OPERATING MANUAL

XSO-Super Oven

**Superior, Full Convection, Bench Top Batch Oven
features four viewing windows, very fast heating and cooling rates and
exceptional performance in maintaining N2 purity during the reflow cycle.**

The oven is nitrogen ready, with the ability to connect to a PC, and includes an XMF-306 Cooling
System Controller. It has a built-in 8-channel profiler and two connectors for external "K"
thermocouples (readings of which are shown on the Oven display, stored and displayed online on
a PC by an optional X-306 Oven Monitor or when controlled by XSO Oven Commander).
This batch oven has a sealed heating chamber that permits heating in N2 environments as good as
2000ppm or better. Custom units can be built to reach 750ppm.

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I. INTRODUCTION

Congratulations on your purchase of a Superior Convection Batch Oven **XSO Super Oven.**
You now own a uniquely designed full convection Batch Oven for use in precisely controlled
production processes, heat resistance testing of components, and use in laboratory experiments for
other purposes where purity of the inactive environment and precise and accurate heating and
precisely controlled cooling media flow rate is required.

The unit offers several unique features, not found in any other ovens on the market today:

- Viewing windows on 4 sides, 2 square windows on the top and bottom plus two rectangular windows on each side, one on the front and another on the back of the oven.
- Built-in on-board 8 channel data logger which monitors in real time 8 "K" thermocouples and records the data on a PC connected via USB port to the oven.
- Built-in residual O_2 monitor to check the actual level of residual O_2 in the oven when operating in N2 environment.
- An operating mode in which the control of a heating/cooling process is implemented by reading the real-time temperature of the heated or cooled object via a thermocouple attached to that object and the TC-T input controlling the heat to reach the pre-programmed temperature.
- Advanced two zone, two media (N_2, shop air or both) programmable flow rate cooling system which enables cooling of heated objects (e.g. PCB's after reflow at the rates of 4 to 5 deg. per second) which gives better reliability of soldered connections and safer handling of the heated objects.
- XMF-306 Programmable Cooling Module, which controls the amount of cooling media (Air or N_2) in order to provide the exact volume of L/min or SCFM's needed for cooling a particular load and assure repeatability of the process in every oven cycle.
- True convection heating with added, separately controlled blue IR illuminators/heaters.
- Time settings in 9 time/temperature zones plus a time setting for purging the oven with nitrogen (N_2) or any other iactive gas to prevent oxidation. .
- Presetting of profiles for different heated objects with memory space for up to 250 profiles. The profiles may be pre-set with control of the air temperature in the chamber or by controlling heaters with the thermocouple attached to the heating object.
- Four inspection windows (two on each of the oposit sides, one on the top and one on the bottom of the oven) allow the user to monitor the heating process during operation (inspection can be done using a microscope or camera system).
- Microprocessor-based control uses closed-loop monitoring to ensure absolute repeatability of the temperature profiles and has enough memory to store 250 profiles.
- The large backlit display shows all process parameters and the specific temperatures and times or a graph of temperature versus time in real time.
- The Nitrogen inlet is standard and the oven can be used for heating in a Nitrogen environment with no additional hardware required. N2 can be substituted with another gas.
- Each oven has a built-in heat exchanger on the fume extraction port to protect the filtration systems if used to extract the fumes.
- Illumination on demand inside the oven is realized using emitting blue/white light IR heaters.

SAFETY

The purpose of this "SAFETY" section is to inform the users of the guidelines used to indicate special Notes, Cautions, Warnings or Dangers. Also included are the precautions which must be observed when operating or servicing this product.

These "NOTES", "CAUTIONS", "WARNINGS" and "DANGERS" are inserted in this manual wherever deemed necessary. They appear in blocked-off form with an outline and a shaded background to highlight the information as shown below.

NOTE
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

NOTE:
- Used to indicate a statement of company recommendation or policy. The message may relate directly or indirectly to the safety of personnel or protection of property. NOTE is not associated directly with a hazard or hazardous situation and is not used in place of "CAUTION", "WARNING" or "DANGER".

CAUTION
- Used to indicate a hazardous situation which may result in minor or moderate injury. May also be used to alert personnel to conditions, procedures and practices which, if not observed, could result in damage to or destruction of the product or other equipment.

WARNING
- Used to define additional information that, if not closely followed, may result in serious damage to equipment and serious personnel injury.

DANGER
- Defines additional information that, if not closely followed, may result in severe personnel injury or death. Danger is not used for property damage unless personal injury risk is present.

PRECAUTIONS

The following are general safety precautions which personnel must understand and follow when using or servicing this product. These precautions may or may not be included elsewhere in this manual.

1. Utilize all standard electrical safety precautions when using this or any other electrical equipment.
2. Always use this system in a well-ventilated area.
3. Exercise proper precautions when using chemicals (e.g., solder paste). Refer to the Material Safety Data Sheet (MSDS) supplied with each chemical and adhere to all safety precautions recommended by the manufacturer.
4. The fumes emitted during soldering are irritants and therefore should be removed. A pumped vent is located at the rear of the unit and should be ducted accordingly.
5. The area close to the hood becomes hot; care should be taken when working around this area.
6. The oven must be properly grounded.
7. Please read this operation manual carefully prior to use.
8. The areas around the viewing windows become hot, therefore, care should be taken when working around these areas.
9. After ending the cooling cycle, the inside of the oven is still hot, therefore, care should be taken when removing and placing the object(s) to be heated inside the oven.
10. Be sure to wear appropriate gloves to prevent burns when taking heated objects out of the oven and placing new ones inside the oven. The temperatures inside the oven may be as high as 380 degrees Celsius. Use ESD-safe heat-resistant gloves like Bokar P/N AHRG-11 or AHRG-16.
11. To ensure continued peak performance through the years, use genuine X-KAR replacement parts.

II.PACKAGING

The packaging of the XSO-Super Oven has been carefully designed to ensure maximum protection during transportation. However, no packaging can guarantee 100% protection. Damage may occur through rough handling by the carrier. Please ensure that any damage claim is reported promptly to the carrier and to the Distributor from whom the product was purchased.

The Oven is packaged in one crate:

The contents of the crate are as follows:
- XSO Super Oven Unit
- User's manual for the XSO Super Oven
- X485-USB Converter P/N 20-00092
- XTC profiler CD, P/N 33100; XTC USB connecting cable P/N 32033
- Ten "K" thermocouples, P/N 33101

   (8 for the profiler and one each to be used as TCT and TCB)

Bokar International   650 Scranton Pocono Hwy, Covington Twp., PA 18444   USA

- XU-8 Board Holder
- Two cooling flex lines connecting cooling media to both sides of the oven, P/N 33098
- One cooling flex line connecting XMF-306 with XSO Super Oven, P/N 32761
- 17mm wrench to remove the transport screws bolting the Main Oven Body to the bottom of the crate
- XMF-306 Cooling Media Controller.

Note: The unit comes without an AC plug because there are no unified standards for plugs and sockets used for high current 220V, 3 phase power lines.

III. UNPACKING

Prior to using the system, please check if the system is complete. Should you notice that any items are missing, please notify us, giving the model number, voltage, date of purchase, place of purchase and what is missing. Missing items must be reported within 7 days of the date of purchase.

WARNING
When unpacking, please read the Manual carefully. Prior to turning the System "ON", please make sure the voltage of the System corresponds with the voltage of your available supply. Connection to incorrect voltage supply may cause damage to the System!

IV. GENERAL INFORMATION

Control panel view
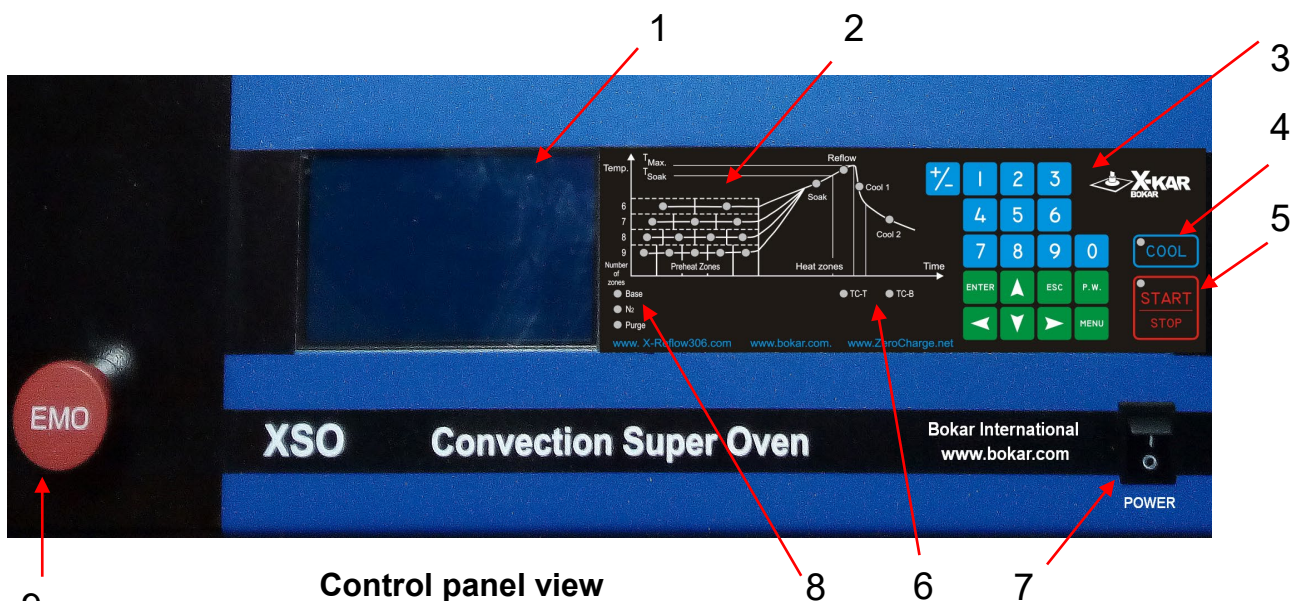
1. Display
2. Current zone indicators
3. Numerical keypad
4. Cool Key
5. Start/Stop Key
6. TC-T and TCB status indicators
7. Main Power switch
8. Mode indicators (Base, N2 and Purging Modes)
9. EMO emergency push-button switch
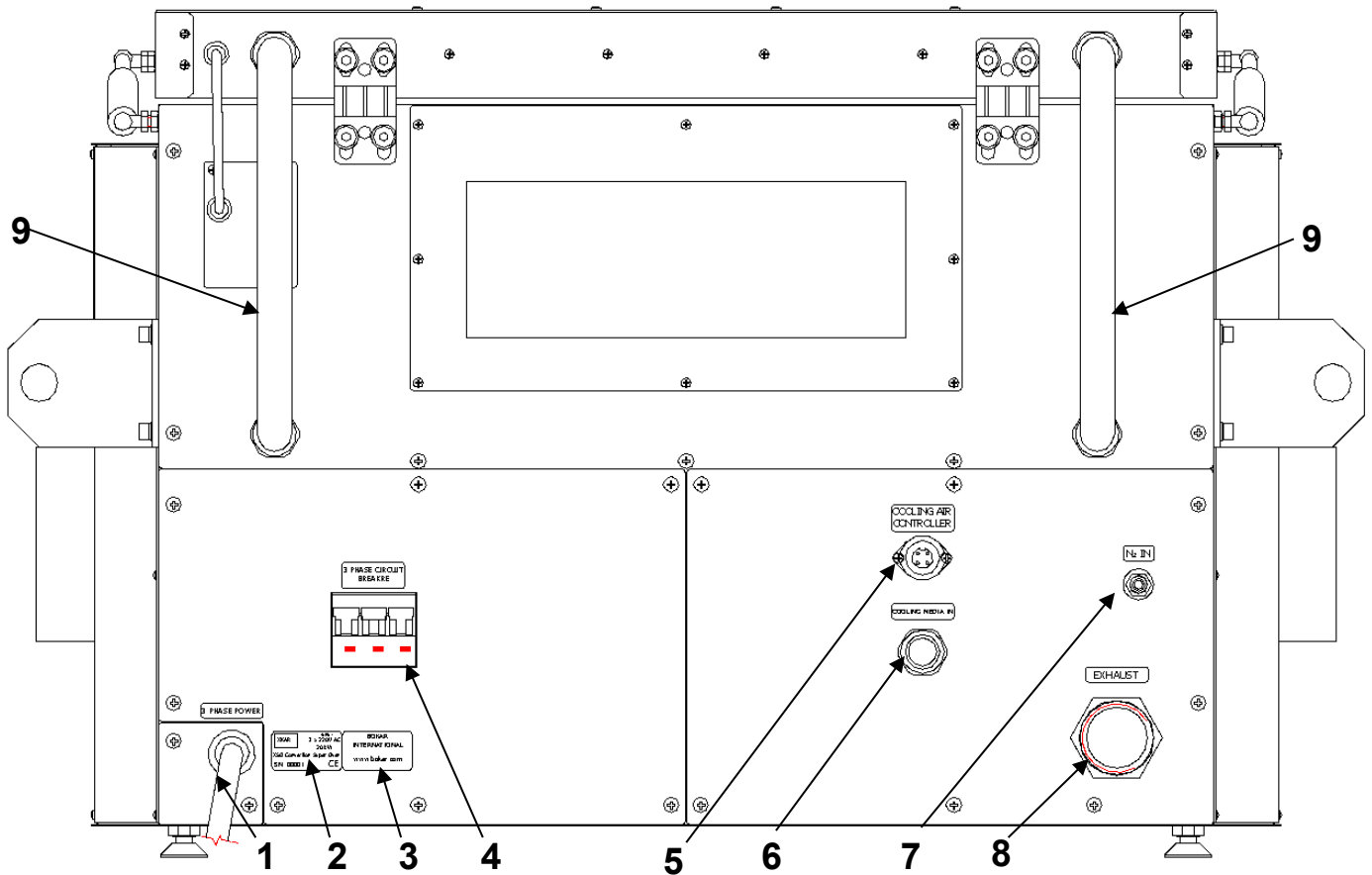
XSO Super Oven rear side view

What is on the back panel and the back of the top clam shell of the oven:

1. 3 Phase Power cord
2. Unit Label (Model, Serial # and working Voltage)
3. Bokar International Company Label
4. 32A, 3 Phase Circuit Breaker
5. Electrical connector to connect XMF-306 Controller
6. 3/4 " airline pneumatic male nipple to connect flex cooling media line from XMF-306 Cooling media controller
7. I/M size 1/4 male quick connector for N2 addition during the heating cycle
8. Exhaust 2 " male pipe thread to connect the exhaust pipe
9. 3/4 "cooling flex lines

V.   SET-UP AND INSTALLATION

ELECTRICAL REQUIREMENTS

The XSO Convection Super Oven unit requires 3 phase AC line as 127 (L-N) / 220 (L-L), 20 kW of power.

If your power outlet cannot provide suitable power, arrange for a qualified, licensed electrician to install one for you.

SET-UP

1. Unpack XSO Super Oven using "Unpacking instruction". Store the shipping crates in a convenient location. Reusing these crates will prevent damage if you ever need to ship or store the unit.
2. The system should be placed on a rigid and stable work surface. Its total weight is about 150Kg (330Lbs).
3. Confirm that the power switch on the front panel is in the "OFF" position and that the 3 phase circuit breaker on the rear panel is turned off (in the bottom position and green fields on the fuse)
4. Open the TOP Clam Shell, remove all accessories and documentation inside the oven and place the XU-8 Board Holder inside.
5. If you wish to use nitrogen for heating in N_2 environment and control low levels of O_2 during heating cycles, attach the nitrogen source (1~2 kg/cm^2) to the nitrogen input port on the rear panel of the oven.
    Note: Higher N_2 pressure can be used (up to 6 bars) if your process requires it.
    If you plan to use N_2 for cooling, secure a high volume source. A volume of 1000 to 2000 liters is recommended for fast cooling.
6. Unpack the XFM-306 Mass Flow Controller and place it behind the unit.
7. Connect the electrical cable which is attached to the XFM-306 unit to the mating connector on the back panel of the oven. Use ½" ID flex line supplied with the unit to connect the XFM-306 cooling media output to the ¾" cooling media input located on the back panel of the XSO Super Oven.
8. The XFM-306 controller allows for the use of N_2 for fast cooling to solidify the molten solder and cool the shop air. It has 2 cooling media inputs. Connect the N_2 to the fast cooling (Cool1) input and the shop air to cooling (Cool2) input.
9. For first-time installation: Install proper AC plug at the end of the power cord. The color coding of the wires is as follows: Brown, Grey, Black = Hot wires (L1, L2, L3), Blue = Neutral wire, Green/Yellow = Grounding wire

    The oven is now ready for use.

POWERING UP and LOGGING-IN

1. Connect the power cord to the appropriate AC power socket: 127 (L-N) / 220 (L-L)

| CAUTION |
| --- |
| To ensure operator safety, the AC supply receptacle must be checked for proper grounding before initial system operation. |

2. Turn on (Lever to upper position) the 3 Phase Circuit Breaker on the back panel.
3. Turn the power switch to the "ON" position.
4. A short sound will be heard and the display will show a welcome screen with the manufacturer's logo, the oven's name, a serial number and the oven firmware revision number (below-left).

Please check if the red LED marked "POWER" on the panel of the XMF-306 Flow Controller illuminates. If yes, the electrical cable from the XMF-306 was properly connected to the Oven.

5. After a few seconds, the display will show a "Log-In" screen where different level of users are listed. After a few seconds, the display will show a "Log-In" screen where different level users are listed (above right). Depending on your privileges (Administrator, User, Guest or Factory Authorized Representative), choose an appropriate logging. Detailed information about privileges and accounts is presented in another chapter of this Manual.

6. If the operator is not the one of the authorized users he/she can log-in as a GUEST.

   Pressing the "up" or "down" arrows on the numerical keypad moves the cursor to the desired user selection. When the appropriate position is selected, press ENTER

7. The screen (below-left) will ask for a Password.
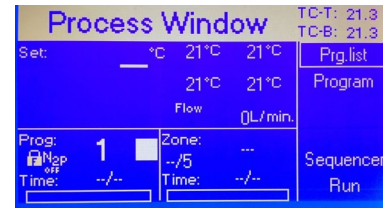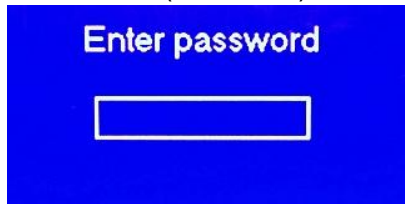
Enter Your four-digit Password and press ENTER . If you are going to be the administrator of the oven and turning on the oven for the first time, please enter preset Factory Code 1234 for the administrator and press ENTER . The Code can later be changed to any four-digit combination. If you change it, please write it down and keep it in a safe place.

8. When the password is entered, the Process Window displays the most recently used profile (above–right). The Programming and Heating Process starts from this window. Process Window is the main window of the Oven Program. To return to the "Process Window" screen from any other viewing windows press P.W. . This window displays all information about settings of times and temperatures in the Oven in different zones. It displays also temperatures read by the external thermocouples connected to TC-T and TC-B sockets on the back panel and temperatures of the air circulating in the chamber from the thermocouples placed in the front and back of the heating chamber.

VI. OPERATION

The heating process (or Program Cycle) can be started from the "Process Window" and "Program window"

Pressing the START/STOP key begins the Program Cycle. When the process starts, the Red LED illuminates in the corner of the Start/Stop key. The display shows the "Process Window" screen (Fig.4 below). Color LED's on the graph located next to the display indicate the phase of the cycle and in which zone the program executes the cycle.

Pressing the [START STOP] key at any time during the process advances the oven to the next task (not to the next zone) and eventually stops the cycle.

Pressing the [COOL] key opens the cooling air valve and starts the cooling immediately by the media connected to Cool2 input of the XMF-306. During the cooling cycle, the fan inside the oven circulates the air. The cold air jets will cool the object in the oven.

3. Temperature scale C or F displayed after a number

4. Actual temperature of air at the exit from two rear heaters and two front heaters

5 & 6. Temperatures of External "K" thermocouples connected to the TC-T (top) and TC-B (bottom) sockets on the side profiler panel

2. Object target temperature (displayed in each zone)

1. Actual temperature of the heated object

7. Programs list

8. Details of actual program

23. Program Number. (Asterisk next to a Number means that the program was modified).

9. Actual Cooling media flow

22. Lock/Unlock STATUS and who locked the Program

11. Sequencer Mode

21. N_2= Injection Mode of N_2 in each zone:
P= Proportional, **T**= Timed
C=Continuous injection
OFF= Nitrogen Valve Closed

12. Process can be started from here

20. Pre-Programmed Base Temperature (If the base mode is not selected in the User Settings, the base temp. is not displayed).

13.Display of the actual zone
- Heat 1 to
- Heat 4
- Soak
- Reflow
- Cool 1
- Cool 2

18. Process Time (Sum of all pre-programmed zones)

16. Elapsed Zone Time (graphic bar)

15. Elapsed Zone Time [s]

14. Programmed Zone Time [s]

19. Elapsed time from the beginning of the process beginning

17. Process Status: Square=Process stopped
Triangle=Process is running
B inside=Base Mode ON   P inside=Purging in progress
(will appear when N_2 Mode is selected in the User Settings)

Before the program starts, Process Window, <u>shown above, displays that the Oven is set to execute the program in which the Oven temperature is controlled by the thermocouple TC-T</u> connected to the heated object and plugged into to the TC-T input on the right side of the control panel of the Oven.

Before the program starts, Process Window, shown below, displays that the Oven is set to execute the program of which the Oven temperature is controlled by maintaining the pre-set temperature of the air or N2 in the Oven.

3 & 4
Front and Rear Heater Temperatures (displayed in each zone)

3a & 4a
Front and Rear Heater Overshot Temperatures (displayed in each zone)

On the right side of the Process Window there is a keypad. To set the required oven parameter, press MENU.

The screen will change to the one below on the left.

.

Settings	**Settings** | Protection | System | Connection
Log Off	Base temperature 50.0
Exit	Offsets
	Overshoot
	Cooling to temp. of Circulating Air
	Ventilation

Press ENTER. The screen will change to the one shown above on the right. The first top row of the display shows the general oven settings.

Under the word Settings, there is a list of the first five oven parameters which can be pre-set.

Pressing the ▲ ▼ arrows allows an operator to scroll up and down the screen to choose the required parameter to change or view. Use the ◀ ▶ to move from the left side to the right side of the screen.

1. **Settings** (From this window, you can set the program on how you want the Oven to function. You can set the units in which your oven shall display the parameters and how it should execute the heating and cooling)

    1.1. **Base Temperature.**

This is the temperature which the oven will maintain inside the heating chamber at all times after the START STOP key is pressed. This option is unique and not commonly found on other ovens. It is very useful because when the heating profile is started when the oven is cold, it takes a minute (or sometimes longer) to heat the mass of the oven body which slows down the heating of the object in the oven. The warm start from known starting temperature gives better repeatability of the same programs run at any time. The Base Mode is also very useful when using the oven as a one zone device for pre-heating or curing purposes. It offers a very quick setup of constant temperature heating.

Settings | Protection | System | Connection	Settings | Protection | System | Connection
Base temperature 50.0	Base temperature 50.0 (Blinking)
Offsets	Offsets
Overshoot	Overshoot
Cooling to temp. of Circulating Air	Cooling to temp. of Circulating Air
Ventilation	Ventilation

To turn this option ON, press ▶ and then ▲. The right part of the line will highlight, and the number in the highlighted area will blink showing previously set Base Temperature. You can use the numerical keypad to set your desired base temperature value. Press ENTER to save your setting. Possible range when setting the Base Temperature is:+50ºC to +380ºC.

From the display shown on the right above, scroll down by pressing ▼ to set one of the next 4 parameters.

Offsets

This feature is also unique. Theoretically, the hot air mixes in the heating chamber and reaches an average value. Both heaters are set up in the factory to deliver the same temperature of the airstream at the front and rear of the heating chamber. If the heated object mass is not evenly distributed (e.g. the board is heavily populated by the large components on the back and lightly populated at the front), the oven heating gas will need to have higher temperature at the back to heat evenly the mass imbalanced object. This is because the mass of the hot air injected to the heating chamber from both front and back is the same. In case of not evenly distributed mass to be heated, the operator should measure the difference in the temperature rise and set the heater offset accordingly. Example: If the back heater should give the air hotter by 20ºC the operator should set the rear heater temperature offset to + 20.
Note: one may also enter negative offset values.

From the display as shown on the left above, scroll down by pressing [▼] to highlight Offsets. Then, press [ENTER] or [►] to set one or both heaters' offsets. The display will show as seen below on the left.

From the display as shown on the left above scroll down by pressing [▼] to highlight Offsets. Then press [ENTER] or [►] to set one or both heaters offsets. The display will be as seen below on the left side.

Base temp.	Offsets	Overshoot	Cool. to T.
Front left heater offset			0.0
Rear left heater offset			0.0
Front right heater offset			0.0
Rear right heater offset			0.0
Override factory offset			Yes

1.1.1. **Front heater offset** – Press [►]. The right part of the line will highlight and 0.0 value will blink. Use the numerical keypad to set your desired value. Press [ENTER] to confirm your setting. Possible settings for the offset for front heater are: -20ºC to +90ºC. The factory setting is 0ºC.

1.1.2. **Rear heater offset** – Press [▼] to scroll to Rear heater offset line. Press [►]. The right part of the line will highlight and 0.0 value will blink. Use the numerical keypad to set your desired value. Press [ENTER] to confirm your setting. Possible settings for the offset for the rear heater are: -20ºC to +90ºC. The factory setting is 0 ºC.

1.1.3. **Override Factory Offset –** Factory offset is set-up to 0 ºC. For some customers (on demand) it is set to a different value. You should choose to override Factory Offset.

1.2. Overshoot

To speed-up the object temperature rise to the pre-set temperature in the zone and start the PID control of the temperature of the air in the heating chamber as close as possible to the moment when the heated object reaches the desired zone temperature, the operator can set target air temperature a bit higher than the desired zone temperature by the number of ºC which he/she can program. He/she can also pre-program how long this temperature overshoot should last.

Press ▼ to go the Overshoot line. Then, press ENTER. The right part of the line will highlight and "off" will blink. Pressing the ▲ ▼ arrows turns the overshoot ON or OFF (picture below left).
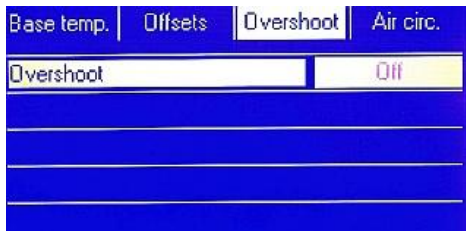

After selecting "ON", press ENTER. The screen will be as shown above right.

Press ▼ to go to the Overshoot time. Press ▶ to go to overshoot time setting section.

Set the desired time and press ENTER. Repeat the action to set the Overshoot temperature.
Recommended Overshoot is 10 to 30ºC in 10 to 30 seconds.

1.4 Cooling to temperature of

Press ▼ to go to Cooling to temp. of. Press ▶. The right part of the line will highlight and previously set mode of Cooling to temperature of will blink.
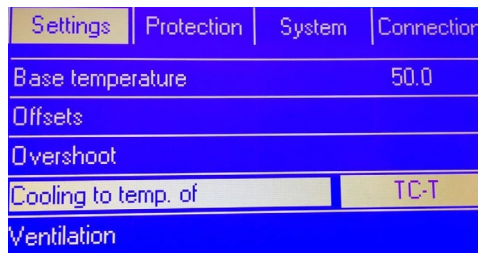
The operator can set how long the cooling shall last. It can be set to track the temperature of the circulating air and stop the cooling action when the circulating air drops to the pre-programmed value. The setting of the maximum cooling time works simultaneously. The cooling action will stop when either: a) pre-set time elapses or
b) the temperature of the air in the oven drops below the pre-set value.

By pressing the ▲ ▼, you can select to cool to either the temperature of the circulating air or the temperature measured by the TC-B or TC-T (thermocouple connected to the heated object and to the input on the back panel of the oven). Mode TC-B or TC-T will make the oven cooling work for as long as the temperature measured by the selected thermocouple reaches pre-programmed value.

Press ENTER to confirm your setting.
Note: Cooling to the temperature of the circulating air (as in all other batch ovens) does not give any guarantee that the load is as cold as the air.

1.5 Ventilation

From the screen Cooling to temperature of, press ▼ to go to Ventilation. Press ENTER or ➤.
This opens the next screen.

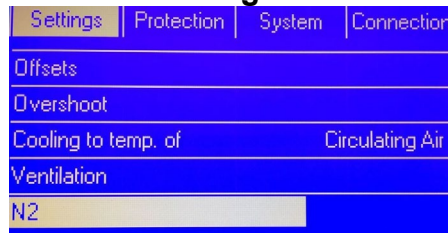| Offsets	Overshoot	Cool. to T.	Ventilation
Circul. Fans Off Time			0
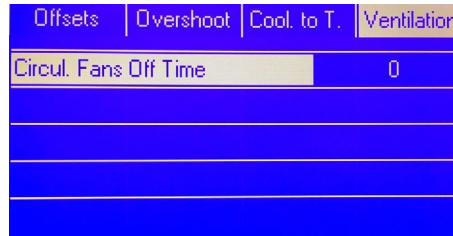
1.5.1 Circulating Fans Off time

The circulating fan may be disabled during cooling to avoid the entrance of hot air to the heating chamber in the heater section.   Possible settings for Circulating Fans OFF are 1 to 1200 sec. The factory setting is "0" (this means the fans are always ON and circulate the air in the heating chamber during cooling).
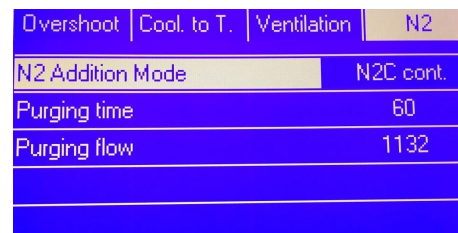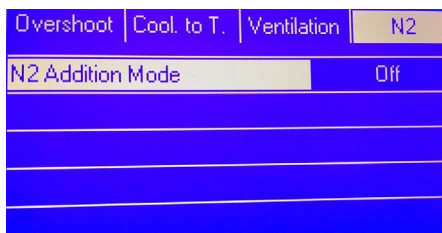
Press ▼ to go to Circulating Fan Off Time: Press ENTER or ➤. The right part of the line will highlight and show blinking "0". By pressing ▲ ▼ you can turn the circulating fans OFF or choose the window where the numerical value of the "time off" can be entered. While in this window, use the numerical keypad to set your desired value. Press ENTER to confirm your setting.

Press   to return to the Settings menu where Ventilation is highlighted.

1.6 N2 – Nitrogen Environment settings.

Settings	Protection	System	Connection
Offsets			
Overshoot			
Cooling to temp. of			Circulating Air
Ventilation			
N2			

Press ▼ to go to N2. To turn this option ON, press ➤ or ENTER. The below left window will open.

Overshoot	Cool. to T.	Ventilation	N2
N2 Addition Mode			Off

Overshoot	Cool. to T.	Ventilation	N2
N2 Addition Mode			N2C cont.
Purging time			60
Purging flow			1132

Overshoot	Cool. to T.	Ventilation	N2
N2 Addition Mode			N2T periodic fill
N2T fill time [s]			10
N2T Repetition rate[s]			60
Purging time			60
Purging flow			1132

Overshoot	Cool. to T.	Ventilation	N2
N2 Addition Mode			N2P proportion
Purging time			60
Purging flow			1132

Press ▶. The right part of the line will highlight and the highlighted area will blink showing the previously set N_2 Mode. By pressing the ▲ ▼ you can set N_2 mode of operation to:
Off, N_2C=Continuous fill, N_2T=Periodic fill [sec] or N_2P=Proportional [%].

Press ENTER to confirm your choice. N_2 Mode will be highlighted.

Press ESC to return to the Settings menu.

1.7 Cooling Media Flow Control

These settings define how the XMF-306 Mass Media Flow Controller attached to the oven will function. The XMF-306 has two inputs (one for fast cooling with N_2 and the second one for the compressed air). Both Fast Cooling (Cool1) and Cooling (Cool2) can be programmed independently when creating the program.
In the settings the Operator can choose cooling flow units (l/min or SCFM's).
Note: Fast cooling solidifies the solder which is best done with N_2. The flow should be chosen depending on the mass and size of soldered components to avoid blowing them out of place. After the solder solidifies, the air flow in Cool2 can have higher velocity.

When in Settings – N2 line, press ▼ to go to the Cooling Air (or N_2) flow Control.

The window shown below/left will open. Press ▶ or ENTER to go to the right side. Turn the mass flow controller ON using the ▲ ▼ up/down arrows.

Settings	Protection	System	Connection
Overshoot			
Cooling to temp. of			Circulating Air
Ventilation			
N2			
Cooling Air Flow Control			On

Settings	Protection	System	Connection
Cooling to temp. of			Circulating Air
Ventilation			
N2			
Cooling Air Flow Control			On
Cooling Air Flow Scale			L/min.

1.8 Cooling Air (or N2) flow Units

Press ▼ to go to Cooling Air Flow Scale. Press ▶ or ENTER to go to the right side. The right part of the line will highlight and the previously set units will blink. Using the ▲ ▼ (up/down arrows) set your desired units (L/min or SCFM).

1.9 **Max.Temp.diff. heater to object**

When the heating rate in the oven is controlled <u>by the thermocouple attached to the heated object,</u> it is often desired to set gas temperature as high as possible to quickly transfer the heat to the heated object. The User may have temperature sensitive devices and may want to have control over how much differential to set between the heating air and the heated object. This setting allows pre-setting the limit for this max. temperature difference.

Press ▼ to go to Max.Temp.diff. heater to object. Press ➤ or ENTER to go to the right side. The right part of the line will highlight and the previously set value will blink. Using the ▲ ▼ (up/down arrows) to adjust this value in increments of 0.1 ºC. You can also use the numerical keypad to set your desired value without going through .1deg. increments.   Press ENTER to confirm your setting. Top Heater temperature will be highlighted.

Press   to return to the Settings menu. Factory set value is 160 deg. C.

2 **Protection (Assignment of passwords)**

Admin – Four-digit Password to manage the Oven use. Highest Level of Authority.
                    The factory setting is 1234

2.1.1 Guest – Possible settings: YES or NO. If YES, the user "Guest" can run the pre-set oven programs without a PASSWORD.

2.1.2 User1

2.1.2.1 Account Type: Possible settings: Privileged or Limited.

2.1.2.2 Four-digit Password for User1. The factory setting is 1111

2.1.3 User2

2.1.3.1 Account Type: Possible settings: Privileged or Limited.

2.1.3.2 Four-digit Password for User2. The factory setting is 2222.

2.1.4 User3

2.1.4.1 Account Type: Possible settings: Privileged or Limited.

2.1.4.2 Four-digit Password for User3. The factory setting is 3333.

2.1.5 User4

2.1.5.1 Account Type: Possible settings: Privileged or Limited.

2.1.5.2 Four-digit Password for User4. The factory setting is 4444.

2.1.6 User5

2.1.6.1 Account Type: Possible settings: Privileged or Limited.

2.1.6.2 Four-digit Password for User5. The factory setting is 5555.

2.1.7 User6

2.1.7.1 Account Type: Possible settings: Privileged or Limited.

2.1.7.2 Four-digit Password for User6. The factory setting is 6666.

3 System

System parameters which shall be set for all oven users.

3.1 Language (At this time, the choice is English or German)

3.2 Temp. Scale – Choice of Temperature Scale: The factory setting is ºC
   ºC – Degree Celsius   ºF – Degree Fahrenheit

3.3 Time and Date – Please set these. Factory Settings are random.

The XSO Convection Super Oven has built-in real time clock which is maintained by an internal battery.
It is mainly used to remember the time and date when the programs were created. The correct time and date settings will provide accurate tracking of the order in which the programs were created.

Setting time:
Hour and minutes

Settings of the date
(year, month and day)

Settings confirmation
button

Time and Date Settings Window
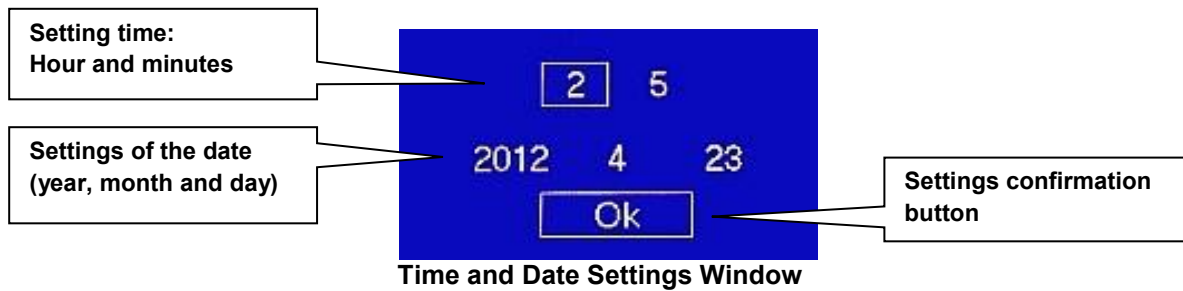
a) Access the time and date settings window (In settings menu)
b) The active frame shows the parameters which can be set. The first one is "hour."
c) Set the hour using the numeric key-pad.
d) Confirm by pressing `ENTER` .
e) Set the minutes and confirm by pressing `ENTER` .
f) Set the year and confirm by pressing `ENTER` .
g) Set the month and confirm by pressing `ENTER` .
h) Set the day of the month and confirm by pressing `ENTER` .
i) Active frame moves to "OK." If satisfied with the settings, confirm by pressing `ENTER` .

3.4 Sound - Available settings:
ON – sound is on
OFF – sound is off
3.5 Contrast – Display contrast setting.
Available values: 32 to 255
3.6 Calibration (An option for the Administrator to perform periodic calibration of temperature sensors)

4 Connection

4.1 Address – Oven address used when it is connected to a computer.
Available numbers 1 to 247. The factory setting is 247.

5 Restore

Protection	System	Connection	Restore
Restore settings			
Restore analog settings			
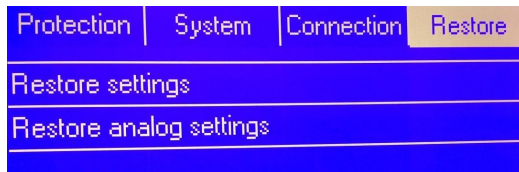
5.1 Restore Settings –This option allows an administrator to restore all settings to the factory-set values. When the **Restore Settings** is highlighted - press `ENTER` .
5.2 Restore Analog Settings This option allows an administrator to restore analog settings to the factory-set values.

When the **Restore Settings** is highlighted - press `ENTER` .

VII. CREATION OF PROGRAMS

Each program has a set of time/temperature zones to fulfill all the requirements of temperature profile which is necessary for proper soldering of the SMT parts to the PCB's or any other heat treatment process.

The PROGRAM should have:
   a) As a minimum one PREHEAT Zone as recommended by solder paste manufacturer for the purpose of proper activation of the flux contained in the solder paste and to gradually change the temperature of the cold board to avoid stress across the entire board and especially on the

   vias (connections between the pcb layers).
   b) SOAK or Heat Equalization Zone to evenly spread the heat across the board,
   c) REFLOW Zone to bring the temperature high enough above the melting point of the solder to melt and hold it in a liquid state for a sufficient time.
   d) COOLING Zone to cool the board and solder, preferably at the rate of one degree per second or better.

The XSO Convection Super Oven has one program example entered at the factory which cannot be changed. There is space to enter and save 250 Programs created by the User.
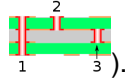
Only the Administrator and Privileged Users can create and save Programs.

XSO Convection Super Oven PROGRAM Characteristics:

This XSO Super Oven can work in the conventional mode (same as other ovens work). This is the mode when the profile is created to control the heating gas temperature in each zone not knowing the difference between the real temperature on the board and the gas temperature. This method has been used for years. An experienced oven operator could run the pilot test and from the results could more or less estimate how much higher to set the temperature of the Air or N2 in each zone to bring the board to a desired temperature in a given time.

XSO Convection Super Oven has a second mode that can be selected when creating the programs. **This mode eliminates guessing of the temperature differential**. The thermocouple is attached to the board (or other heated object) and measures real board temperature. The oven will heat the air/N_2 in such a manner that the temperature set for the board in each zone is reached and maintained. **The greatest benefit is that the operator can set the time duration in each zone so that the oven will maintain pre-set temperature.** There is no need to guess how long the oven will need to reach the pre-set, required temperature. The time to reach this temperature will depend on the board mass and size.

Each PROGRAM created and saved in XSO Convection Super Oven gives the following choices:

   ● Number of zones (choice of 3 to 9 Temperature/Time Zones + purging zone)
   ● Choice of temperature control in the Oven (Either by external TC connected to the heated object or by the thermocouples measuring the temperature of the air in the Oven)
   ● A record of the date on which it was created
   ● The identity of the creator of the PROGRAM
   ● Whether it is Locked or Unlocked and who locked it.

Note: The saved Program can be locked/unlocked only by the Creator or the Administrator.
   An example:
A program locked by User1 cannot be erased, unlocked or modified by User2 or User3 but can be modified and/or locked/unlocked by the Administrator or Factory Serviceman.

- program unlocked

- program locked by User1

- program locked by User2

- program locked by User3

- program locked by the Administrator

- program locked by the Manufacturer

To create a new program, go to the process window (below left).
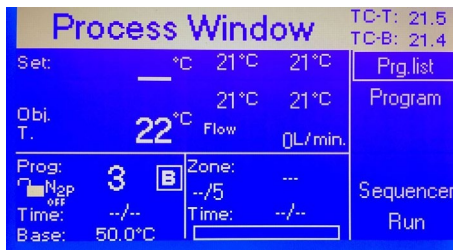
Using the ◀▶ and/or the ▲▼ arrows go to the Prg. List. Press ENTER.. A program list window similar to the one shown above right will open. Scroll using the ◀▶ and/or the ▲▼ arrows to the first empty space for a program. The space will be shown in as a white line outline. Than press ▶ and the section New will be outlined in the right part of the Program List window. Press ENTER. The window shown below left will appear.

Using keypad enter the desired number of zones which your profile requires. The max is 9 zones. (The purging with N_2 is an additional 10th zone). Press ENTER. The window shown above right will appear.

Select "No" if you want to enter the conventional program when the temperature of the air in the oven is controlled, or "Yes" if you want the oven to heat your object to desired and pre-programmed temperature in ach zone and measured by an external thermocouple attached to the heated object. press ENTER

If you have chosen to control the air temperature in the oven the display will show as below left. If you have chosen to control the object temperature in each zone as measured by attached to it thermocouple TC, the display will be like shown below right.

Press ENTER to edit the sample program and set your required values.

Depending on your choice of number of zones and the type of the temperature control one of the two windows shown below will appear.

Using the ◄ ► and/or the ▲ ▼ arrows or the keypad, set the required values for your program.

When finished, press ESC. The screen will outline Edit on top of the right column. Press ▼. The rectangular outline will move over "Save". Press ENTER and then P.W to go to the Process Window screen.

Now you can run your newly created program.

The programming can be done much more efficiently using an XSO Oven Commander, a program which is available to operate the XSO Super Oven from a PC.

The XSO Oven Commander allows for storage of unlimitted number of programs and profiles and for viewing in a real time graphs of the temperatures of the hot gas entering the oven and also the temperature of the heated object if the conroling thermocouple is connected to the heated object.

Information about the program:

Program List window

1. Program Number
3. Number of zones
4. Program number
5. Program just created.
2. Short Description of Program
6. Menu accessible from this window
6. White background shows the chosen selection
3. Program Status (Locked, unlocked and, if locked, who locked it.

Moving around the Menu:

Use the ◄ ► to move from the left side to the right side of the screen. Pressing the ▲ ▼ arrows allows an operator to scroll up and down the screen.

The selected item is framed by a rectangle. While in the MENU, pressing **ENTER** gets the Operator into the selected action (view of the Program List, Current Program Settings, the Sequencer Mode or the RUN position

from which he/she can start the process by pressing either **ENTER** or the   key.)

Note: To return to Process Window from any place just press **P.W.** .

To change the program to a different one:

Go back to the Program List. Select desired program and press **ENTER** .

To edit the Current Program or create a new one:

Select "Edit" on the Menu and press **ENTER** . If you are authorized to do so, you will be able to edit this program's parameters.

Starting Program Cycle
● Power up the oven
● Select the program

● Press the   key to start the oven.

<table>
<tr><td>CAUTION</td></tr>
<tr><td>The interior of the Oven can be very hot.
Start the cooling cycle before opening the Oven to place or remove the PCB.</td></tr>
</table>

Cooling Cycle

- When the reflow process is completed at the end of the REFLOW zone, the cooling cycle starts automatically.

OR   one can press [COOL] to start the cooling cycle at any time during program cycle.

<table>
<tr><td>NOTE</td></tr>
<tr><td>During the cooling cycle, a fan inside the Oven circulates the air. (Unless it is programmed to stop after a pre-defined number of seconds).
To speed up the cooling, open the lid of the Oven.</td></tr>
</table>

Selecting the program
To select a program to run:

a) Use the [▲] [▼] keys to select the desired program.

b) Press [ENTER] to access this program.

When in the Process Window, press   to run the program.

Program Edit

a) When in the window "Program" select Edit on the MENU and press [ENTER]. If you are authorized, you will be able to edit the program. If not, ask the oven Administrator for help.

b) When in the window "Program" select Edit on the MENU and press [ENTER]. If you are authorized, you will be able to edit the program. If not, ask the Oven Administrator for help.

VIII. SEQUENCER

The Sequencer can be used by the following types of users:
        PRIVILEGED USER
        ADMIN
        The Sequencer is an additional tool which allows for up to eight selected programs to run one after another. The parameter which ends one set program and starts the next selected program is the temperature measured by the external thermocouple connected to the "K" TC 1 connector located on the back panel of the Oven. During the cooling cycle (zone) of the running program, the temperature reaches the pre-set value by the user, this program ends and the Oven automatically starts the next program chosen in the sequencer. If the external thermocouple "K" TC1 is not connected, the temperature which ends the program and starts the next one is determined by the internal thermocouple measuring front heater temperature.

Note:
        During the Sequencer cycle, the settings in the cool zones of the selected programs do not
        have any meanings. They are overwritten by the reading of the "K" TC1 temperature. The

program will end when the TC-1 temperature reaches the pre-set in the Sequencer temperature "R". After the Oven is cooled to this temperature, the running program stops and the next program selected in the sequencer starts running.

Menu

Selected programs to run in the pre-programmed order

Sequencer window

Temperature which defines the end of one program. When a cooled PCB reaches this temperature the consecutive program on the sequencer list starts the next cycle.

How to run the SEQUENCER

1. Access ''Process Window''.
2. From the menu on the right, select "Sequencer". Sequencer window will be displayed.
3. Select the first desired program to run using the numerical key-pad and press ENTER
4. Select the consecutive programs to be run one after another.
   (If you want to run only four out of the possible eight programs in the sequence, select 0 for item 5 to 8 on the program list (zero means that there is no program to run).
5. Pressing the ▲ ▼ or ENTER select "Temp. R" field.
6. Set cooling temperature which you want to reach in each cooling zone of each program run in the Sequencer.
7. Press ➤ to get to the menu on the right.
8. Press ▼ to select "Run"
9. Press ENTER to start the first program to be run in the Sequencer Mode.

IX.   LEVELS OF AUTHORITIES for OVEN OPERATORS

To protect saved profiles and the Oven settings, the **XSO Convection Super Oven** is programmed to give different users a selected choice of authorities. In other words, the Operator can have either full access to the Oven settings (Administrator), limited access (USER), or no access (GUEST). The Administrator has the highest level of authority. He or She manages the use of the Oven. This Security System protects against unauthorized or accidental changes in Oven settings and/or loss of stored profiles. To use the Oven, the Operator must select the Level of Authority assigned to him/her and log-in by entering the assigned PASSWORD. GUEST does not require a PASSWORD but GUEST can only RUN existing programs and cannot create, change or delete any settings.

WHO CAN OPERATE THE SUPEROVEN :

- Guest   (Unlimited number of Guests)
- User   (Three Authorized users)
- Admin (One Administrator)

Level of Authorities for each Group of OPERATORS:

Admin – The Highest Level of Authorities.
   The Administrator can:
- Assign passwords for the USERs
- Set the privileges for each USER
- Access and change all Oven settings
- Create New Programs and modify the existing ones
- Lock and unlock all programs (except the factory pre-programmed examples)
- Delete program
- Run all programs
- Edit programs "on the go" in real time
- See the Program settings
- See the graphic display

User – Standard and Extended Set of Privileges for Oven Operator
       (Requires Password to Log-in and operate the Oven)
   ☐ **Limited User** (with Limited Privileges) can:
- Run existing programs
- See the Program settings
- See the graphic display

   ☐ **Privileged User** can:
- Run existing programs
- See the Program settings
- See the graphic display
- Create New Programs
- Delete Programs
- Edit the Programs "on the go" in real time
- Lock and unlock the programs

Guest – This type of Operator does not need a PASSWORD to operate the oven

The GUEST can:
- Run existing programs
- See the Program settings
- See the graphic display

Factory – Account for Factory Personnel for Maintenance and Service purposes. It requires a special factory password known only to the Factory-Authorized Personnel.

List of Factory set PASSWORDS when the unit is shipped out to the Customer.

(The Administrator can change these PASSWORDS at any time)

- Admin :   1234   User1 :   1111   User2   :   2222

- User3 :   3333   User4 :   4444   User5   :   5555

- User6 :   6666   Guest :   Does not require a password

- XXXXX Emergency Password for the Administrator

NOTE: *The emergency PASSWORD should be used only when the regular PASSWORD is lost (or forgotten). This PASSWORD is for one time use only and cannot be changed. Please call the Distributor or Factory to get this PASSWORD if you need it.*
All other PASSWORDS can be set and/or changed in Oven Settings Menu accessible only by the Administrator of the Oven.
The Administrator shall not assign the same passwords to different Users.

X.   PROTECTION OF XSO SUPER OVEN-ERROR MESSAGES

The oven is digitally controlled and has its own sub-program controlling the state of various subsystems.
In case of malfunction of one of them or abnormal behavior, the heating cycle will be stopped automatically and the display will show an error message.

The list of error messages displayed by XSO Convection Super Oven is shown below.
To understand error messages please note:
The first digit is the heater number: 1 = left front; 3= right front; 2= left rear, 4 = right rear;
The second digit of the code is the error number:
(Example: E11- pretends to the Left Front heater - means that the Left Front thermocouple have failed (open circuit);
E21- pretends to the Left Rear heater - means that the Left Rear thermocouple has failed (open circuit)).

#	Error code - description	Description	Type	Possible cause	When	an accurate description
1	E**11**-Left front thermocouple failed (open circuit)	Thermocouple has open circuit.	Software Protection	The thermocouple is not connected; the thermocouple is faulty; an error in the controller in the track of the A/D converter	Always	Thermocouple readings exceed 1500 °C.
	E**21**-Left rear thermocouple failed (open circuit)					
	E**31**-Right front thermocouple failed (open circuit)					
	E**41**-Right rear thermocouple failed (open circuit)					
2	E**12**-Left front thermocouple failed (short circuit)	Short circuit in the thermocouple circuit.	Software Protection	Shorted thermocouple; error in the controller in the	When oven is heating	If in 30 seconds after delivery of power to the heater of more than 25% the thermocouple temperature
	E**22**-Left rear thermocouple failed (short circuit)					

	E**32**-Right front thermocouple failed (short circuit)			track of the A/D converter		is less than 50° C and the difference between reference temperature between the sensor on the PCB and a thermocouple is less than +/- 1.5°C.
	E**42**-Right rear thermocouple failed (short circuit)					
3	E**13**-Left front heater malfunction	No heating.	Software Protection	SSR defective (open); Faulty heater (open circuit); faulty controller	When oven is heating	If in 30 seconds after delivery of power to the heater of more than 25% the thermocouple temperature is less than 40° C and the difference between reference temperature between the sensor on the PCB and a thermocouple is less than +/- 1.5°C.
	E**23**-Left rear heater malfunction					
	E**33**-Right front heater malfunction					
	E**43**-Right rear heater malfunction					
4	E**14**-Left front heater malfunction (SSR is damaged)	Thermal runaway in the chamber.	Software Protection	SSR defective (short circuit); faulty controller	When the oven is turned on and is on standby or in the cooling mode	If after 20 seconds of switching to the standby mode or Cool the temperature will rise.
	E**24**-Left rear heater malfunction (SSR is damaged)					
	E**34**-Right front heater malfunction (SSR is damaged)					
	E**44**-Right rear heater malfunction (SSR is damaged)					
5	E**15**-Left front heater malfunction (overheat)	An excessive increase in temperature in the chamber (>550 °C).	Software Protection	SSR defective (short circuit);	Always	
	E**25**-Left rear heater malfunction (overheat)					
	E**35**-Right front heater malfunction (overheat)					
	E**45**-Right rear heater malfunction (overheat)					
6	E**16**-Obj. thermocouple fail (open circuit)	Object thermocouple has open circuits.	Software Protection	The thermocouple is not connected; the thermocouple is faulty; an error in the controller in the track of the A/D converter	When the oven is heating and program with Ext. TC	Thermocouple readings exceed 1500 °C.
	E**26**-Obj. thermocouple fail (open circuit)					
	E**36**-Obj. thermocouple fail (open circuit)					
	E**46**-Obj. thermocouple fail (open circuit)					
7	E**17**-Object temperature rise too slow	Too slow temperature rise on the measured object	Software Protection	No thermocouple in the heating chamber; shorted thermocouple; error in the controller in the track of the A/D converter	When the oven is heating and program with Ext. TC	At the temperature difference between the heater and the object > 100 °C, the object temperature does not grow quickly enough.
	E**27**-Object temperature rise too slow					
	E**37**-Object temperature rise too slow					
	E**47**-Object temperature rise too slow					

XI   XSO SUPER OVEN TECHNICAL SPECIFICATIONS

Reflow Area	20" x 16" x 6.5" (508 x 407 x 165 mm)
Temperature Range	30°C to 380°C
Temperature Zones	Purging, to push oxygen out + up to nine zones pre-set by the operator for each program. The last 2 zones are two cooling zones.
Heaters	4 heater cartridges 4,88 kW (220V)
Max. PCB Size	18 "x 14" (457 x 356 mm)
Supply Requirements	3 phase, 31.9 amps (Max. power consumption: 20.5 kW)
Advanced Cooling Module (Detachable to Ease Maintenance).	Cooling media: Nitrogen or Shop Air. Timing and object temperature to cool to is defined by the operator in the program. Cooling media enters through small holes in the array of tubes located above the heated object. Advanced cooling produces more reliable soldering connections and helps to handle heated objects at the end of a heating cycle. Opening and closing of the exhaust port is controlled by the programming.
Monitoring Glass Windows	There are 6 (six) viewing windows: - window in the center of top clam shell: 11.14"x11.14" (283×283 mm) - window in the center of the bottom of the heating chamber: 7.5"x7.5" (190x190 mm) - two identical rectangular windows (front and rear) 11"x3.94" (280x100 mm) - two identical small side windows: 2.36"x3.54" (60x90 mm)
Nitrogen Connection for re-filling during the heating cycle	I/M 1/4 in. pneumatic male plug connector. Nitrogen pressure:1/2-1bar (7-14.5 psi) Residual O2 in the heating chamber can be maintained at the levels 1000ppm or lower.
Size	L=33.7" x W=33.5" x H=21,7" {L=856mm x W=850mm x H=-550mm
Weight	Unpacked: 220 lbs. (~100 kg) Packaged for shipping: 330lbs. (~150kg)
Computer Profile Control	Allows pre-programming, storage and recall of up to 255 programs
Communication with PC	RS485 port (XKAR X485-USB converter required to connect to PC's USB port)
Advanced Features	● Heating and cooling rates between 2.0 C/sec to 3C/sec. ● Equipped with X-KAR Residual O2 Monitor when operating the oven in N2 environment. ● Display of the actual temperature/time numerically or as a graph and full indication of set functions and process parameters along with their values in the Process Window. ● Choice to control the temperature in the Oven getting feedback from the measurement of the air temperature (conventional way) or to control the air temperature to heat the object to a preset temperature by measuring the object's real temperature using the "K-type" thermocouple connected to the object. ● <u>Advanced, two-stage cooling system</u> allowing for use of N2 and air to cool the heated object at the rate of a few degrees per second. ● RS-485 port for controlling the Oven and for downloading firmware upgrade from a PC. ● Built-in XTC-Profiler – a data logger to read, store and display in real time the data from eight external thermocouples. ● Ready to solder in Nitrogen environment. ● Heating and cooling control by the temperature of the "K" thermocouple attached to the heated object.

XII. RESIDUAL O$_2$ MONITOR

The Oven is equipped with on board Residual O$_2$ monitor. It can be used continuously or, to save the O$_2$ sensor life, periodically. To do so, the Oven operator need to push "Push to Test switch" and obtain the current reading.

Description and Operation

Residual O2 Monitor is equipped with the oxygen sensor which offers excellent linearity. The gas (air/N2 mixture from the oven) is pulled by the long life pump through the built-inside the monitor heat exchanger to lower sampled gas temperature below 50°C which is required by the design of the sensor. The sampled gas enters then the sensor passing first through the flowmeter. The sample gas flow should be set at 2 l/min.

To protect the sensor and extend the sensor's life, the monitor has 2 switches. The STANDBY switch turns "ON" the pump which circulates the sample gas from the heating chamber in a closed loop making the Monitor ready for the measurement of the residual O2 at any desired time.

Only when the PUSH to TEST pushbutton is pressed the sampled gas is switched to circulate through the sensor and a residual O2 value is shown on the LCD display.

The display can be set to read either in % or in PPM's. When the measurement is finished, it is recommended to press the PUSH to TEST pushbutton again and close the flow of the sample gas through the sensor.

The measurement can be repeated periodically during the reflow cycle.

The monitor is essential to determine the purging time needed to reach the desired level of a residual O2 during the heating cycle.

Since the oven is not perfectly sealed, there is a second N2 entry to the heating chamber located on the back panel to add N2 during heating cycle. The pressure on this N2 line shell be set to 1 to 2 bars. In the heating program the operator can select how he/she wants to add N2 during the heating cycle: continuously, proportionally to the time of the zone or set up the fixed amount of time during the zone in which the N2 will be added to the heating chamber.

This N2 addition will depend on the operator settings and also on the pre-set N2 pressure delivered to the N2 addition port on the back panel of the oven.
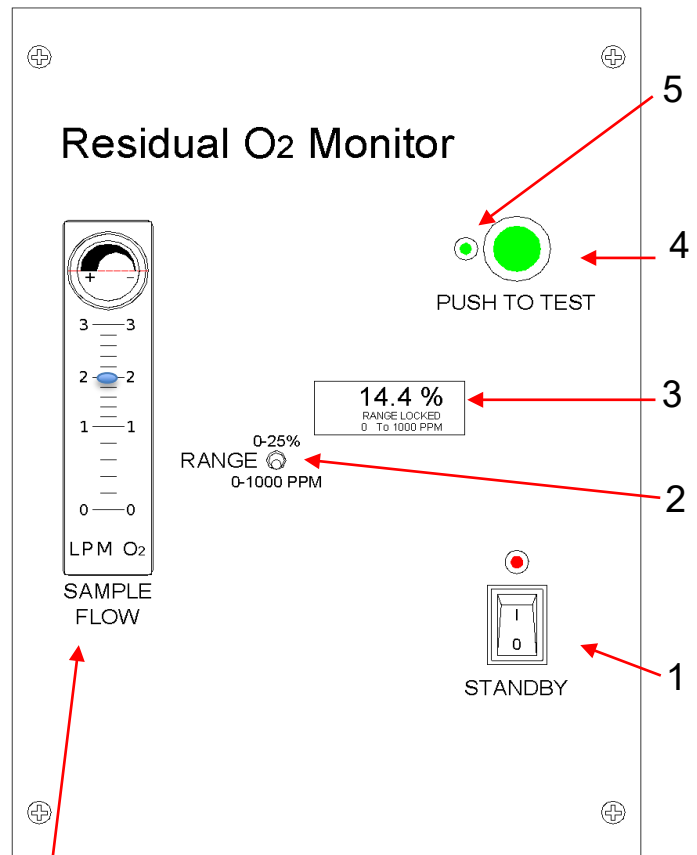
Residual O$_2$ Monitor front panel.

1. Standby Switch
2. Range Switch
3. Residual O2 Display
4. Push to Test button
5. Led Indicator showing that the monitor is measuring residual O2
6. Airflow Meter 0-3 L/min

XIII.   XTC PROFILER

XTC Profiler is an eight-channel K-TC data logger which connects to a PC and allows for monitoring of eight "K" thermocouples. This unit is very useful for determining temperature uniformity of the heating object in real time when running heating/cooling processes.

Introduction

The XTC-Profiler allows for:
- Online measurement, display and storage in a PC of eight temperatures of monitored thermocouples
Printing the stored time / temperature graphs
- Exporting stored information of the time / temperature graphs to Excel

The system Includes:
- Eight "K" Thermocouples 1m long
- USB cable
- CD with XTC Profiler Software

System Description:

Keyboard:

Power   - Turns the profiler ON and OFF
ESC   - Exits the selected function
Arrows: - Left to Right –scroll through
                    the functions
Enter   - Confirm the selected function
Menu   - Entry to the unit Menu   – not applicable
ACQUIRE   – Not applicable
LOW MEM.   – Not applicable
CHARGE   – Not applicable
LOW BAT.   – Not applicable

TC1, TC2, TC3, TC4, TC5, TC6, TC7, TC8 - Sockets to connect up to 8 Thermocouples
On the right side of the XSO Convection Super Oven

Display of temperatures measured by the thermocouples:
Press and hold the POWER button. The display shows the temperature of the first thermocouple.
Press the right and left Arrows to scroll, in sequence, through the readings of all thermocouples from TC1 to TC8.

XTC-Profiler – Application Software

a) Installation instructions

1. Copy files from the CD on a Hard Disc of Your PC (or the files sent to you by e-mail, unpack the zip file: XTC-Profiler v2.0.2.2.zip on a Hard Disc of Your PC)

   All unpacked files must be together in the same folder.
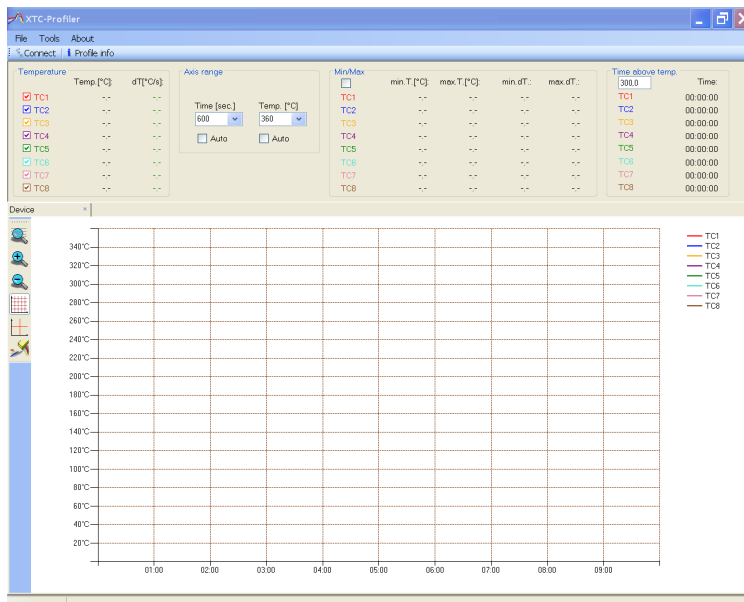
The files are listed below:
   DocumentFormat.OpenXml.dll
   FTD2XX_NET.dll
   Profiler.exe
2. Run the file: **Profiler.exe**
   and start the Oven Monitor program from the start menu on your PC

3. Connect the XTC-Profiler to a PC via a USB cable (make sure to use the original cable with a magnetic core around the cable)
4. Press ESC (Power) and hold. The XTC-Profiler will power up and show the reading of Ch 1

5. Press *Connect* (Top/Left corner on the Menu for X-306 Oven Monitor).
This will connect the oven to your pc.

Connect
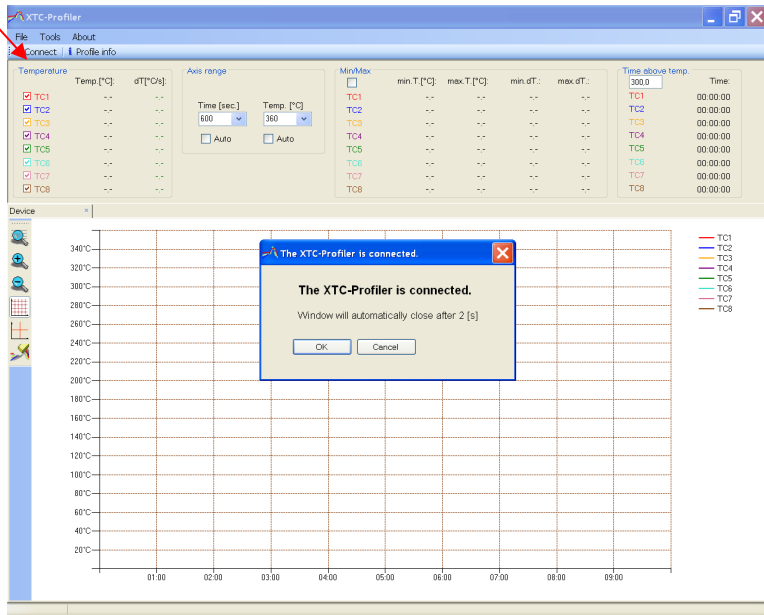
Note:
If your computer will not connect to the Oven via X485-USB Converter*,*
un-zip the file "X485-USB converter_driver.zip" and run file "CDM20600.exe".

b) **MAIN WINDOW**

Menu

Choice of the thermocouple readings which should be displayed

Axis range modification

Display area controls

Display Area to observe Profile in real time

c) Saving profiles

When you already have a profile on the screen and you want to save it, select "File" from the Menu and then "Save "
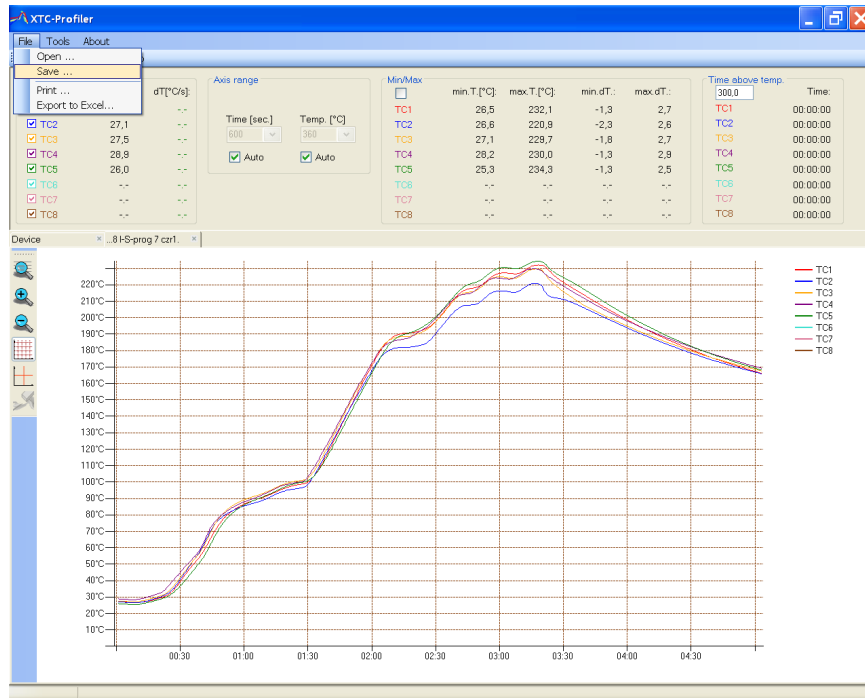
Select where you want to save it on your computer, enter the file name and save by clicking the Save button
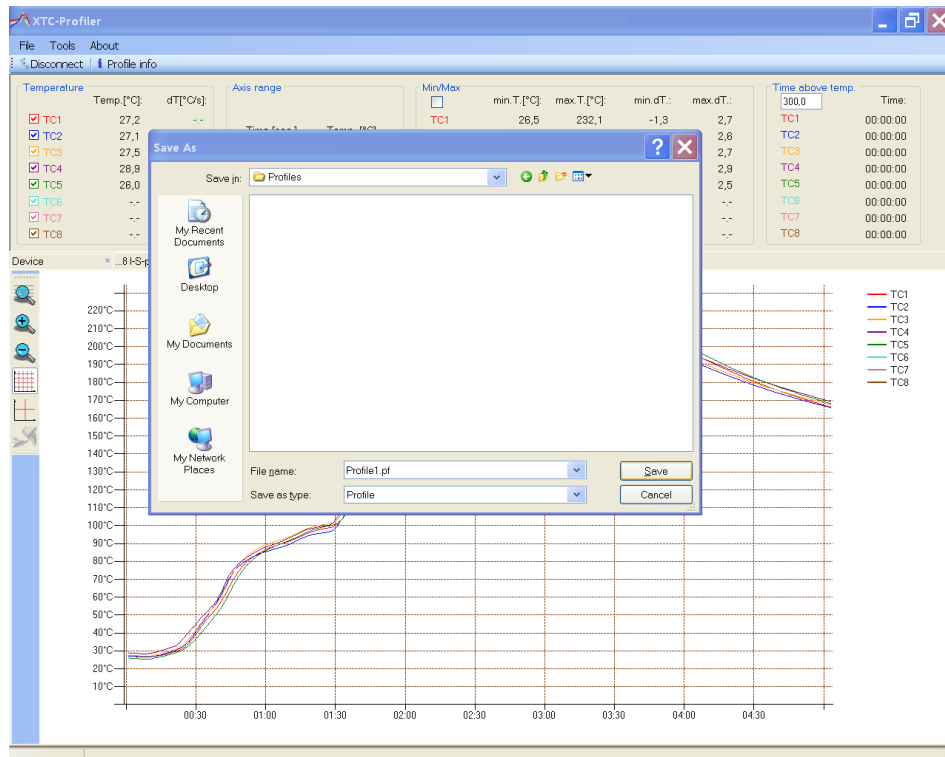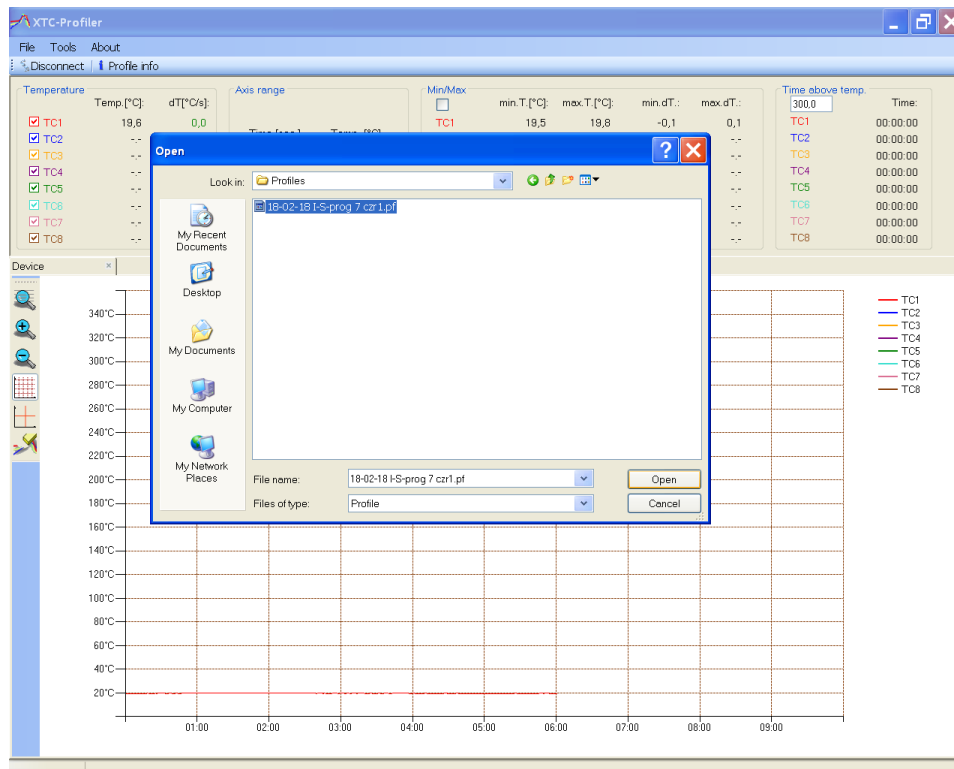
d) **Reading saved profiles**

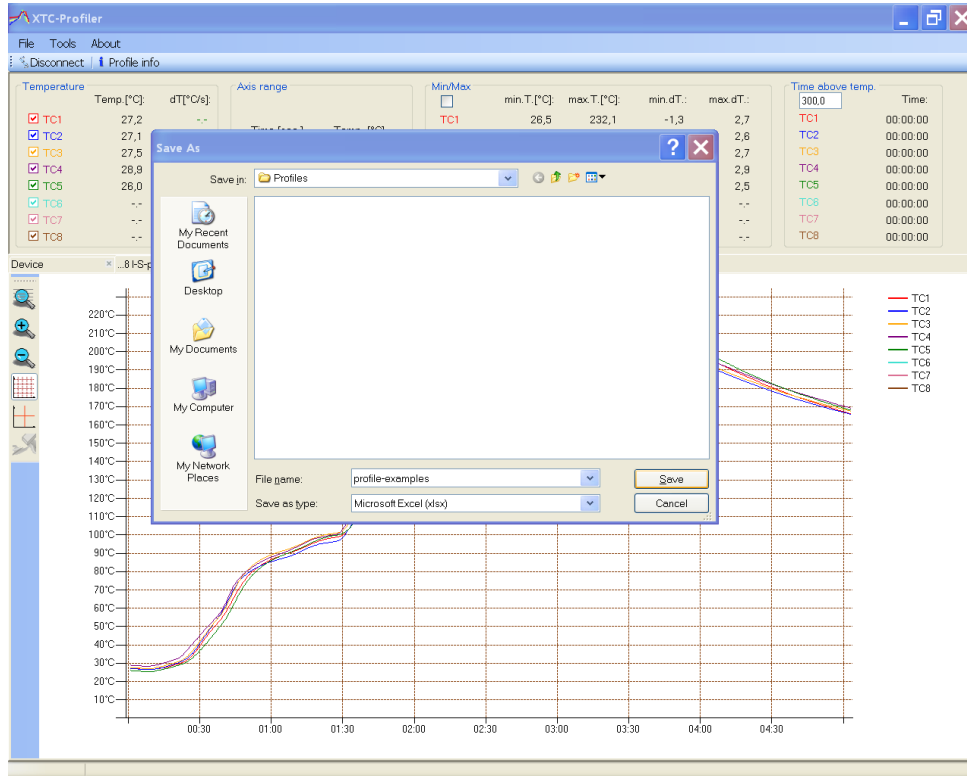Open the file: chose from the Menu "File" and then "Open
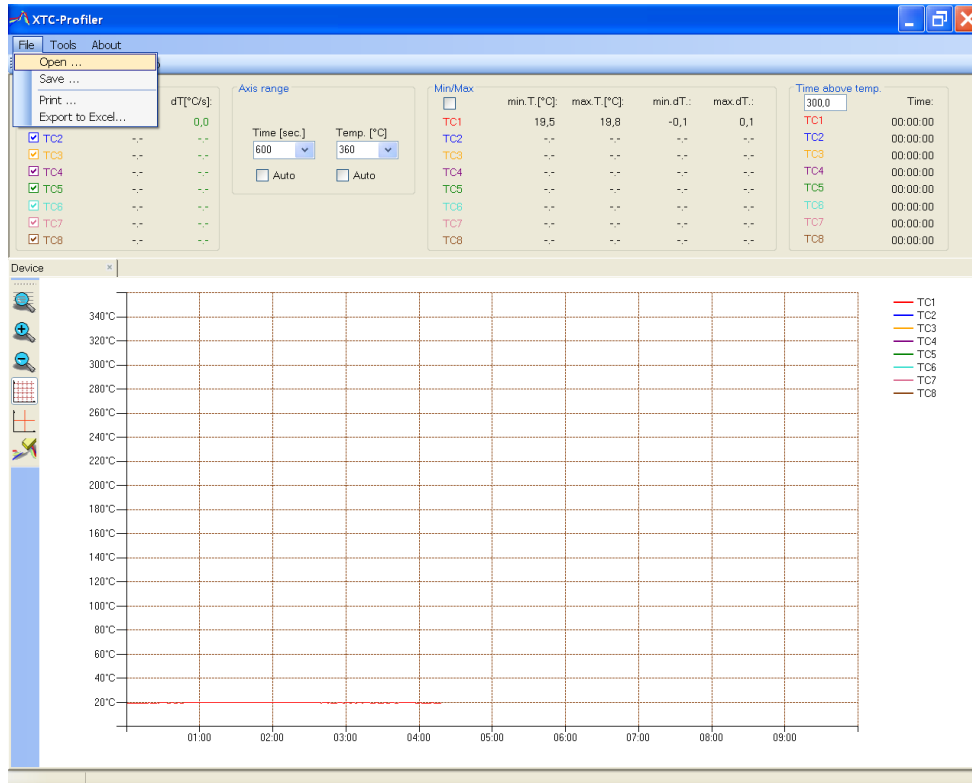
Chose "profile-example1.pf" or another file and open it:

e) **Export the graph to the Excel file**

If you want to export the graph to the excel file, choose the following options from the menu: "File" and then "Export to Excel". Enter the desired file name and chose the place to save the excel file.
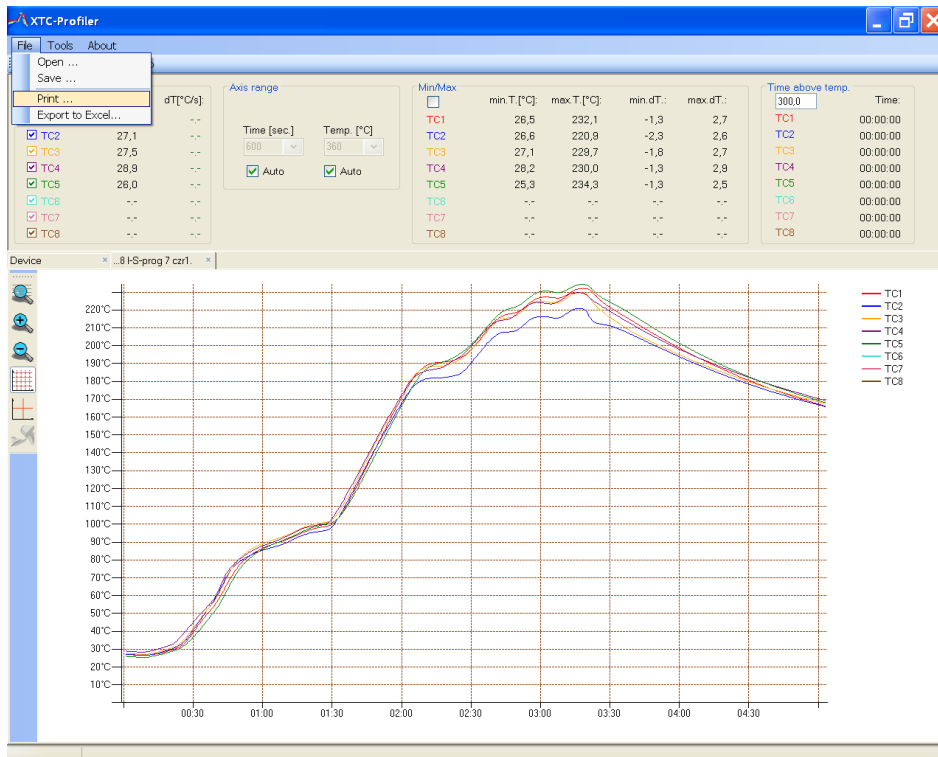Click "Save" button and the excel version of your graph is saved to your specified location.

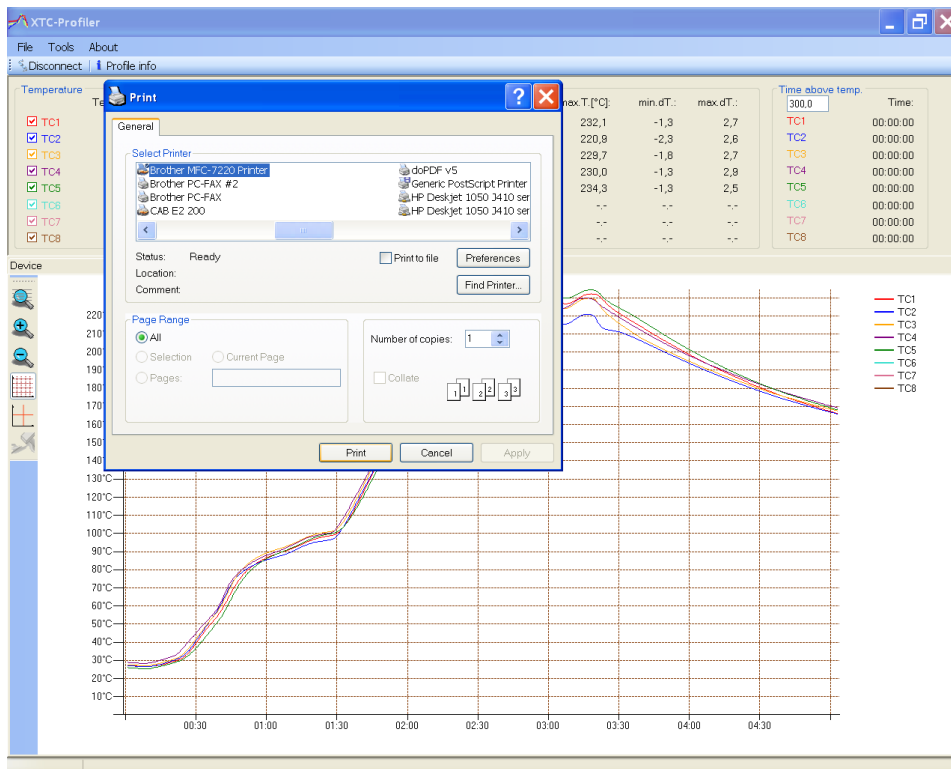When you open the excel file it will look as shown below:

f) Printing the graphs:

If you want to print on the graph: select "Print" from the Menu.

And select the printer from which you want to use to print your graph. Click "Print"

XIV. HOW TO UPGRADE THE FIRMWARE OF XSO SUPER OVEN

Receive the latest firmware version from Bokar International by e-mail.

1. Copy the file firmware XXX.zip and unpack it to one folder (All files must be in the same folder)
2. Connect XSO Super Oven (RS-485 Connector) to PC (USB) using X485-USB converter.
   NOTE: X485-USB Converter needs installed driver for proper operation.
   If the converter is first connected to the PC, You should install the X485-USB driver.
3. Press and hold the enter button on the Oven
4. Turn Power switch to the ON position.
5. Release "Enter" button. The oven display should show text "Bootloader mode"
6. Run program Flasher.exe on the PC (double click on the flasher icon)
7. Flasher should find the serial port where the oven is connected.
8. Flasher will ask "Do you want to start up update device?"
9. Select "Yes" to confirm and press "enter".
10. After upgrade is finished, you should get the message "Write successful. Would you like to run application?"
11. Press "ENTER"
12. Application will start. The display in the oven should show X-KAR logo, name, serial number and firmware version number.
13. Flasher window will automatically close.

XV. XSO CONVECTION SUPER OVEN SPARE PARTS LIST:

Item no	Description	P/N
1	Thermocouple Ass'y (for the heater chamber)	33099
2	Heater Cartridge Ass'y left (2 pcs in the unit)	33102
3	Heater Cartridge Ass'y right (2 pcs in the unit)	33103
4	Circulating Fan Ass'y left (2 pcs in the unit)	33117
5	Circulating Fan Ass'y right (2 pcs in the unit)	33118
6	TC "K" Thermocouple 1m long	33104
7	ASR-25DA Solid state relay	30170
8	Cooling fan DC24V	31722
9	Cooling fan DC12V	33044
10	XC-64 Controller Board	33105
11	Power supply 24V DC	33106
12	Power supply 12V DC	33107
13	Display Assembly	32376
14	Keyboard	32737
15	EMO button	32983
16	Power switch	31205
17	3 phase circuit breaker	33108
18	N2 valve 24V DC	32640
19	Exhaust valve 24V DC	33084
20	Airflow meter 0-3 L/min	33085
21	O_2 Sensor	33109

BOKAR INTERNATIONAL ™

SMT — www.SMTpreheater.com — **SMT**

www.SMTdispenser.com

www.SMTfocus.com

www.Assembly-SMT.com

www.SMTrework.com

X-KAR
BOKAR
www.bokar.com

Six Zones

Temperature and SMD Measurements

www.Fumextraction.com

www.BestBatchOven.com

SMT

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www.ZeroCharge.net   www.ESDlabcoats.com

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