



INSTRUCTION MANUAL

X-1003 Large Area, Six Sections Convection Pre-heater

**Full Convection, Bench Top,
Intelligent preheat for large boards.**



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Large Area, Six Sections Convection Pre-heater

Full Convection, Bench Top, intelligent preheat for large boards

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I. INTRODUCTION

Convection Pre-heater X-1003 was designed on a request of large PCB service and repair companies. Increasing numbers of multilayer boards created the need for powerful, large area convection pre-heaters. Not many suppliers in the industry offer Large Area Pre-heater.

Large boards include computer and notebook boards, as well as boards used in military, telecommunications and other applications.

The design was based on many years of experience in PCB preheat, which started in the early 1990's, when the first high power pre-heater, SA-2000, was introduced to solder and de-solder BGA components from multi-layer boards, and became an integral part of the BGA Rework Systems. Thousands of these pre-heaters (followed later by the digitized and upgraded X-KAR Brand X-1000 and X-1001 models) were sold worldwide to date.

With time, the number of layers kept increasing and with the number of layers the demand for a higher heat capacity pre-heater. Bokar International has made several custom designs of equipment for several customers who have had difficulty obtaining the appropriate process control with standard equipment.

The request to make the Large Area Pre-heater came from key customers a few years ago. Our development team worked very hard to maximize the pre-heater efficiency to obtain large preheat area and keep the power within a manageable range.

X-1003 has 3600 W of power, which allows the pre-heater to preheat the large multilayer board evenly in a reasonable time. To give the user flexibility and convenience, the heating area was divided into six independent sections. Each section can be turned ON or OFF as needed, depending on the size of the processed board. When all sections are ON, the temperatures in each section can be individually adjusted. Microprocessor control and interface with the X-KAR Hot Air FOCUS"X" controller enables you to assemble the powerful Rework System X-FineRework 6L.

Color Graphic Display makes programming and use of the pre-heater very user friendly.

II. 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 a blocked off form with 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. The X-1003 pre-heater area and top plate are hot when the system is "ON" and for a period of time thereafter. DO NOT touch neither the pre-heater area, top plate or direct heated air stream. Severe burns may result!
2. Utilize all standard electrical safety precautions when using this or any other electrical equipment.
3. Always use this system in a well-ventilated area. A fume extraction system (such as those available from XTRACTOR) is highly recommended to protect personnel from solder flux fumes.
4. 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.

DANGER

POTENTIAL SHOCK HAZARD – All repairs made on this product should be performed only by qualified service personnel. Line voltage parts will be exposed when equipment is disassembled. Service personnel must avoid contact with these parts when troubleshooting.

NOTES

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

III. PACKAGING

The box contains the following items:

1. X-1003 Base Unit
2. XK-TC 26/39 "K" Type Thermocouple
3. One Power cord: (P/N XPC-16 for X-1003-115V or P/N XPC-1 for 220V units)
4. Manual and Guarantee card

IV. 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 details of model number, voltage, date of purchase, where purchased 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!	

V. GENERAL INFORMATION

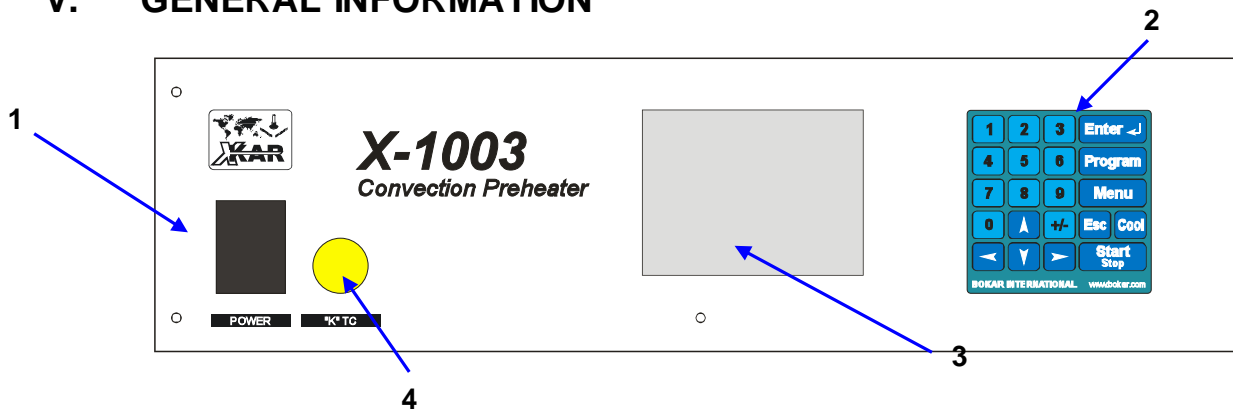


Fig. 2 X-1001 Series Front Panel

1. **POWER Switch** – Turns the power to the system "ON" and "OFF".
2. **Key Pad** – see below
3. **Display** – see below
4. **Thermocouple connector** – Socket to connect external thermocouple.

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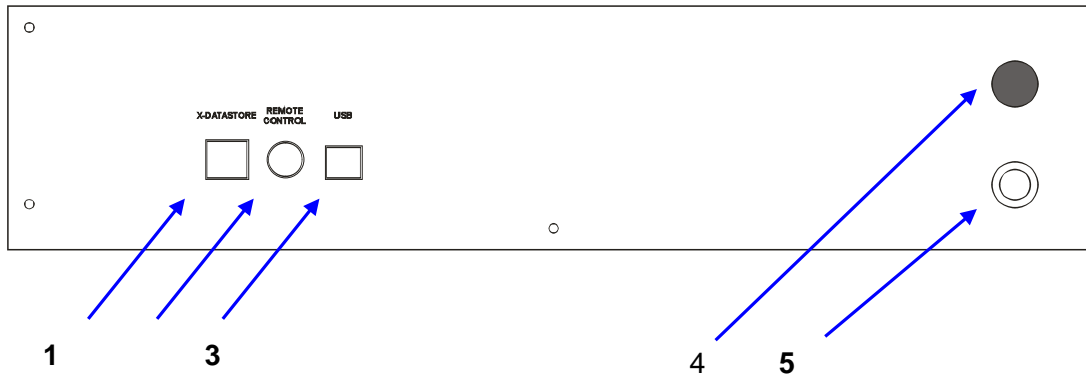


Fig. 3 X-1003 Series Pre-heater Back Panel:

1. **X-DataStore** – Factory calibration port and connection to PC via X485-USB Converter.
2. **Remote control connector**
 - i. Allows connection of FOCUS “X” to the unit and remote control by FOCUS “X” including 5 zone (temperature/time) control of the pre-heater.
 - ii. Allows ON/OFF control when XFS-2 footswitch is connected.
3. **USB** – Socket to connect to a PC
4. **Fuse holder 1** – Contains a fuse for overload protection. The fuse is 20 mm type (see table below)
5. **AC power cord** - Provides AC power to the system through a power cord.

DESCRIPTION OF THE KEY PAD



Fig. 4. X-1003 Preheater keyboard

1 2 3 4 5 6 7 8 9 0	Numeric keypad
+/-	A key to change from positive to negative numbers
↑ ↓ ← →	Keys (arrows) to scroll up/down and left/right through the MENU
Menu	Key to access the MENU
Enter	Key to confirm entries and to open the next levels of the MENU
Esc	Key to leave the present window
Program	Key to enter the window to enter required temperatures
Start/Stop	Key to start or stop the heating
Cool	Key to turn the cooling ON or OFF

VI. SET-UP AND INSTALLATION

ELECTRICAL REQUIREMENTS

The X-1003 requires 3.6 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-1003 from its shipping box. Store the shipping box in a convenient location. Re-using these box/boxes will prevent damage if you ship or store the system.
2. The system should be located on a rigid and stable work surface.
3. Confirm that the power switch on the front panel is in the "OFF" position.
4. When working with the FOCUS"X" or FOCUS"A+" connect the 4 wire cable XCB-1R (mini DIN5) between the "Remote Control" socket on the rear panel of the Pre-heater and a "Pre-heater" socket on the rear panel of the FOCUS Series unit.
5. Plug the power cord into the AC supply receptacle.

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

NOTE
There are openings in the bottom of the pre-heater which can not be covered, to insure proper air flow. Covering them may cause the damage to the unit.

POWER UP

1. Turn the Power Switch to the "ON" position.
2. A short sound will be heard and the display will show a welcome screen with the manufacturer's logo, product name, serial number and firmware revision number.
3. After a few seconds, the Actual Temperature Window will show. The Programming and pre-heating process starts from this window.

CAUTION
The pre-heater is generating hot air. During operation the parts on top of the pre-heater will reach few hundred deg. C. Touching the top surface and/or other hot parts of the pre-heater can cause burns or other injuries.

VII. OPERATION OF THE PRE-HEATER

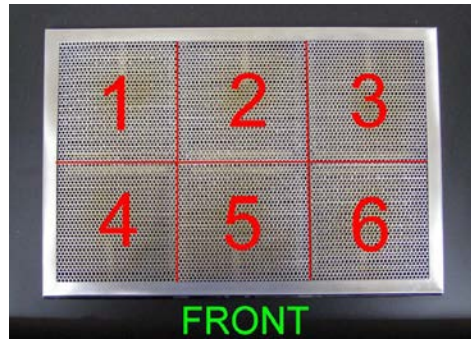


FIG.5 View of the top of the X-1003 Preheater showing six heating sections

The X-1003 Preheater has six independently controlled heating zones. Operating temperature and offset can be set for each of the zones. Each zone can be independently turned ON or OFF. FIG.5 shows the preheater sections and FIG.6 shows "Actual Temperature" window.

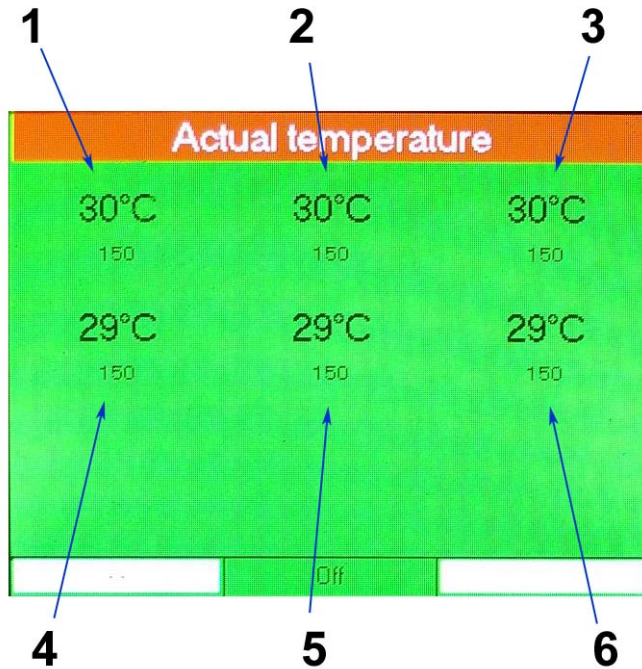


FIG.6 The "Actual temperature" window showing the temperatures in the six heating sections

USING THE PRE-HEATER

Using the Preheater starts from „Actual temperature" window.

Pressing **Esc** at any time during operation of the machine will bring the operator to this window.

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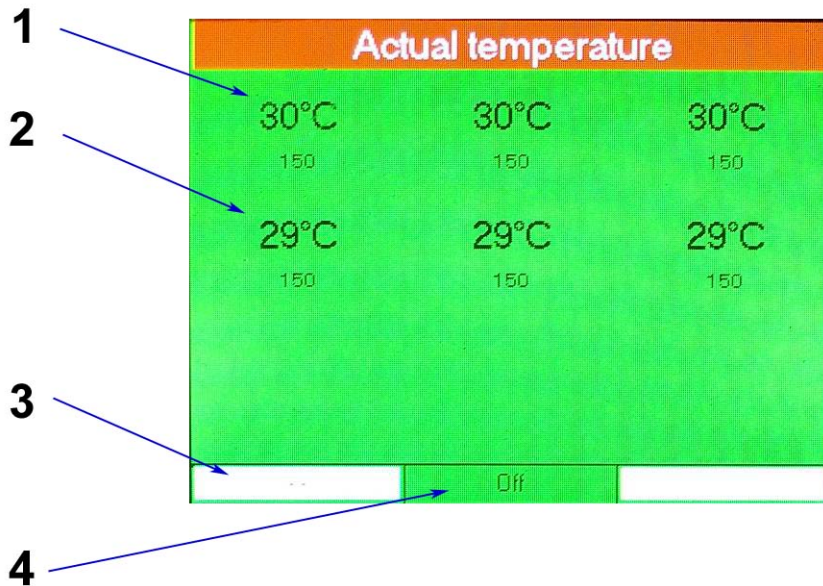


FIG.7. Description of what the "Actual temperature" window shows

1. The actual temperature of the air above the heating zone (adjusted by the keyed-in offset value)
2. Set temperature for Zone 1
3. Description of Zone (Preheat1, Preheat2, Soak, Reflow or Cool) when X-1003 is controlled by the FOCUS"X" in Auto Mode.
4. Indication of Preheater Status: „ON“, „OFF“ or „AUTO“. Auto means controlled by the FOCUS"X"

Setting zone temperatures and offsets:

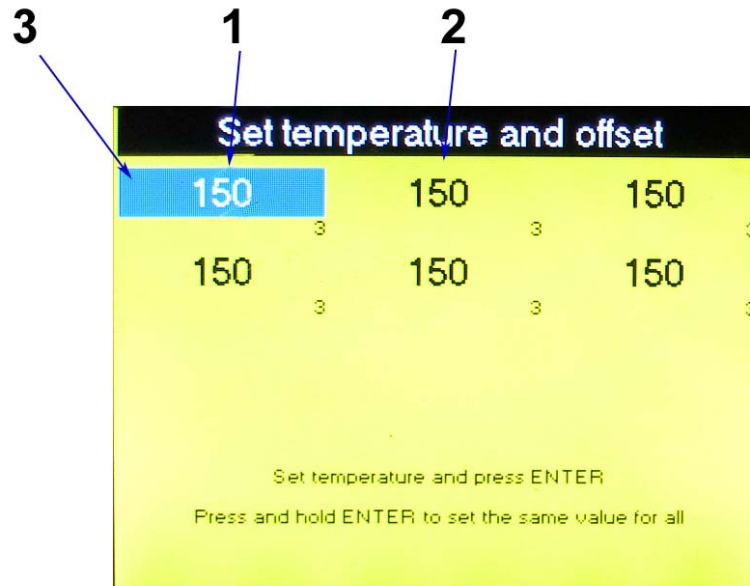







FIG.8. Setting Zone Temperatures and Off-sets

1. Temperature in zone 1
2. Setting the offset in zone 2
3. Shading showing currently set parameter







Note:

Offset causes the system to increase hot air temperature and should be set-up in such a way so that the temperature programmed and shown on the display equals actual temperature on the surface of the preheated PCB.



How to set the temperatures of the zones and the zones' offsets:

1. Press  when in the "Actual temperature" window
2. The "Set temperature and offset" window opens with shading on the first zone position. You are ready to set the temperature of the first zone (positioned on the left side in the back row). Enter the required temperature using the numerical key-pad and confirm by pressing: . Entering zero (0) for the zone temperature turns this zone OFF.
3. The shading moves to the next position, which is zone 1 indicating the off-set of zone 1.
4. Enter the required off-set using the numerical key-pad and confirm by pressing: .
5. The shading moves to the next position, which is zone 2 (positioned in the center of the back row).
6. Enter the required temperature using the numerical key-pad and confirm by pressing: .
7. Repeat these steps for all six zones. This will set the ON or OFF status and the required temperature for each zone.
8. Press  to return to the "Actual Temperature" window.


Attention:

- If the operator wants to set the same temperature and off-sets for all zones, after entering the required temperature and off-set for zone 1, press and hold . When the values appear in all five of the remaining zones release .
- The operator can also use     (the arrow keys) to move around set positions in the "Set temperature and offset" window.




STARTING THE PRE-HEATER

1. Set the temperatures and offsets for all six zones.
2. Press  to return to the "Actual Temperature" window.
3. Press .

Note:

Pressing  at any time during operation will stop the heating (except for AUTO mode when the X-1003 is controlled by the FOCUS"X").



COOLING

To cool the board press . During the cooling process all heaters are turned OFF and all cooling fans work at the maximum speed. To stop the cooling process press either  again, or press .

Controlling X-1003 Pre-heater with FOCUS"A+" or FOCUS"X" Units.

There are two modes of operation when the X-1003 is controlled by a FOCUS Series unit.

Auto Mode: – temperature in each profile zone is pre-set in the FOCUS menu and is always the same for each of the Pre-heater's six zones. It is possible to vary the actual temperatures of each zone by pre-setting different off-sets for each zone on the Pre-heater. Selected Pre-heater zones can be turned OFF by setting the temperature in the Pre-heater zone at zero (0).

On/Off Mode: – A FOCUS Series unit only turns the Pre-heater ON or OFF (the same way as pressing  on the Pre-heater's keyboard would). All of the Pre-heater's temperatures and off-sets are pre-set on the Pre-heater's control panel. Cooling in this mode is possible only by pressing  on the Pre-heater's keyboard.

HOW TO SET COMMUNICATION BETWEEN X-1003 PRE-HEATER AND FOCUS SERIES CONTROLLER.

1. Turn „ON” the X-1003 Pre-heater. Access User Settings Menu. Set Mode of operation either to „Auto” or „ON/OFF”).
2. Turn „ON” FOCUS Series Controller. Access User Settings Menu. Set the same Mode of operation which
 1. Was set on the Pre-heater.
 2. Turn „OFF” both units.
3. Connect one end of the XCB-1R - Cord connecting FOCUS "X" with Pre-heaters (mini din5) to the „Remote control” socket on the rear panel of X-1003 Pre-heater.
4. Connect the other end of the XCB-1R - Cord (mini din5) to the „Pre-heater” socket on the rear panel of the FOCUS Controller.
5. Turn „ON” the X-1003 Pre-heater and FOCUS „X” or FOCUS”A+” controller.
6. In case of „Auto” mode of operation, on the bottom of the window „Actual temperature” on Pre-heater's screen status „Auto” should appear.

PRE-HEATER SETTINGS

This intelligent pre-heater gives the Operator possibilities to set-up its parameters according to the operator needs. This can be chosen in the „User Settings” Menu.

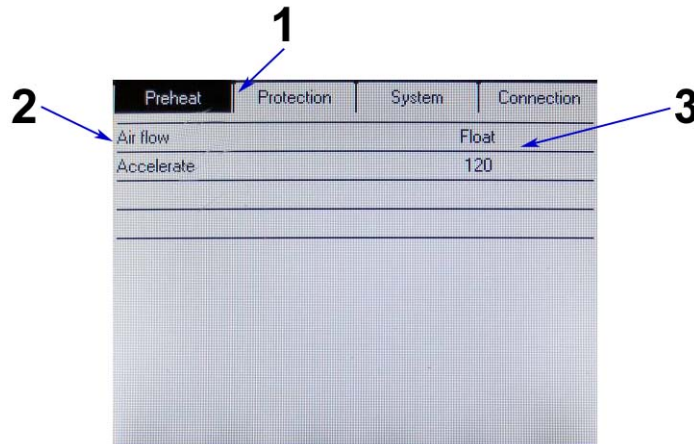


FIG.9. User Settings

1. Main Menu
2. Parameter to set
3. Parameter's value

Accessing „User Settings” Menu:








1. When in „Actual temperature” window, press .
2. Using   arrow keys choose „Main menu”
3. Press  key. Settings window will appear on the pre-heater's screen (FIG. 10.)



FIG. 10. Settings window

- a. „User Settings” – Settings available for the Administrator.
 - b. „Factory Settings” – Settings available for the Factory personnel.
 - c. „Exit” – return to the previous menu.
4. Press   keys to select „User Settings”
 5. Press  key. The window asking for Password will appear.

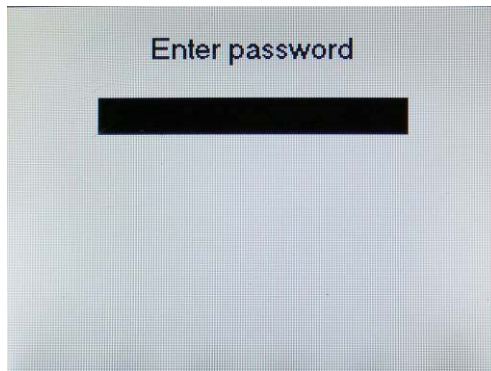



FIG.11. Password entry window









6. Enter your Password. Factory set password is 1234.

Note:

If you change the 1234 password and later on forget your new password, call or e-mail the distributor or manufacturer to obtain „emergency password”. Have the serial number handy when contacting the distributor to obtain emergency password.

Press  key to confirm the entry. Window “User Settings” will appear.

Moving around the MENU

Use       keys to move around the MENU. First menu window which appears is a main menu with cursor in position „Preheat”. To move to next positions use   arrow keys.

Example:

Pressing  key, moves the cursor right to next menu positions.

From "Preheat" – to „Protection” - to „System” - to „Connection” – and to „Preheat” again.

To access next level of a particular menu choice, press  key.

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To return to a previous level, press **Esc** key.

To change the value of a particular setting press **▲ ▼** arrow keys or use numerical key pad.

Each value change, to be memorized must be confirmed by pressing **Enter** key.

PERMITTED VALUES OF PRE-HEATER PARAMETERS

- | | |
|--------------------------------|--|
| 1. Preheat | Settings to optimize the heating |
| 1.1. Air flow | Mixing air fan mode of operation |
| Low | Low RPM |
| High | High RPM |
| Alternating transfer | Alternating RPM from Low to High, to enhance temperature from heaters to air and from air to a PCB. |
| Factory set: | Low |
| 1.2. Acceleration | Time after start-up in which the temperature is set to a maximum to speed-up preheat of cold boards. |
| Off | |
| Min. | 20 [s] |
| Max. | 120 [s] |
| Factory set: | Off |
| 2. Protection | |
| 2.1. Password | An access code to operate the unit |
| Min. | 0 |
| Max. | 9999 |
| Factory set | 1234 |
| 3. System | |
| 3.1. Temp. scale | Units in which temperature is entered and displayed |
| °C | Celsius scale |
| °F | Fahrenheit scale |
| Factory set | °C |
| 3.2. Sound | Sound heard when the keys are pressed and when warning signals are communicated by the system |
| On | sound turned ON |
| Off | sound turned OFF |
| Factory set | On |
| 4. Connection | |
| 4.1. Address | Pre-heater address viewed by a PC connected to it. |
| Min. | 1 |
| Max. | 247 |
| Factory set: | 247 |
| 4.2. FOCUS control mode | How FOCUS Series unit controls the pre-heater |
| Off | FOCUS does not control the pre-heater |
| OnOff | FOCUS turns ON or OFF the pre-heater but does not control the temperature |
| Auto | FOCUS controls both time when the pre-heater is ON and temperature of the pre-heater |
| Factory set | Off |

VIII. Service and Maintenance

Changing the cooling air filters.



Fig.7. Side view of the X-1003 Preheater

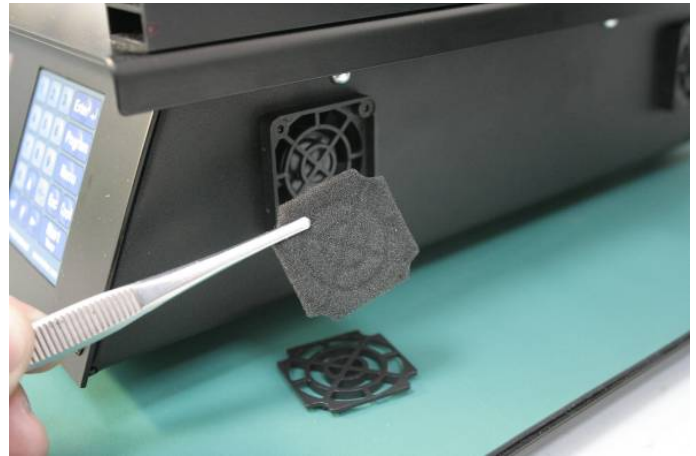
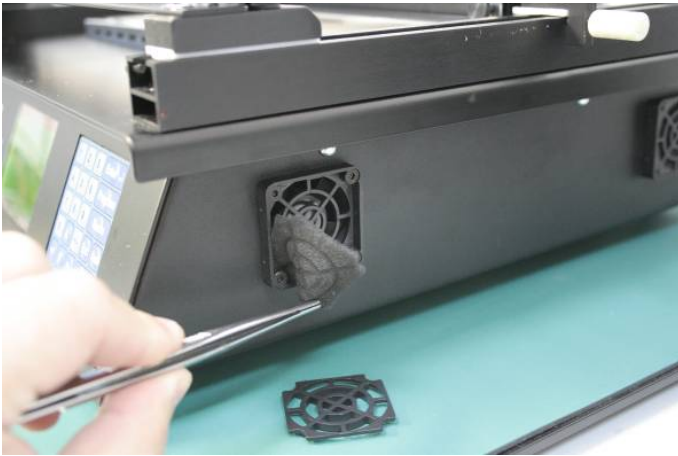
On the side panels of the X-1003 Pre-heater there are cooling fans. With time, depending on the working environment of the Pre-heater, the filters will become dirty, and need to be changed. It is difficult to define the amount of time that the filters will last before it will be necessary to change them. As previously mentioned, this will depend on the frequency of use of the Pre-heater, and the environment in which the Pre-heater was used. It is recommended to check the status of the filters approximately once a month. A dirty filter may block the cooling air and cause the equipment to malfunction.

How to change the filter:

1. Turn the Pre-heater OFF.
2. Remove a power cord from the power outlet
3. Remove a plastic fan guard
4. Remove an old filter and replace it with the new one: P/N 1003RF
5. Re-install the fan guard. Make sure that it snaps into the proper position.
6. Repeat the procedure for all four cooling fan filters.



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IX. TECHNICAL SPECIFICATIONS

Supply AC Voltage	200-230 V AC
Power requirement	Max. 3600 VA
Weight	5,5 kg (12.1 lbs.)
Dimensions	(400 x 470 x 170 mm)
Communication Ports	RS485, USB, Remote Control
Board Preheat temperature measured on the surface of the preheated board.	(60 -150 °C), 140-302 °F
Hot air outlet area	240 x 155 mm
Board preheat area	> 240 x 155 mm
Average time to preheat 4 layers board to set temperature	< 3 min.



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