

# MANUAL

## X-REFLOW 306 LF

Full Convection, Bench Top, Superior Batch Reflow Oven

**Nitrogen Ready**, with a connection port for X306 FumeExtract, two connectors for external “K” thermocouples which are read and displayed by the optional X-306 Oven Monitor



View of the X-Reflow306LF Batch Oven

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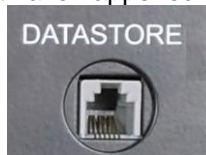
**I. INTRODUCTION****View of the X-Reflow306LF Batch Oven**

Congratulations on your purchase of our Superior Batch Reflow Oven Model X-Reflow306 LF. You now own a uniquely designed full convection Reflow Batch Oven for use in low volume production, heat resistance testing of components and laboratory experiments where precise and accurate heating is required.

This oven was designed to achieve the highest degree of process control possible for demanding applications that call for uniform temperature distribution, temperature stability, accelerated cooling and repeatability.

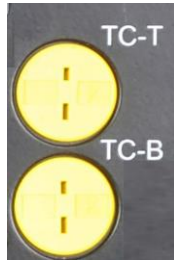
**The new, unique features of the X-Reflow306 Oven include:**

1. An interface to a PC which allows for downloading upgrades to the oven firmware. The upgrades are made following feedback and special requests from worldwide users. Newer firmware can be obtained free of charge from Bokar International and downloaded to each oven via X-KAR's X485-USB Converter. The same, build-in interface allows for monitoring (in real-time) the two "K" thermocouples measuring hot air (nitrogen) entering the heating chamber and controlling the heaters, and monitoring two additional thermocouples which can measure the temperature of the heated object in the chamber or the temperature of the air in any place in the chamber.  
(To view these 4 temperatures in real time, store the time/temperature graphs, print them, recall them later for comparison and to have a record of what have happened during the program run,



optional X306 Oven Monitor is required).

2. Two external "K" thermocouple inputs (placed on the back panel), to monitor temperature points selected by the user. This two thermocouple inputs are also used in the advanced "Power at Max mode" to set up a second level of control in order to precisely set pre-reflow and reflow temperatures.



3. Build-in Fume Extraction Port. Batch Ovens are often placed in relatively small rooms with limited ventilation. Each reflow or curing process releases fumes which can be harmful to the operators and have an unpleasant smell. All of the other batch ovens on the market today do not provide facilities for fume extraction. The X-reflow306 is the only oven which deals with this issue. It allows for the removal of fumes from the oven at the end of the soldering/heating cycle, prior to opening the batch oven lid. To remove fumes, a high vacuum fume extractor (possibly with a HEPA filter) is needed. Almost any commercially available high vacuum fume extractor will work, because our oven has a built-in heat exchanger to lower the temperature of the fumes to a level safe for any commercial filter.

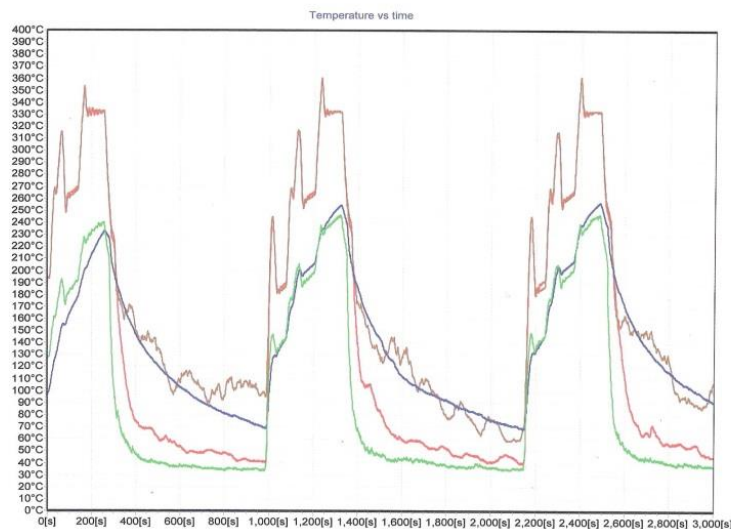
Besides the heat exchanger, the X-Reflow306 ovens have an additional AC 230V outlet located on the back panel, which will supply power to the fume extractor and to turn it on or off when the oven program calls for it.



4. The numerous programming options were added to give the user ultimate control over the heating process. Standard batch ovens have only settings for zone time and temperature.
- a) Programmable purging time when working with Nitrogen to repeatedly push out the oxygen out of the heating chamber every time the oven is reloaded.
- b) Sequencer mode allows for the choice of eight (8) programs from the memory and allows for running them one after another without opening and/or restarting the oven. This option is used to test behavior of boards or other heated objects when heated and cooled several times.

X-KAR Oven Monitor

Date : 7/22/2009

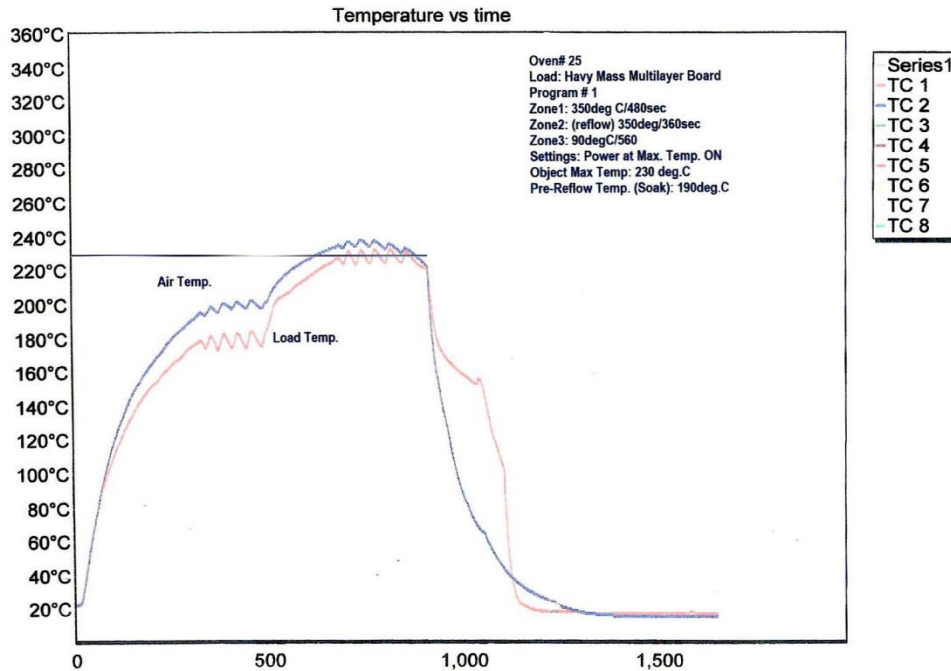


The sequencer run

- c) Cooling the heated object to a pre-defined temperature (works with the Accelerated Option or without it).
- d) Advanced "Power at Max. temperature" option. When this option is selected, the temperature of the heated object is controlled by a thermocouple that is attached to the object. Most ovens simply measure and control the temperature of the circulating air. The Power at Max feature allows the user to set and maintain within few degrees Celsius the board's pre-reflow (soak) and reflow temperatures. It is handy when developing a new profile for a new board assembly. It takes away trying to guess the heat transfer ratio between the hot gas (air or nitrogen) and the heated object. After using this option only few times the operator will be able to set a perfect profile for the new board.

XTC-Profiler

Date : 1/21/2012



**Power at Max. Temperature Option turned "ON" and controlling pre-reflow and reflow temperatures**

**SAFETY**

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

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

**\*\*NOTE**

XX

**\*\*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 represent a potential for 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.

**\*\*CAUTIONS**

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. A fume extraction system (such as those offered by the XTRACTOR Brand) is highly recommended to protect personnel from solder flux fumes.
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, therefore care should be taken when working around this area.
6. This oven must be properly grounded.
7. Please read this operation manual carefully prior to use.
8. The area around the viewing window becomes hot, therefore care should be taken when working around this area.
9. After ending the cooling cycle, the inside of the oven is still hot, therefore care should be taken when removing and mounting the PCB.
10. Be sure to wear appropriate gloves to prevent burns when taking the PCB's out of the oven and placing a new one. The PCB is still hot.

**\*\*NOTE**

To insure continued peak performance, use genuine X-KAR replacement parts.

**II. PACKAGING**

The packaging of the X-REFLOW306 LF oven has been carefully designed to ensure maximum protection during shipping. However, no packaging can guarantee 100% protection and damage may occur through rough handling by the carrier. Please ensure that any claims for shipping damage are reported promptly to the carrier and to the Distributor from whom the product was purchased.

The content of the box is as follows:

1. X-REFLOW306 LF – Superior Batch Oven with Nitrogen Connections
2. Two “K” thermocouples
3. X485-USB Converter
4. User Manual
5. Warranty Card

**III. UNPACKING**

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

**\*\*WARNING**

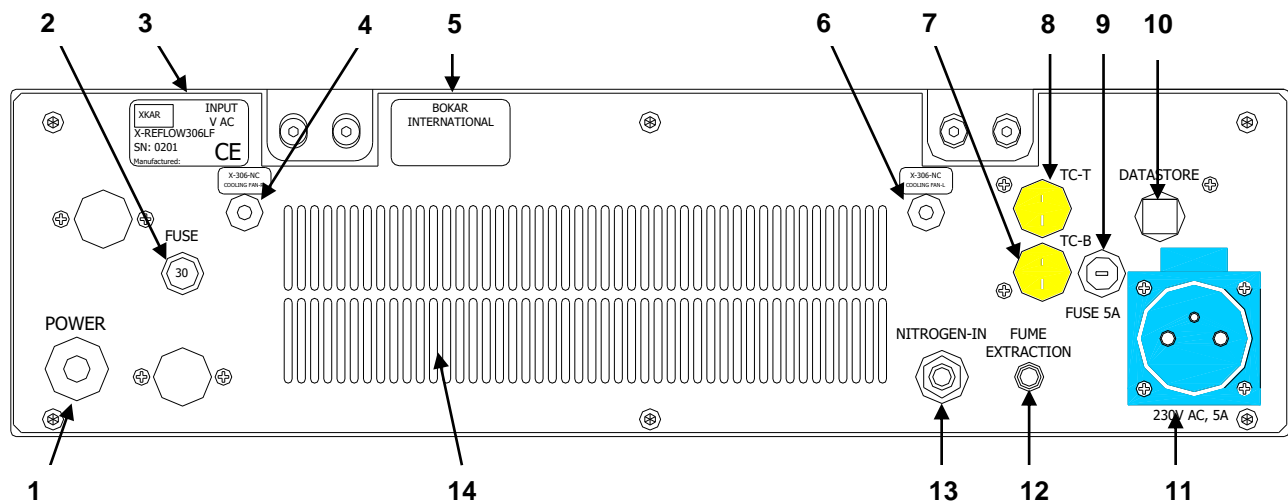
When unpacking, please be careful and read the manual prior to turning the System “ON”. Please check that the voltage of the System corresponds with the voltage of your available supply. Connection to incorrect voltage supply may cause damage to the System!

## IV. GENERAL INFORMATION



1. Display
2. Numerical keypad
3. Power switch

**Fig. 1. X-REFLOW 306 FRONT PANEL VIEW**



**Fig.2 X-REFLOW306LF (and X-REFLOW306LF-NC) REAR PANEL**

1. Power cord
2. 30A Circuit Breaker
3. Unit Label (Model, Serial # and working Voltage)
4. X-306-NC COOLING FAN-R Connector to supply cooling air (Models with the prefix NC only)
5. Bokar International Company Label
6. X-306-NC COOLING FAN-L Connector to supply cooling air (Models with the prefix NC only)
7. External "K" Thermocouple Input TC-B (Bottom TC)
8. External "K" Thermocouple Input TC-T (Top TC)
9. 5A Fuse limiting current available for an AC outlet (# 11 on the above drawing)
10. DATASTORE Socket to connect to a PC for firmware upgrades and/or use of X306 Oven Monitor
11. 230V AC Power Outlet to supply and turn ON and OFF X306 FumeXtract (or equivalent)
12. Connection for Fume Extractor to vacuum fumes generated during the heating process
13. N2 Inlet Port
14. Louvers to provide ambient air for cooling the oven subsystems

## V. SET-UP AND INSTALLATION

### ELECTRICAL REQUIREMENTS

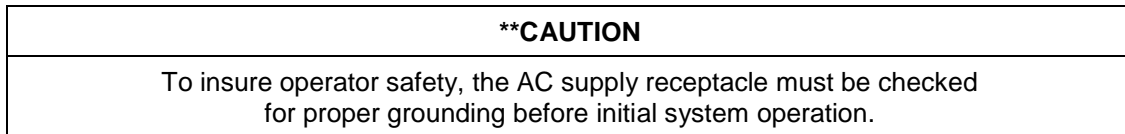
The X-Reflow306 LF unit requires 6 KW of power. A separate, dedicated AC supply line circuit may be required to adequately power the system. If your power outlet cannot provide suitable power, arrange for a qualified, licensed electrician to install one for you.

### SET-UP

1. Remove the X-Reflow306 LF from its shipping box. Store the shipping box in a convenient location. Reuse of the box will help to prevent damage when shipping or storing the system in future.
2. The system should be located on a rigid and stable work surface.  
ATR-1/360, the ESD safe cart which was designed to accommodate the Oven and accessories/options like A fume extraction system etc. It would make the oven mobile, independent and free work bench space in the laboratory.
3. Confirm that the power switch on the front panel is in the "OFF" position.
4. Open the TOP Clam Shell and check if there are accessories or documentation inside the heating chamber.
5. If you wish to use nitrogen, attach the nitrogen source (0.5~1 kg/cm<sup>2</sup>) to the nitrogen input port on the rear panel of the oven.  
\*\*Note: Higher N2 pressure can be used (up to 6 bars) if your process so requires.

### POWERING UP and LOGGING-IN

1. Installation for the first time: Install a proper AC plug at the end of the power cord. The color coding of the wires is as follows: Brown=Hot wire, Blue=Neutral wire, Green/Yellow = Grounding Wire
2. Plug the power cord plug into an appropriate AC supply receptacle.(208V for 208V oven model and 220-230V for 230V oven model. The Oven's nominal voltage one can be found on the label 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, oven name, serial number and the revision number of the oven firmware
5. After a few seconds the display will show a "Log-In" screen where different level users are listed.





Depending on privileges ( Administrator, User, Guest or Factory Authorized Representative), choose an appropriate logging. Detailed information about privileges and accounts is presented later.

6. If the operator is not one of the authorized users he/she can log-in as a GUEST.  
Pressing "up" or "down" arrows on the numerical key-pad moves the cursor to the desired


user selection. When the appropriate position is selected press 

7. If any selection other than GUEST is made, the next screen will ask for a Password.

Enter Your Password and press  If you are going to be the administrator of the oven and are turning the oven on for the first time, please enter the universal code 1234 selected for the administrator in

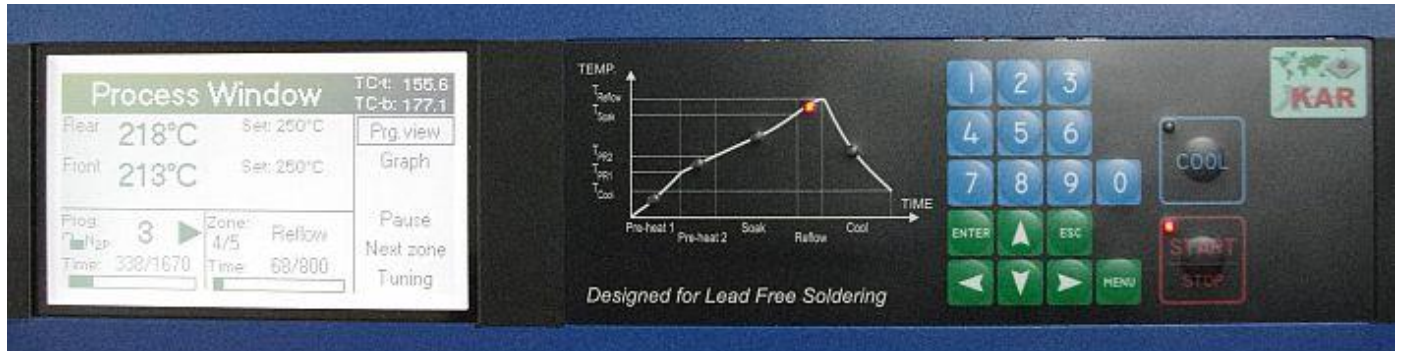
the factory and press 

8. The Actual Process Window will show. The Programming and Heating/Soldering Process starts from


this window. Process Window" is the main window of the Oven Program. Pressing  when viewing any other window will always return the Operator to the "Process Window" screen. This window has all the information about the settings and temperatures in the oven as well as the reading of the external thermocouples connected to TC-T and TC-B sockets on the back panel.



## VI. OPERATION

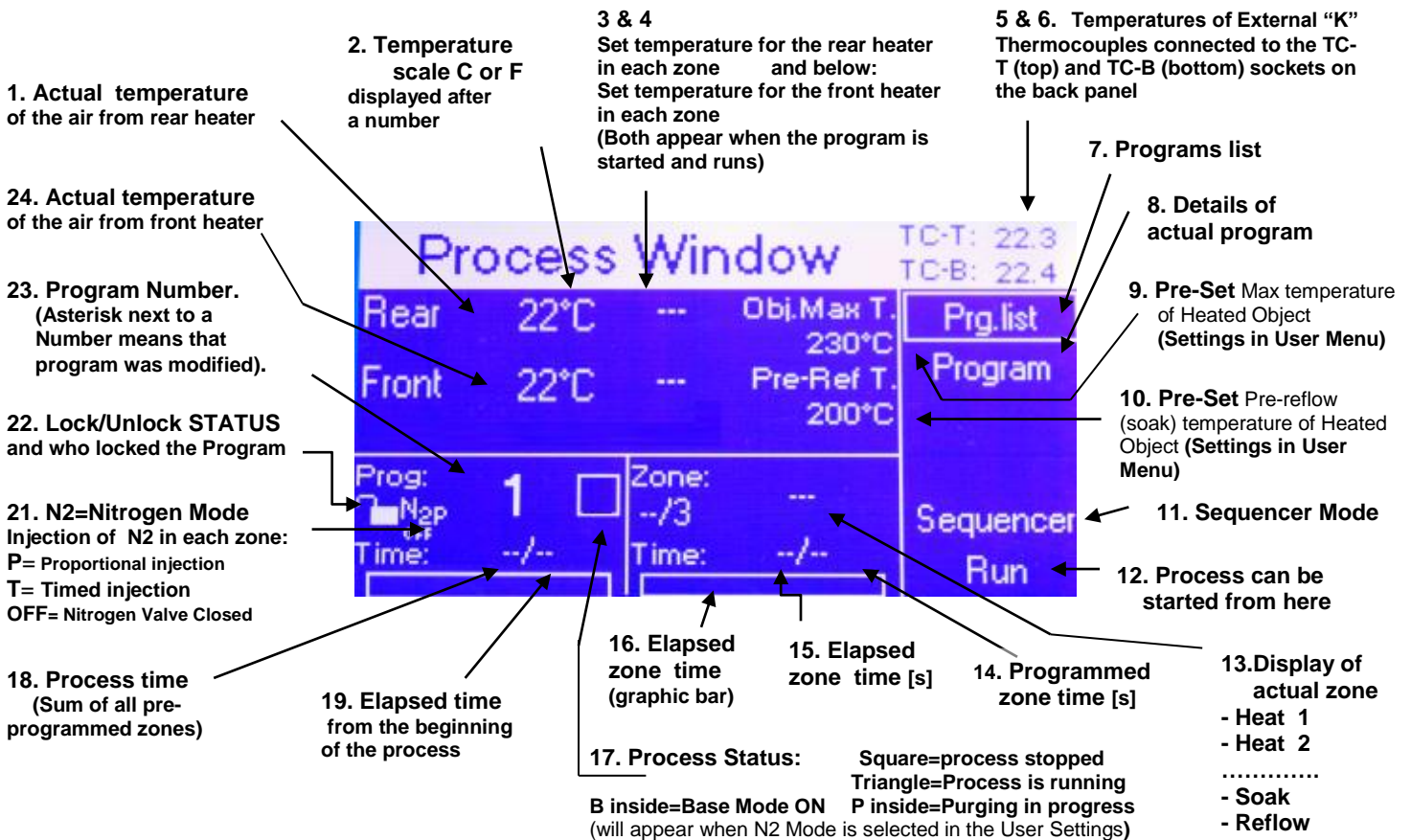
The Human Interface with the Oven is done by observing the oven display, and pressing ON/OFF power switch and the keys on the oven keypad.



The Soldering Process (or Program Cycle) can be started from the “Process Window”.





Pressing the  key begins the Program Cycle. A Red LED illuminates in the corner of the Key. The display shows the “Process Window” screen (Fig.4), and color LED's on the graph located next to the display indicate in which zone the Program Cycle is executed.




Pressing the  key at any time during the process stops the cycle. Pressing the  key opens the cooling air valve and starts the cooling cycle. During the cooling cycle the fan inside the oven circulates the air. If you have connected shop air to the cooling input on the back panel, the cold air jets will cool the object in the oven. To speed up the cooling, one can open the top clam shell (TOP) of the oven.



**Fig. 3 Process Window before the program starts**






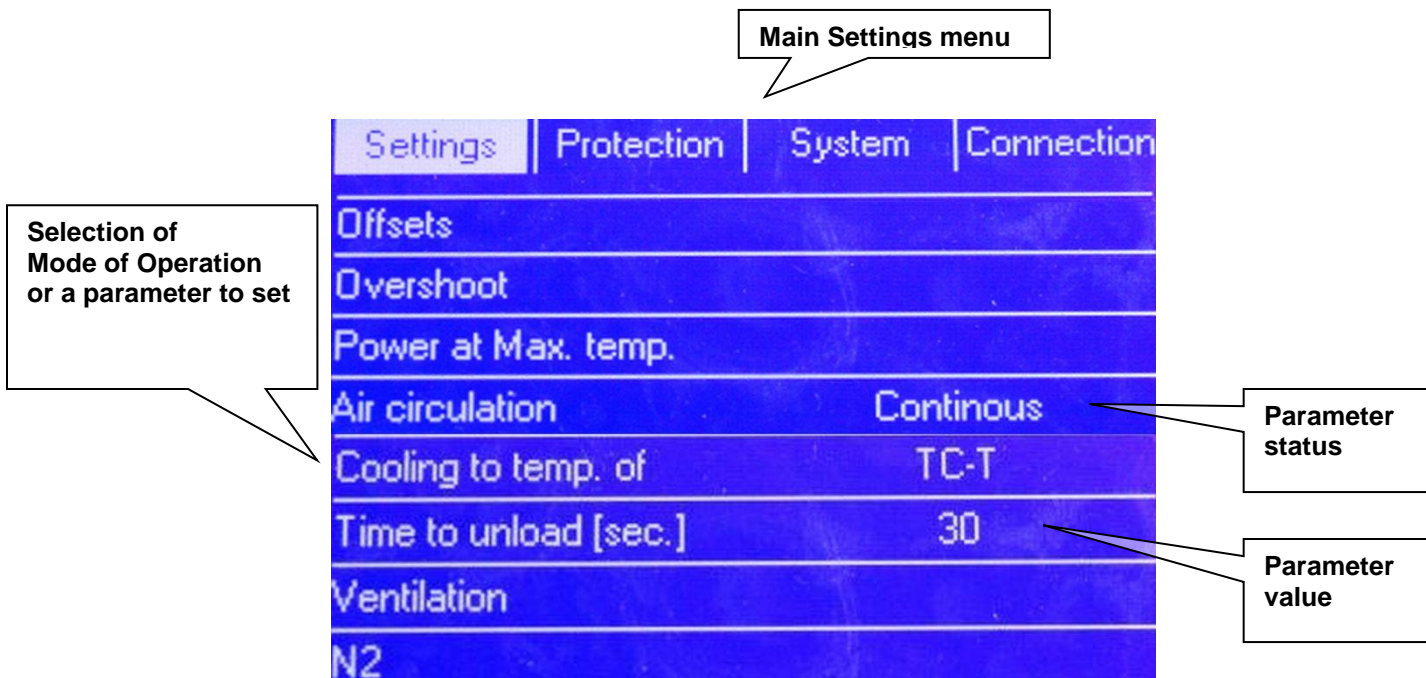
On the right side of the Process Window there is a MENU. Use   to move from the left side to the right side of the screen. Pressing the   arrows allows an operator to scroll up and down the screen to choose the required item.

The selected item is framed by a rectangle. When in the MENU, pressing  gets the Operator into the selected action (view of the Program List, Current Program Settings, Sequencer Mode or into the RUN position from which he/she can start the process by pressing either  or the  key.

### Oven Settings:

Parameters of the oven can be set by the Administrator. To access the Oven Settings one must log-In as the ADMIN or FACTORY.

1. After Log-in the “Process Window” screen appears.
2. Press MENU on the oven keypad. A window with a login menu appears.
3. Using the   arrow keys, select Settings and press .
4. This opens the window shown below.



**Fig. 4 User Settings Screen**

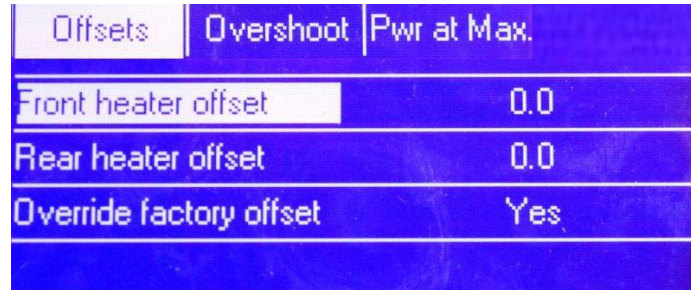
To move to the selected position on the screen press up/down and left/right arrows on the keypad.



## 1. Settings




Possible settings using the arrows and keypad:

### 1.1. Offsets

Using   scroll to Offset. Press . The screen will change to:








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

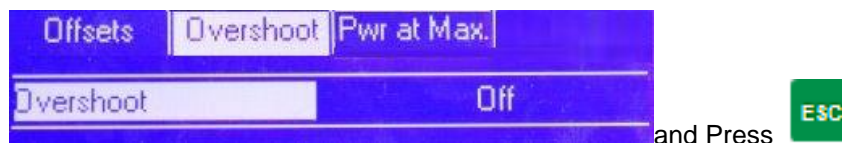
**1.1.2. Rear heater offset** – Press  to scroll to Rear heater offset line. Press . The right part of the line will highlight and 0.0 value will blink. Using numerical keypad set your desired value. Press  to confirm your setting. Possible settings for the offset for rear heater are: -20°C to +90°C.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

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

### 1.2. Overshoot

Using   scroll to Overshoot line. Press . The right part of the line will highlight and “off” will blink. Pressing   arrows you can turn the overshoot ON or OFF.



When you decide on your choice, press . The following screen opens.




to return to the Settings menu.



Factory Overshoot is set-up to 10 °C during 10 sec time. If you choose not to override Factory Overshoot both heaters will be ON until the temperature is higher by 10°C than the set temperature, after the thermocouples measuring air temperature of the air entering the heating chamber reach pre-set values and will keep this higher temperature for 10 seconds.

### 1.3. Power at Maximum Temperature



Using   scroll to Power at Max. .Press . This opens the next screen.


| Offsets              | Overshoot | Pwr at Max. |
|----------------------|-----------|-------------|
| Power at Max.        |           | On          |
| Object Desired temp. |           | 230.0       |
| Pm-D.C. Period [s]   |           | 10          |
| Pm-Duty Cycle [%]    |           | 1           |
| Pm-Max. power [%]    |           | 2           |

Press . The right part of the line will highlight and On or Off will blink.

By pressing   arrows you can turn this option On or Off.

When you decide on your choice, press . Power at Max will be highlighted.


Press  arrow to go to Object Desired temp. Press . The right part of the line will highlight

and previously set value will blink. Using numerical keypad set your desired value. Press  to confirm your setting. Object Desired temp. will be highlighted.


Possible settings for the Object Desired temp. are: 50 to 400°C.

The factory setting is 230 °C.

Next parameter of Object Desired temp. to set is Pm-D.C. Period, which defines how often the power will be added to the heaters after the object reaches desired temperature.

Press  arrow to go to Pm-D.C. Period.

Press . The right part of the line will highlight and previously set value will blink. Using


numerical keypad set your desired value. Press  to confirm your setting.

Pm-D.C. Period will be highlighted.

Possible settings for the Pm-D.C. Period are: 0 to 600. The factory setting is 15 sec.

Next parameter of Object Desired temp. to set is Pm-Duty Cycle %. (Defines in what part of the set period the power will be added to the heaters).


Press  arrow to go to Pm-Duty Cycle %. Press . The right part of the line will highlight

and previously set value will blink. Using numerical keypad set your desired value. Press  to confirm your setting. Pm-D.C. Period will be highlighted.

Possible settings for the Pm-Duty Cycle % are: 0 to 100. The factory setting is 3.


Next parameter of Object Desired temp. to set is Pm-Max. Power %. (Defines how much power will be added to the heaters during set by two previous parameter time).



Press  arrow to go to Pm-Max. Power %. Press . The right part of the line will highlight

and previously set value will blink. Using numerical keypad set your desired value. Press  to confirm your setting. Pm-Max. Power % will be highlighted.




Possible settings for the Pm-Max. Power % are: 2 to 100. The factory setting is 2.

Next parameter to set is Obj. Pre-reflow temperature:

Press . The right part of the line will highlight and On or Off will blink.


By pressing   arrows you can turn this option On or Off.

When you decide on your choice, press . Obj. Pre-reflow will be highlighted.


Press  arrow to go to Pre-reflow Temp. Press . The right part of the line will highlight and previously set value will blink. Using numerical keypad set your desired value. Press  to confirm your setting. Pre-reflow Temp. will be highlighted.

Possible settings for the Object Desired temp. are: 50 to 400°C.  
The factory setting is 200 °C.

Next parameter of Pre-reflow Temp. to set is Pr-Duty Cycle Period, which defines how often the power will be added to the heaters after the object reaches pre-set, pre-reflow temperature.

Press  arrow to go to Pr-Duty Cycle Period.



Press . The right part of the line will highlight and previously set value will blink. Using


numerical keypad set your desired value. Press  to confirm your setting.

Pr-Duty Cycle Period will be highlighted.

Possible settings for the Pm-D.C. Period are: 0 to 600. The factory setting is 15 sec.

Next parameter of Pre-reflow Temp. to set is Pre-reflow Duty Cycle %. (Defines the part of the set period in which the power will be added to the heaters).


Press  arrow to go to Pre-reflow Duty Cycle %. Press . The right part of the line will highlight and previously set value will blink. Using numerical keypad set your desired value.

Press  to confirm your setting. Pre-reflow Duty Cycle %. will be highlighted.


Possible settings for the Pre-reflow Duty Cycle % are: 0 to 100. The factory setting is 3.

Next parameter of Pre-reflow Temp. to set is Pr-Max. power %. (Defines how much power will be added to the heaters during set by two previous parameter time).

Press  arrow to go to Pr-Max. power %. Press . The right part of the line will highlight and



previously set value will blink. Using numerical keypad set your desired value. Press  to confirm your setting. Pr-Max. power %. will be highlighted.


Possible settings for the Pr-Max. power % are: 2 to 100. The factory setting is 2.

Press  to return to the Settings menu.

#### 1.4. Air Circulation

Press  arrow to go to Air Circulation. Press . The right part of the line will highlight and previously set mode of air circulation will blink.



By pressing   arrows you can turn this option to Continuous or Pulsed.


Press  to confirm your setting. Air Circulation will be highlighted.

Continuous Mode of air circulation means that the air circulating blower is on all the time during oven operation. In Pulsed Mode of Operation blower is pulsing the air.

#### 1.5. Cooling to temp. of.

Press  arrow 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.

By pressing   arrows you can turn this option to Circulating Air or TC-T.




Press  to confirm your setting. Cooling to temp. of. will be highlighted.

Cooling of to temperature of circulating air means that the oven will cool for as long as pre-programmed and/or to the temperature measured by the thermocouple measuring temperature of the air in the heating chamber.


Cooling of to temperature of TC-T means that the oven will cool for as long as pre-programmed and/or to the temperature measured by the thermocouple attached to the load (PCB) processed in the heating chamber and connected to the TC-T input located on the rear panel of the oven. This mode allows to cool the heated object exactly to desired temperature.

With cooling to the temperature of the circulating air (like all other batch ovens do) does not give any guarantee that, when the air is already cold, the load was cooled as well.


#### 1.6. Time to unload

Press  arrow to go to Time to unload. Press . The right part of the line will highlight and previously set value will blink. Using numerical keypad set your desired value. Press  to confirm your setting. Time to unload will be highlighted.

Possible settings for Time to unload are: 3 to 300 sec. The factory setting is 15 sec.



Press  to return to the Settings menu.

#### 1.7. Ventilation




Press  arrow to go to Ventilation. Press . This opens the next screen.

| Air circ.            | Cool. to T. | Time to unl. | Ventilation |
|----------------------|-------------|--------------|-------------|
| Ext. Power Delay     |             | 3            |             |
| Ext. Power ON Time   |             | 120          |             |
| Forced Cooling Delay |             | 110          |             |
| Circul. Fan Off Time |             | On           |             |




### 1.7.1. External Power Delay:

Press . The right part of the line will highlight and previously set value will blink. Using numerical keypad set your desired value. Press  to confirm your setting. External Power Delay will be highlighted. Possible settings for External Power Delay are: 0 to 60 sec. The factory setting is 3 sec. This defines after how many seconds past the end of the REFLOW Zone, the AC power will supplied to the blue External Power Socket located on the rear panel of the oven. (This outlet powers (turns ON or OFF) the fume extractor (optional)).





### 1.7.2. Ext. Power ON Time:


Press  arrow to go to Ext. Power ON Time: Press . The right part of the line will highlight and previously set value will blink. Using numerical keypad set your desired value. Press  to confirm your setting. Ext. Power ON Time will be highlighted. The Ext. Power ON Time defines how long the AC power will be supplied to the AC outlet located on the rear panel of the oven and at the same time how long the fume extractor will be ON if it was connected to this outlet. Possible settings for Ext. Power ON Time are: 0 to 1200 sec. The factory setting is 3 sec. If fume extraction system is not used, this value should be set to min.

### 1.7.3. Forced Cooling Delay:


Press  arrow to go to Forced Cooling Delay: Press . The right part of the line will highlight and previously set value will blink. Using numerical keypad set your desired value. Press  to confirm your setting. Forced Cooling Delay: will be highlighted. The Forced Cooling Delay should be set up at the higher or equal value to the External Power On time. When this time elapses, the forced air cooling valve opens and cooling air enters the oven already vacated from the fumes by the fume extraction system. Possible settings for Forced Cooling Delay are: 0 to 1200 sec. The factory setting is 3 sec. If fume extraction system is not used, this value should be set to min.

### 1.7.4. Circul. Fan Off Time: (This option should be set to zero on the X-reflow306 LF ovens. It applies only to the ovens with Accelerated Cooling)

Press  arrow to go to Circul. Fan Off Time: Press . The right part of the line will highlight and "On" will blink. By pressing   arrows you can turn the circulating fan On or choose the window where numerical value of the time off can be entered. When in this window, use numerical keypad to set your desired value.

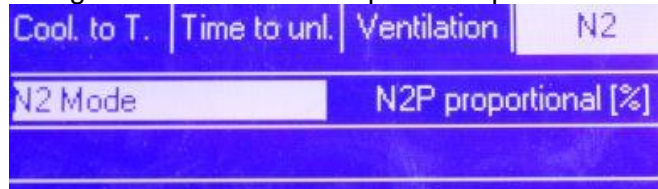
Press  to confirm your setting. Circul. Fan Off Time will be highlighted.




Possible settings for Circul. Fan Off are: 0 to 600 sec. The factory setting is “On”. The circulating fan may be disabled to avoid entrance of the hot air accumulated in the heater part of the oven to the chamber where is placed the load to be cooled.


Press  to return to the Settings menu.


## 1.9 N2 :

Press  arrow to go to N2. To turn this option ON press  or . The new window will open.



Press . The right part of the line will highlight and the highlighted area will blink showing previously set N2 Mode. By pressing   arrows you can set N2 mode of operation to: off, N2C=Continuous fill, N2T=Periodic fill [sec] or N2P=Proportional [%].

Press  to confirm your choice. N2 Mode will be highlighted.

Press  to return to the Settings menu.

## 1. Protection (Assignment of PASSWORDS)

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

1.10.2. **Guest** – Possible settings: YES or NO. If YES, the user “Guest” can run the pre-set oven programs without a PASSWORD.

### 1.10.3. User1

1.10.3.1. Account Type: Possible settings: Privileged or Limited.

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

### 1.10.4. User2

1.10.4.1. Account Type: Possible settings: Privileged or Limited.

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

### 1.10.5. User3

1.10.5.1. Account Type: Possible settings: Privileged or Limited.

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

### 1.10.6. User4

1.10.6.1. Account Type: Possible settings: Privileged or Limited.

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

### 1.10.7. User5

1.10.7.1. Account Type: Possible settings: Privileged or Limited.

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

### 1.10.8. User6

1.10.8.1. Account Type: Possible settings: Privileged or Limited.

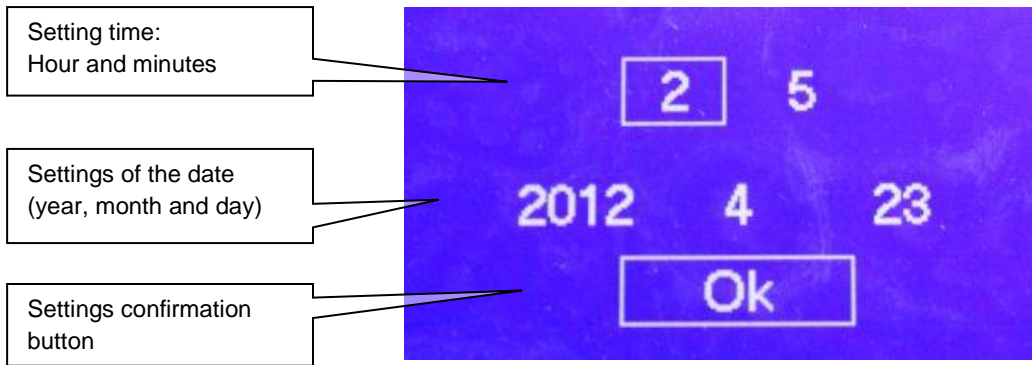
1.10.8.2. Four-digit Password for User6. The factory setting is 6666.

## 2. System

- 2.10.1. **Temp. Scale** – Choice of Temperature Scale: The factory setting is °C – Degree Celsius.  
 °C – Degree Celsius  
 °F – Degree Fahrenheit







- 2.10.2. **Time and Date** - Please set. No Factory Settings.

The X-Reflow 306LF has built-in real time clock which is maintained by 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. The time and date is set from the Settings Menu.



**Fig.6 Time and Date Settings Window**

### How to set the time and date:

- Access the time and date settings window (In settings menu)
- The active frame shows the parameter which can be set. The first one is „hour”.
- Set the hour using numeric key-pad.
- Confirm pressing the  key.
- Set the minutes and confirm pressing  key.
- Set the year and confirm pressing  key.
- Set the month and confirm pressing  key.
- Set the day of the month and confirm pressing  key.
- Active frame moves to „OK.” If satisfied with the settings, confirm pressing  key.

- 2.11. **Sound** - Available settings:

ON – sound is on  
 OFF – sound is off

- 2.12. **Contrast** – Display contrast setting.  
 Available values: 32 to 255

## 3. Connection

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

## 4. Restore

- 4.10. **Restore Settings** –This option allows to restore all settings to factory set values.



## VI. 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.

PROFILE is a temperature curve in time of the PCB placed in the oven and heated by the Hot Air or cooled by Nitrogen. Each PROGRAM should have:

- 1) A minimum of one PREHEAT Zone as recommended by the 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.
- 2) SOAK or Heat Equalization Zone to evenly spread the heat across the board,
- 3) 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
- 4) COOLING Zone to cool the board and solder, preferably at the rate of one degree per second.

X-Reflow306 LF has one example program entered at the factory which cannot be changed.

Operators can enter and save up to 250 Programs.

Only the Administrator and Privileged Users can create and Save the Programs.

The X-Reflow306 LF PROGRAM Characteristics:

Each PROGRAM created and saved in X-Reflow306 LF Memory has:

- Choice of 3 to 5 Temperature/Time Zones
- The ability to name the zones of the created programs
- A record of the date on which it was created
- The information who created the PROGRAM
- The information if it is Locked or Unlocked and who locked it.

Note: The saved Program can be locked/unlocked only by the creator or the Administrator.

*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

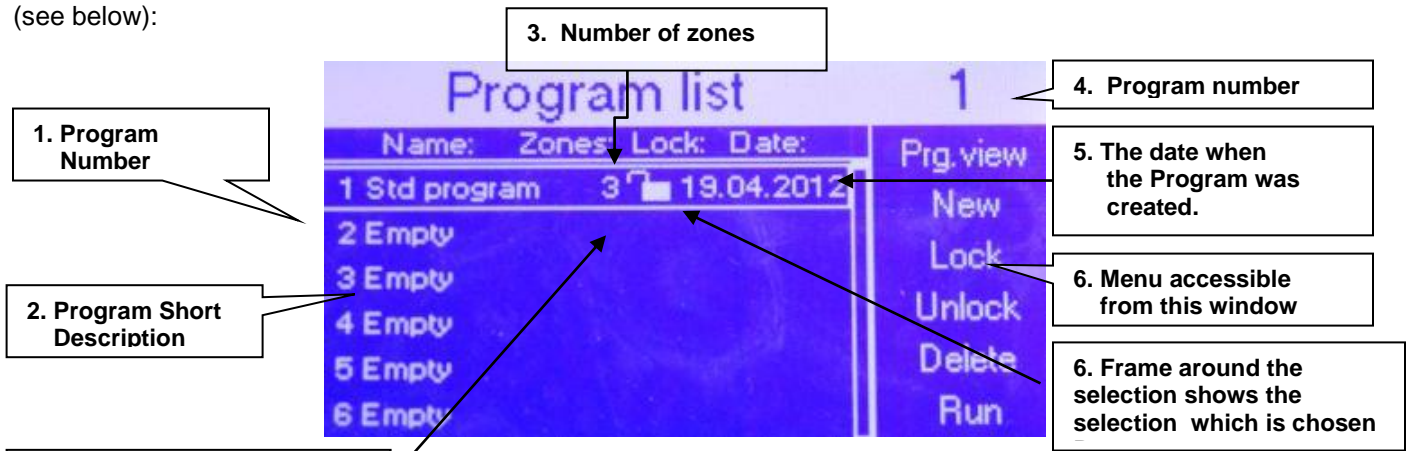
**Moving up and down the MENU**



**Fig. 7 Process window**

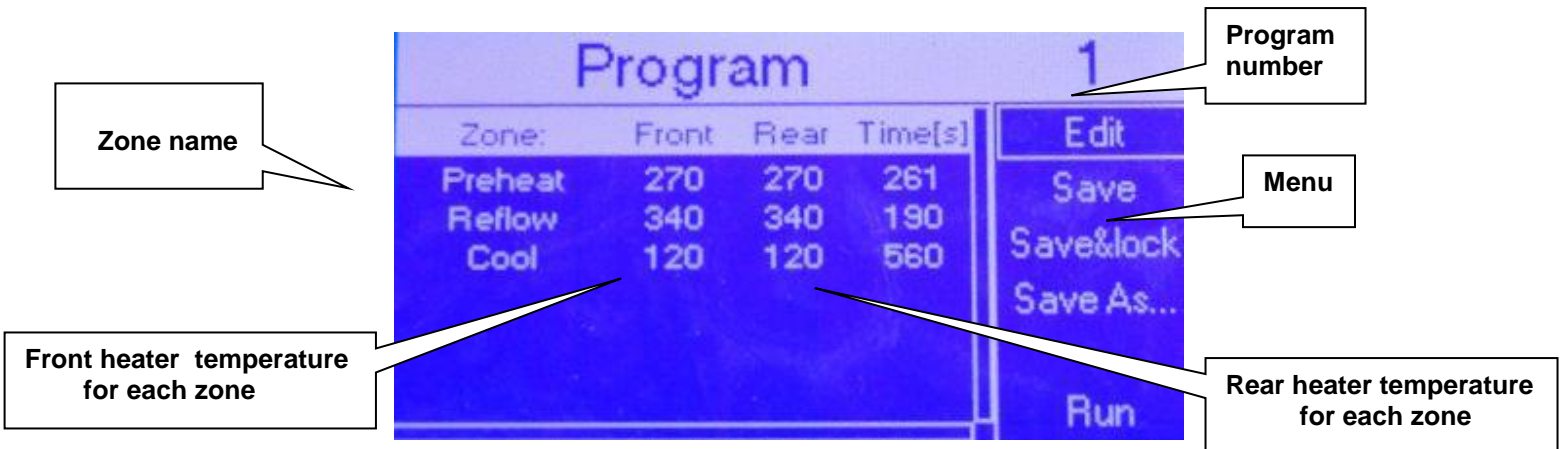
Pressing the Arrow will move the surrounding rectangle one place down to "Program".

Pressing button when hovering over "Program List" will open the window showing Program List (see below):




**Fig. 8 Program List window**

If Prg. view is selected and is pressed the PROGRAM window will show:




**Fig. 9 Program window**

To change the program to a different one:

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

To edit Current Program or create a new one:

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

### a) Starting Program Cycle

- Power up the oven
- Select the program
- Press the  key to start the oven.


### b) Stopping the Program Cycle

- Press the  key to stop the oven.

#### CAUTION

The inside of the oven can be very hot.  
Start the cooling cycle before opening the oven and/or placing or removing the PCB.

### c) Cooling Cycle

- When the reflow process is completed at the end of the REFLOW zone the cooling cycle starts.
- OR Press  key to start the cooling cycle at any time during program cycle.




#### NOTE


During 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.

### d) Selecting the program


Screen "Program List" (FIG. 7).

To select a program to run:

1. Press   arrow keys to select the desired program.
2. Press  key to access this program.

When in the Program window, press  to run the program.

### e) Program Edit

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

## VII. SEQUENCER

The Sequencer can be user by the following types of users:

PRIVILEGED USER  
ADMIN  
FACTORY

The Sequencer is an additional tool which allows user to run up to eight selected programs 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, when the temperature reaches the user's pre-set value, the 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 one 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 effect. They are overwritten by the reading of the "K" TC1 temperature. The program will end when the TC-1 temperature reaches the pre-set temperature in the Sequencer temperature "R". After the oven is cooled to this temperature, the running program stops and the next selected in the sequencer program starts.

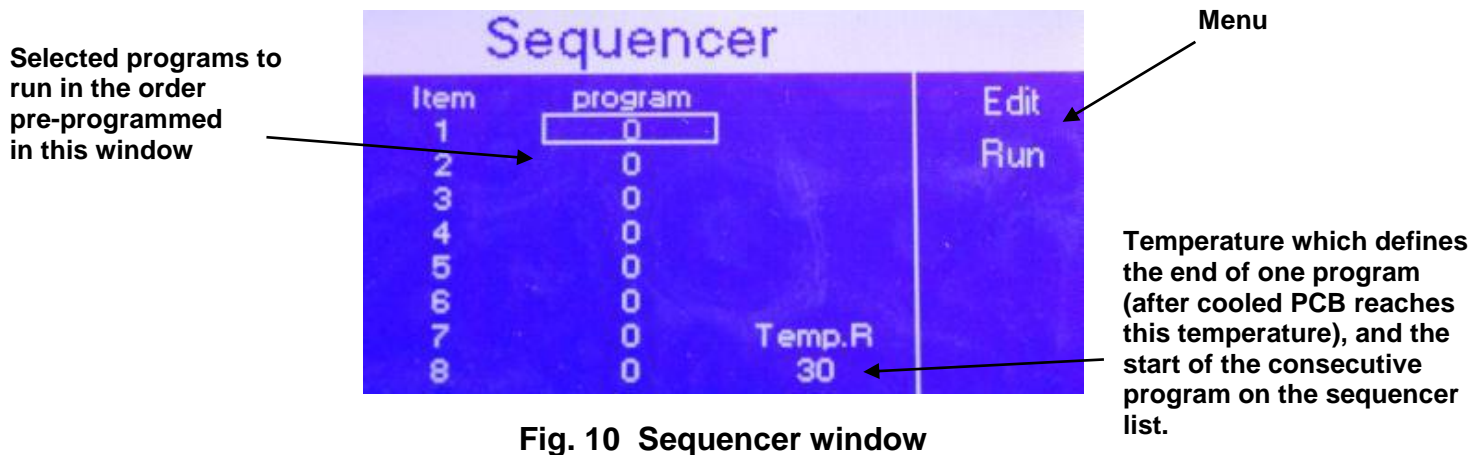









Fig. 10 Sequencer window

### A. How to run the SEQUENCER

1. Access „Process Window“.
2. From the menu on the right hand side, select “Sequencer”. The Sequencer window will be displayed.
3. Select the first program to run using the numerical keypad and press .
4. Select the programs to run one after another.  
(If you want to run only four out of 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   or  to select the “Temp. R” field.
6. Set the 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 hand side.

8. Press  to select "Run"
9. Press  to start the first program to be run in the Sequencer Mode.

**\*\*Note:**

To distinguish the views between "Process Window" in the "Sequencer" mode and a single program mode when the oven is running, the letter "S" is added to the word window in the "Process Window", e.g. "Process Window **S**" is displayed instead of "Process Window"

## VIII. LEVELS OF AUTHORITIES for OVEN OPERATORS

To protect stored profiles and oven settings, the X-REFLOW306 LF oven is programmed to give a selected choice of authorities to different users. The Operator can have either full access to oven settings (Administrator), limited access (USER), or no access (GUEST) at all. 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 or her and login by entering the PASSWORD assigned. Only GUEST does not require a PASSWORD (but GUEST can only RUN existing programs and cannot make any changes).

### WHO CAN OPERATE THE OVEN :

- Guest (No limits on the number of Guests)
- User (There are three accounts available for authorized users)
- Admin (There is one Administrator account)
- Factory (There is one account for Factory Personnel for Maintenance and Service purposes)

#### A. Level of Authorities for each Group of possible OPERATORS:

**Admin** — The Highest Level of Authorities. The account for the Oven Administrator.

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 for the factory pre-programmed examples)
- Delete programs
- Run all programs
- Edit programs in real time
- See the Program settings
- See the graphic display

**User** — Standard and Extended Set of Privileges for the 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 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. Requires Special Factory Password known only to Factory Authorized Personnel.

**B. 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
- Admin1 : XXXXX Emergency Password for the Administrator

**NOTE:** *The emergency PASSWORD should be used only when the regular PASSWORD is lost (forgotten). This PASSWORD 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 Oven Administrator.

He or she has to remember not to assign the same passwords for different Users.

## IX. X-Reflow306 LF TECHNICAL SPECIFICATIONS

|  |  |
|--|--|
| Reflow area  | 12"x12"x1.75" (305x305x45 mm)  |
| Temperature range  | 50°C to 350°C  |
| Number of Zones  | Purging, to push oxygen out + variable, three to five zones, set by the operator for each program. Last zone is a cooling zone. So the oven can have 3 zones or 5 zones.   |
| Heaters  | 2 Heaters (Front and Rear) 3,1kW (230V) and 3.1KW (208V)   |
| Max. PCB size  | 12"x12" (306x306 mm)   |
| Supply Requirements  | 25 amps, 230V 50/60 Hz (Max power consumption: 6 kW)   |
| Advanced Cooling Module<br>(Removable to ease maintenance, or to gain extra ½" of chamber height if it is needed occasionally) | Cooling media: Nitrogen or Shop Air. Timing and object temperature to cool to, is defined by the operator in the program.<br>Cooling media enters through small holes in the array of tubes located under the heated object. Advanced cooling produces more reliable soldering connections and helps to handle heated objects after heating cycle.<br>Opening and closure of the exhaust port is controlled by the programming.<br>(This option is not included in the X-Reflow306 LF Models)  |
| Monitoring Window Size   | 9.84"x9.84" (280x280 mm)   |
| Nitrogen Connection  | Standard Connector. Nitrogen pressure:1/2-1bar (7-14.5 psi)  |
| Size   | L=30"xW=20"xH=12" (L=480mm x W=711mm x H=200mm)  |
| Weight (unpacked)  | 100lbs. (~43 kg)   |
| Computer profile control   | Allows pre-programming, storage and recall of up to 255 programs   |
| Communication with PC  | RS485 port (X485-USB converter is included with the oven to connect to PC's USB port)  |
| Advanced Features  | <ul style="list-style-type: none"> <li>• 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.</li> <li>• Independent off-set for the 2 heaters, (useful when processing unevenly loaded boards).</li> <li>• RS-485 port for downloading firmware upgrades from a PC and monitoring air and two additional "K" Thermocouples during reflow process. (X-KAR R485-USB Converter is needed for connection to a PC and X306 Oven Monitor Software for monitoring and displaying on a PC real temperatures during the heating cycle. <b>X-KAR XTC-Profiler (Eight TC inputs) is also recommended</b> for multi-point monitoring.</li> <li>• Ready to solder in Nitrogen environment.</li> <li>• Means to monitor the process in progress (besides the on board LCD display)</li> <li>• Power at Max Mode, which allows for pre-setting a pre-reflow temperature of the heated object and a maximum temperature of this object by means of control of the heating by the "K" thermocouple attached to the heated object and the TC-B socket at the back of the unit.</li> <li>• Build-in heat exchanger for extraction of hot fumes after the heating cycle ends, to protect standard fume extraction systems against melting of their filters during the filtration process.</li> </ul> |

## X. OPTIONAL ACCESSORIES and EQUIPMENT

### A. ATR-1R



**ATR-1R** was design especially to make the use of the batch oven easy and very practical.

It is fully antistatic to add security and comfort.

The oven fits on top of the cart and can be moved around the workplace. The cart has a brake on one of the front wheels to secure the cart in place.

There is enough space on the side of the oven to place additional TC meter, tools, hot gloves or the note pad.

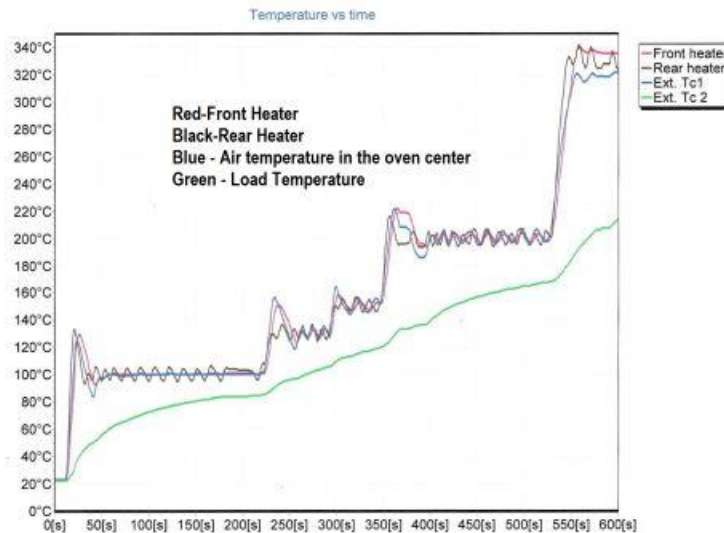
The middle shelf is positioned on such height so that the X-306 Fume extract can fit on the bottom shelf of the cart. **(Note that this fume extract shall be supplied from the back panel of the oven).**

The middle shelf is reserved for various accessories one may need when using the oven [polyamide (Kapton TM) tape, knife or scissors, test boards, players (if used to pick-up hot items from the oven) etc. The cart makes it easy to store the oven out of your way when not in use.

### B. X-306 Oven Monitor, Highly Recommended.

X-306 Oven Monitor

Date : 4/25/2012



Process Monitoring Software that displays the graphs of temperature versus time on a PC.

It reads the front and rear thermocouples of the oven and two additional thermocouples connected by the oven operator. One can see, record, save and print the profile of the soldered PCB. One or two external "K" thermocouples can be connected to the board, or one to the board and another placed inside the oven above the board to see the actual board and air temperatures during the program cycle.



### C. XTC Profiler

Eight channel K-TC data logger which connects to a PC and allows to monitor 8 “K” thermocouples. This unit is very useful to determine heating object temperature uniformity in real time when running heating/cooling process.

<http://www.bokar.com/inspection-and-measuring-systems.html>

### D. Side Cooling Fan Modules

Two Fan Modules are available to be mounted on each side of the oven. When cooling cycle starts, the fans blow room air into the oven rapidly cooling the object inside the oven after the top clam shell is opened. This option was developed for the users who do not have sufficient shop air supply for cooling purposes. The option also is very helpful for the users who are using shop air, providing additional cooling to drop the heated object temperature faster after the oven is opened.

The Fans modules can be seen on <http://www.bokar.com/x-reflow306/nc.html>

### E. X-306 FumeExtract Fume Extraction System

A cost-effective unit capable of extracting fumes from the X-Reflow306 Batch Oven and also from a single iron fume extraction tube.

The unit can be supplied from 208-240V and when used to extract fumes from a batch oven can be connected to the outlet provided for this purpose located on the back panel of X-Reflow306 oven.



## IX. How to upgrade the firmware in X-Reflow306 LF in the future:

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

1. Copy the file firmware XXX.zip and unpack this to one folder (All files must be in the same folder)
2. Connect the X-Reflow 306 (Data Store Connector) to a PC(USB) via the X485-USB converter.  
NOTE: X485-USB Converter required an installed driver for proper operation.  
When the converter is connected to the PC for the first time, the X485-USB driver will be installed automatically.
3. Press and hold the enter button on the Oven
4. Turn Power switch to the ON position.
5. Release the "Enter" button. The oven display "Bootloader mode"
6. Run the 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 to update device?",
9. Select "Yes" to confirm and press "enter".
10. After the upgrade is finished, you should see the message "Write successful. Would you like to run application?"
11. Press "ENTER"
12. The oven will start. The display in the oven should show X-KAR logo, name, serial number and firmware version number.
13. The Flasher window will close automatically.



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Other Bokar Products pages:



**SMT:** [www.Assembly-SMT.com](http://www.Assembly-SMT.com) [www.FineRework.com](http://www.FineRework.com) [www.X-Reflow306.com](http://www.X-Reflow306.com),  
[www.X-1003.com](http://www.X-1003.com) [www.SMTrepair.com](http://www.SMTrepair.com) [www.SMTFocus.com](http://www.SMTFocus.com)  
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