Vacuum chamber furnace VBF-1200X-H8

Version: March 1, 2024

VBF-1200X-H8 is a vacuum furnace with a 7.5" ID × 13.4" L quartz tube chamber (7.6 Liter) placed horizontally. Water-cooled stainless steel vacuum flanges with valves are installed to achieve a vacuum of 10^{-2} to 10^{-5} Torr through the use of a turbo molecular vacuum pump.

It is designed for calcining or annealing semiconductor wafers (up to 6") under vacuum or various other gas atmospheres with a temperature up to 1100 °C. Inert gas and oxygen gas flow can be achieved via two valves. (Attention: MTI does not recommend using our products under hazardous conditions). Max. gas pressure shall be less than 1.2 atm.


Quartz Thermal Block

System Specifications

Working Temperature	1000 °C , continuous Max. 1100 °C, <30 min
Uniformity	+/- 2 °C
Temperature Controller	Programmable up to 50 segments

Operation instructions

1. Turn ON pump system (round button on the top of the table)

2. Turn ON cooling water (on the room wall).

3. Put sample in the chamber, and place the refractory Quartz Thermal Block (Alumina fiber filled) inside the chamber. Please always wear gloves when handling this block and do not touch it when hot.

4. Close chamber door and tighten the six fixing screws evenly and gradually (not extremely tight).

5. Open vacuum valve, wait until vacuum is 1×10^{-1} Torr or lower. Vent valve must be closed.
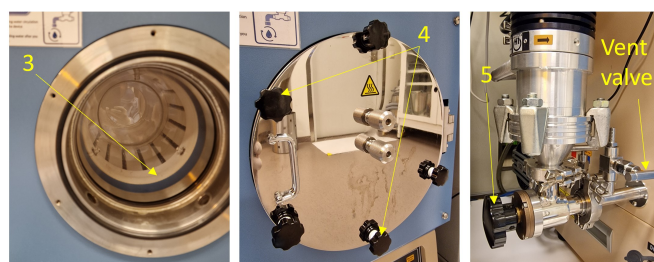

6. Turn ON the turbo molecular pump controller TURBOTROINK NT 50, wait a minute and press START. The pressure will go down to 10^{-3}-10^{-4} Torr after 10-20 minutes, you do not need to wait so long, go to step 7.
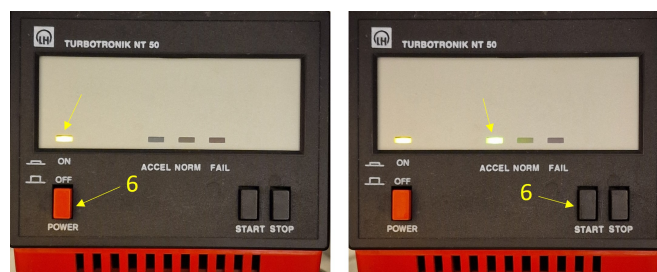
7. Turn ON the main power ⊘ of the oven. When starting the device, the meter type and program version will display for a few seconds, and then enter the normal state. Blinking "stop" indicates the program is in "normal state".

Start display

Blinking between these two

Set temperature and RUN

8. Press once to enter the setup menu, **C 01** will appear, change values down by or up by if needed, then continue by pressing to see t 01 and change by /.

C 01 is the step to reach the set point (this example to reach 700 °C in 40 minutes).
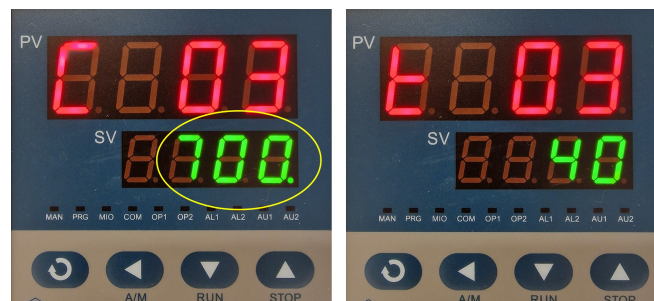
Do not change anything in this step.

9. Press to continue to **C 02**, her you define your heating temperature by /. Then press to set for how long time by /. This example is for heating heating at 700 °C for 60 minutes.

You may change temperature and time as wanted.

10. Press to continue to **C 03**, it is the time to cool down from the set temperature to 30 °C, this example from 700 °C to 30 °C in 40 minutes. **Change only 700 °C to your set temperature, do not change time.**

You continue by pressing and change set point by /.

11. Press to enter **C 04** and press again to enter t 04, this step is a code to stop program after reaching 30 °C (the code is -121 minutes). **Do not change any thing in this step.**

If you want to return back, exit or to return back to the main menu during any step, do nothing and just wait for 30 seconds then you are back automatically to the main manue.

12. To run heating program, press first the green "Heating Ready" button , a "clunk" sound should be heard. This switch activates the relay switch inside the furnace to establish power connection to the heating elements. If the sound is not heard, please do not proceed with operating the furnace.

To **RUN** the program hold pressing for 2 seconds.

During operation:

PV (process value) is the real **temperature inside the oven** (raises until reaching the set temperature).

SV (set value) is the **target temperature**.

Both PV and SV will increase during heating and decrease during cooling relatively slowly, meaning the heat treatment time can be longer as your set time.

You can STOP the program by pressing ▲ and hold for 2 seconds.

NOTE: Remember that this is not a rapid heating oven, heating up and cooling down to room temperature can take more than an hour or longer. Cooling time depends on temperature set by the user.

Do not open the oven before finishing all steps of the heating program. Never open the oven when temperature is over 100 °C .

Switching OFF

13. After finishing the program, push the red "Heating Off" button ⬤ to deactivate the furnace relay, a "clunk" sound should be heard.

14. Turn OFF the Main Power lock switch ◣ to cut off power from the control panel.

15. Press STOP on TURBOTROINK NT 50, after 10 minutes turn off TURBOTROINK NT 50.
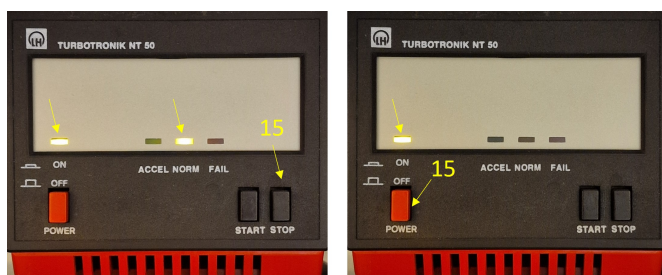
16. Open the ventilation valve slowly (marked in picture in step 5), open chamber and take out samples, remove the refractory Quartz Thermal Block (Alumina fiber filled) carefuly. Please always wear gloves when handling this block and do not touch it when hot.

17. Turn OFF cooling water button.

Maintenance and equipment care

- Avoid using rapid heating and cooling rates as doing so will render shock and damage to the heating elements. A 10 /min heating or cooling rate is suggested.

- While furnace is running, please do not touch furnace to avoid burns from high temperature.

- Do not open the furnace when it is being heated above 300 °C to prevent its insulation materials from cracking.

- MTI furnaces are only suitable for using with air or inert gas environments. Other flammable or toxic gases, such as H_2, Cl_2 and SO_2, will cause damage to the heating elements.