follow the steps below to operate the evaporator manually.

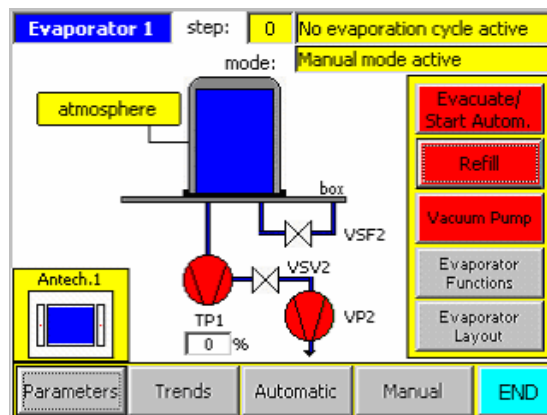
Touch the **Antechamber** icon on the start screen.



Touch the **Evaporator** icon on the Antechamber screen to access the Evaporator screen.

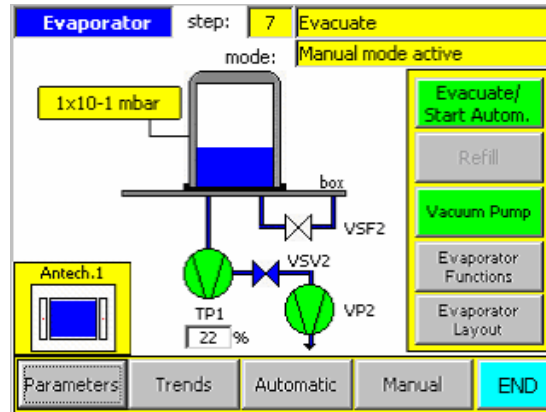


Touch the **Manual** button.



Touch the **Evacuate/Start Autom.** button to evacuate the chamber to the desired level.

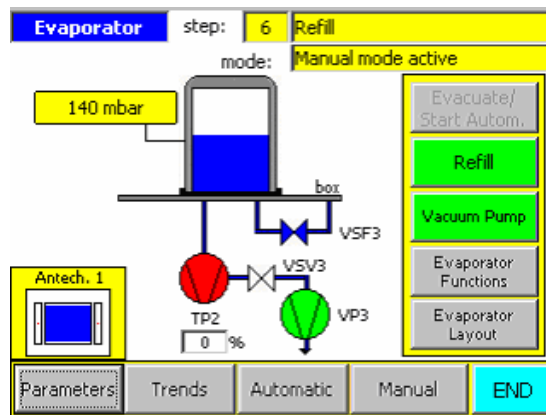
Touch the **Evacuate/Start Autom.** button again to deactivate the evacuation process when the desired level has been reached.



NOTICE The following two steps are not necessary, but may be performed if the user wishes.

Touch the **Refill** button to refill the chamber to the desired level.

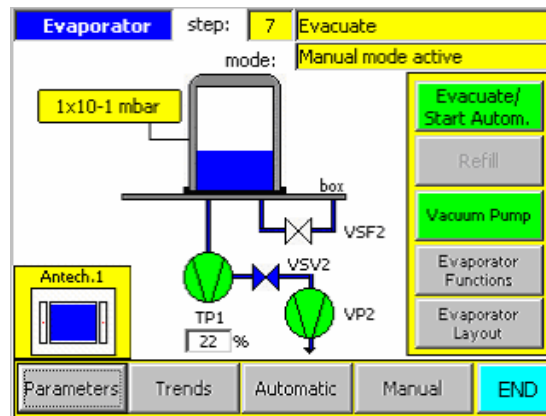
Touch the **Refill** button again to deactivate the refill process when the desired level has been reached.



Touch the **Evacuate/Start Autom.** button to evacuate the chamber to the desired level.

Touch the **Evacuate/Start Autom.** button again to deactivate the evacuation process when the desired level has been reached.

Repeat the evacuation and refill processes as needed.



Touch the **Automatic** button and then immediately touch the **Evacuate/Start Autom.** button.

Touch the **Start Layer** button on the Sigma controller.

The system will cycle through all steps involved in the evaporation process only (Steps 9-14).

