

AOYUE[®] Int6028

**Sirocco Series
SMD Rework Station**

Instruction Manual

Thank you for purchasing the Aoyue 6028 Rework Station.
Please read the manual before using the unit.
Keep manual in accessible place for future reference.

Manufacturer:

AOYUE TONGYI ELECTRONIC EQUIPMENT FACTORY

Jishui Industrial Zone, Nantou, Zhongshan City,

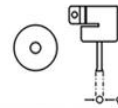
Guangdong Province, P.R.China

<http://www.aoyue.com>

REPLACEMENT AIR NOZZLES

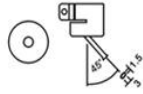
This manual is designed to familiarize and instruct the technician with the proper operation and maintenance of the equipment. The "Care and Safety Precautions" section explains the hazards of using any type of soldering or reworking device. Please read carefully and observe the guidelines in order to maximize usage and minimize the risk of injury or accidents .

Straight Single



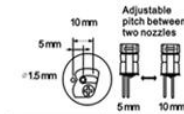
Nozzle Model	Nozzle Size (mm)
1124	2.5
1130	4.4
1194	6
1195	8
1196	7
1197	9
1198	12

Bent Single



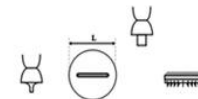
Nozzle Model **1142**

Dual Single Adjustable



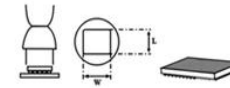
Nozzle Model **1325**

Single In Line Package



Nozzle Model	IC Package Size (mm)	Nozzle Length (mm)	
		SIP 25L	SIP 50L
1191	SIP 25L	26	
1192	SIP 50L	52.5	

Ball Grid Array



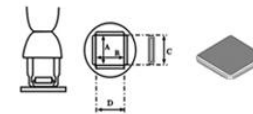
Nozzle Model	IC Package Size (mm)	Nozzle Size (mm)	
		W	L
1010	BGA 9x9	10	10
1313	BGA 12x12	13	13
1616	BGA 15x15	16	16
1919	BGA 18x18	19	19
2828	BGA 27x27	28	28
3636	BGA 35x35	36	36
3939	BGA 38x38	39	39
4141	BGA 40x40	41	41

Small Outline J-Lead



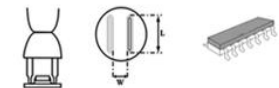
Nozzle Model	IC Package Size (mm)	Nozzle Size (mm)	
		L	W
1183	SOJ 15x8	16	8
1184	SOJ 18x8	19	10
1214	SOJ 10x26	25.9	12

Plastic Leaded Chip Carrier



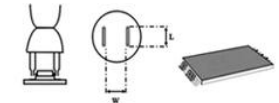
Nozzle Model	IC Package Size (mm)	Nozzle Size (mm)			
		A	B	C	D
1135	PLCC 17.5x17.5 (44pins)	18.5	18.5	15	15
1136	PLCC 20x20 (52pins)	21	21	19	19
1137	PLCC 25x25 (68pins)	26	26	24	24
1138	PLCC 30x30 (84pins)	31	31	29	29
1139	PLCC 7.3x12.5 (18pins)	9	14	6.9	6.9
1140	PLCC 11.5x11.5 (28pins)	13	13	15	10
1141	PLCC 11.5x14 (32pins)	15	13	15	10
1188	PLCC 9x9 (20pins)	11	11	10	10
1189	PLCC 34x34 (100pins)	36.5	36.5	33.5	33.5

Small-Outline Package



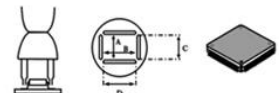
Nozzle Model	IC Package Size (mm)	Nozzle Size (mm)	
		L	W
1131	SCP 4.4x10	10	4.8
1132	SCP 5.6x13	15	5.7
1133	SCP 7.5x15	16	7.2
1134	SCP 7.5x18	19	7.2
1287	SCP 11x21	21	11.7
1258	SCP 7.6x12.7	11.7	8.2
1259	SCP 1.3x28	29	13.5
1260	SCP 8.6x18	19	8.7

Thin Small-Outline



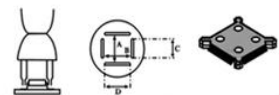
Nozzle Model	IC Package Size (mm)	Nozzle Size (mm)	
		L	W
1185	TSOL 13x10	10	11.9
1187	TSOL 18.5x8	10	18.5
1186	TSOL 18x10	11.7	18.2

Quad Flat Pack



Nozzle Model	IC Package Size (mm)	Nozzle Size (mm)			
		A	B	C	D
1125	GFP 10x10	10.2	10.2	10	10
1126	GFP 14x14	15.2	15.2	15	15
1127	GFP 17.5x17.5	19.2	19.2	19	19
1128	GFP 14x20	15.2	21	15	21
1229	GFP 28x28	29.5	29.7	29	29
1215	GFP 42.5x42.5	42.5	42.5	40	40
1261	GFP 20x20	20.2	20.2	21	21
1262	GFP 12x12	12.2	12.2	12	12
1263	GFP 28x40	27.7	39.7	29	39
1264	GFP 40x40	40.2	40.2	39	39
1265	GFP 32x32	32.2	32.2	31	31

Bumpered Quad Flat Pack



Nozzle Model	IC Package Size (mm)	Nozzle Size (mm)			
		A	B	C	D
1180	BQFP 17x17	18.2	18.2	13.6	13.6
1181	BQFP 19x19	19.2	19.2	16	16
1203	BQFP 35x35	35.2	35.2	30.6	30.6
1182	BQFP 24x24	24.2	24.2	21	21

* Sold Separately

BASIC TROUBLESHOOTING GUIDE

PROBLEM 4: THE TEMPERATURE ADJUSTMENT KNOB IS NOT WORKING

Description:

Turning of the temperature setting knob does not alter the display or show the set temperature level nor does the set temperature level changes with the turn of the knob.

CAUSE & SOLUTION:

The temperature knob may be damaged and needs to be replaced. Have the unit serviced by a certified technician.

PROBLEM 5: DISPLAY SHOWS UNRECOGNIZABLE CHARACTERS

SOLUTION: Turn on the main power switch ad on again , if the problem persists have the unit serviced by a qualified technician.

PROBLEM 6: OTHER PROBLEMS NOT MENTIONED IN THIS DOCUMENT

SOLUTION: Please bring the unit to a certified service station.

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PRODUCT DESCRIPTION

The Aoyue 6028 hand held reflow system is a reworking equipment that produces hot air reworking conditions analogous to reflow oven soldering environment .

Its sirocco style fan induces seamless airflow thru the heating element providing convection style heating akin to reflow oven systems . Furthermore the non-pressurized air stream is perfect for reworking highly sensitive IC packages such as BGA, QSP, SOP and plastic based SMD devices.

An intricately developed hand piece provides great handling and ease of use. The integrated hand piece holder clears up generous desktop space to provide maximum functionality in a single package.

The 6028 also provides ample safety features such as idle mode auto shut off and overheat protection. The idle mode auto shut off feature detects if the soldering gun has been placed on its holder thus invoking the system to turn off heating and shut down activity after temperature has gone down to a safe level. These features will be discussed in greater detail together with the complete features in the succeeding sections of this manual.

Finally, the unique, innovative design provides precision, safety, and ease of use to match all reworking requirements.

BASIC TROUBLESHOOTING GUIDE

PROBLEM 1: THE UNIT HAS NO POWER

1. Check if the unit is switched ON.
2. Check the fuse. Replace with the same type if fuse is blown.
3. Check the power cord and make sure there are no disconnections.
4. Verify that the unit is properly connected to the power source.
5. Pick up the hand gun the unit may just be in sleep mode.

See "Operating Guidelines" about cool down and sleep mode on page 16.

PROBLEM 2: ACTUAL AIR TEMPERATURE IS NOT INCREASING

Description: Actual temperature is not increasing or decreasing based on desired level. Air is streaming out of the device.

CASE 1: Hot air gun is placed in its holder.

SOLUTION:

The System is in cool down mode pick up the hot air gun from its holder to activate its heater.

CASE 2: Hot air gun is not in its holder.

SOLUTION:

- The heating element may be broken and needs to be replaced. See "Replacing the heating element" guide on page 18
- The overheat protection has been engaged , see " care and maintenance" part of the heating element for more info on overheat protection.

PROBLEM 3: NO AIR IS COMING OUT OF THE HOT AIR GUN

Description: No air is flowing out of the nozzle, the nozzle heats up, and no sound can be heard on the air intake end of the hand piece.

SOLUTION:

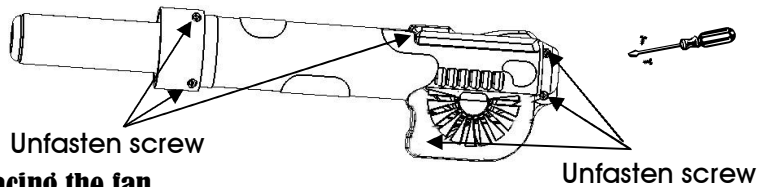
The fan may be broken and needs to be replaced. See replacing the Fan on page 18.

CARE AND MAINTENANCE

Replacing the heating element

When the heating element has reached the end of its life or has been damaged it may need to be replaced. The following steps illustrate how to replace the heating element.

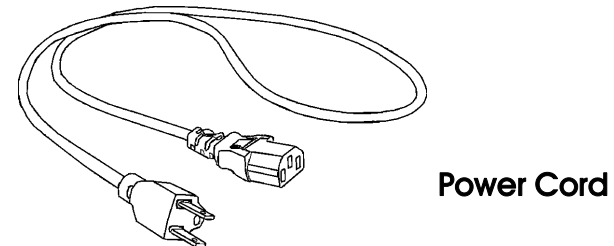
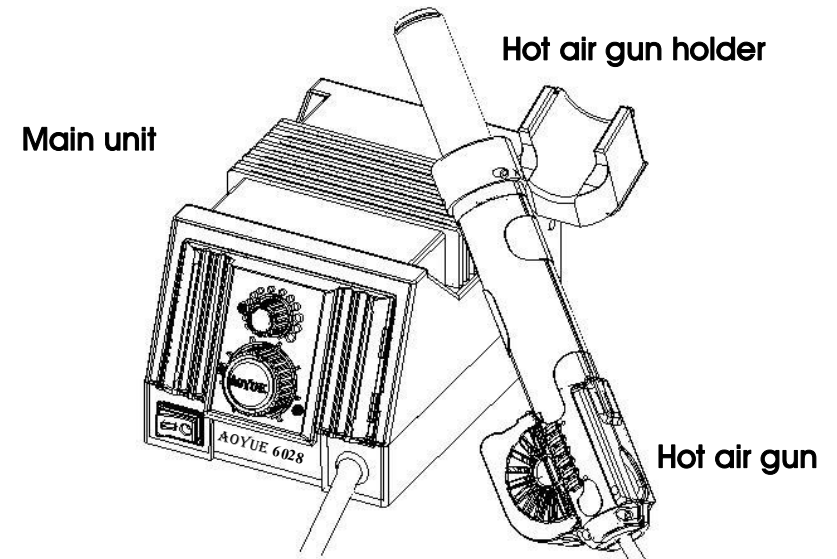
1. Detach the bolts and screws shown in the illustration.
2. Slide off the nozzle and pop out the heating element.
3. Detach the heating element by pulling away both side of the white plastic connector.
4. Unsolder the last two wires connecting the hand piece and heating element together.
5. Attach the new heating element's sensor wires to the hand piece. this can be done by soldering the wires together. Take note of the color code of the wires. Use a heat shrinking tube or electrical tape to protect the solder joints from shorts .
6. Reattach the white plastic connector.
7. Replace the nozzle and refasten the nuts and bolts in the hand piece.



Replacing the fan

1. When the fan has been deemed inoperable or damaged it may be replaced by the following steps.
2. Follow steps 1 and 2 of replacing the heating element.
3. Pull out the fan and unsolder the ends of its power wires. Take note of the placement of the wires as the fan supply has a positive and negative terminal.
4. Re-solder the two wires to the new fan.
5. Replace the nozzle and refasten the nuts and bolts in the hand piece.

PACKAGE INCLUSION



SPECIFICATION

MAIN STATION

Power Input :	available in 110V / 220V
Station Dimensions:	112(w) x 92(h) x 165(d) mm
Weight:	1.5Kg

HOT AIR GUN

Power Consumption:	600W
Temperature Range:	100°C - 480°C
Heating Element	Metal Heating Core
Fan Type:	Sirocco
Air Capacity:	35 l /min (max)

CARE AND MAINTENANCE

Heating element

The following steps would help prolong the life of the heating element.

- Always let the unit enter cool down and sleep mode first before turning off the unit.
- Always turn the temperature knob fully counter clockwise and airflow level at around mid point after each use.

Note: Overheat protection is automatically enabled when the temperature rises to a critical level.

Signs than overheat protection have been engaged :

- Temperature does not rise even though heater LED is always on.
- Temperature is dropping even though heater LED is always on.
Let the unit cool down first, if the overheat protection keeps on engaging recalibrate the hot air gun.

Calibrating the hot air gun

In some cases, it may be necessary to synchronize the amount of heat delivered by the Hot air gun with an external temperature sensing device. This can be achieved by following these few steps:

- Turn the temperature knob ("5" from the control panel) up to the 480°C grid.
- Place the external temperature sensing device's sensor near the tip of the hot air gun nozzle.
- Wait for the Heater LED to start flickering, and the external temperature sensor to stop rising to provide a stable readout.
- Slowly turn the CAL or calibration utility ("6" from the control panel) using a small screw driver until the approximate operating temperature on both devices are synchronized.

OPERATING GUIDELINES

D. AFTER REWORKING/EXTRACTION

1. Replace hot air gun into its holder. the heater LED would turn off signifying it is now on cool down mode.
2. Let the hot air gun cool down automatically.
3. After the temperature has dropped down to a safe level the unit would automatically shut down the fan the unit has now entered sleep mode.
4. The unit can now be shut down by turning the main power switch to off .(“3” from the control panel)

Note: The airflow can be turned to the maximum level for faster cool down of the device.

E. COOL DOWN MODE

- Whenever the Hand gun is placed on its holder the system automatically goes into cool down mode.
- Cool down mode turns off the heater but lets the fan blow air at room temperature to cool down the unit.
- The heater LED should automatically switch off whenever the hand gun is placed in its holder.
- The station would then go into sleep mode once the temperature has gone down to a safe level.
- Lifting the hot air gun from its holder would deactivate the cool down mode.

E. SLEEP MODE

- The system will be in sleep mode whenever the hand gun is placed in its holder and the temperature is lower than 100°C .
- Sleep mode turns off both the heater and the fan.
- When the system is in sleep mode lifting the hot air gun from its holder will activate the unit .
- When the system is initially turned on the system is already in sleep mode lift up the hot air gun to activate the device.
- In sleep mode both the main unit LED and Heater LED are off.

FUNCTIONS and FEATURES

- ESD safe hand piece.
- Auto cool down feature, unit shuts off heating element then blows air at room temperature , when hot air gun is placed on its dock.
- Auto off feature, unit turns off heater and fan when not in use.
- Over-heat protection, heating element auto shuts off when temperature rises over the maximum limit to protect the system and its components.
- Large control knobs for easy controls of temperature and air flow.
- Convection style heating allowing low pressure hot air to pass target devices and concentrate on the solder joints.
- Easy grip solder gun design, provides snug fit clasp and easy control of hot air direction.

SAFETY PRECAUTIONS



CAUTION: Improper usage can cause serious injury to personnel and/or damage to equipment and work area. For your own safety, please observe the following precautions.

- Check each component after opening the package to make sure everything is in good condition. If there are any suspected damage, do not use the item and report the issue to your vendor.
- Turn OFF the main power switch and unplug the device from power source when moving the device.
- Do not strike or subject the main unit (and all its components) to physical shock. Use carefully to avoid damage to any part.
- Handle with care.
 - Never drop or sharply jolt the unit.
 - Contains delicate parts that may break if the unit is dropped.
- Make sure the equipment is always grounded. Always connect power to a grounded receptacle.
- Temperature may reach as high as 480°C when switched ON.
 - Do not use the device near flammable gases, paper and other flammable materials.
 - Do not touch heated parts, which can cause severe burns.
 - Do not touch metallic parts near the tip.
- Disconnect the plug from the power source if the unit will not be used for a long period.
 - Turn off power during breaks, if possible.
- Use only genuine replacement parts.
 - Turn off power and let the unit cool down before replacing any part.
- The unit may produce a small amount of smoke and unusual odor during initial usage. This is normal and should not yield any negative result when reworking.
- Soldering process produces smoke — use on well ventilated places.
- Do not alter the unit, specifically the internal circuitry, in any manner.

OPERATING GUIDELINES

Soldering:

1. Follow procedures in, "**A. INITIAL PROCEDURES**".
2. Prepare the unit to be worked upon on a stable elevated surface. A working platform with locking mechanisms to secure the PCB is highly recommended. Use a preheating station if appropriate.
3. Apply solder paste to the PCB .
4. Pick up the hot air gun.
5. Set the temperature control knob to about 250°C.

Note: Air flow and temperature may vary depending on size of components.

6. Turn the airflow control knob to a minimum airflow.
7. Wait for the heater LED to start blinking. This signifies that the hot air temperature has attained its temperature setting.
8. Place the hot air gun vertically on top of the target device. This will allow hot air to directly heat up the target device and the solder paste. Use appropriate nozzle for better soldering.
9. Solder paste would melt and solder target device and the PCB together.
10. Let PCB cool down.



ATTENTION

- Temperature setting presented in these guides are provided as reference only. Please refer to device manufactures data for the tolerances of the items to be soldered.
- Actual temperature settings for soldering and reworking are dependent on the size of the material to be soldered and solder paste reflow temperatures.
- Very high reworking temperatures can damage sensitive SMT materials.

OPERATING GUIDELINES

D. TRADITIONAL REWORKING GUIDE:

Traditional reworking :

The hand held reflow gun is also well suited for traditional reflow soldering and extraction, the following is a brief guide on reworking via the traditional method.

Extraction:

1. Follow procedures in, "**A. INITIAL PROCEDURES**".
2. Prepare the unit to be worked upon on a stable elevated surface. A working platform with locking mechanisms to secure the PCB is highly recommended. Use a preheating station if appropriate.
3. Pick up the hot air gun.
4. Set the temperature control knob to about 220 to 300°C.
5. Turn the airflow control knob to a medium airflow.

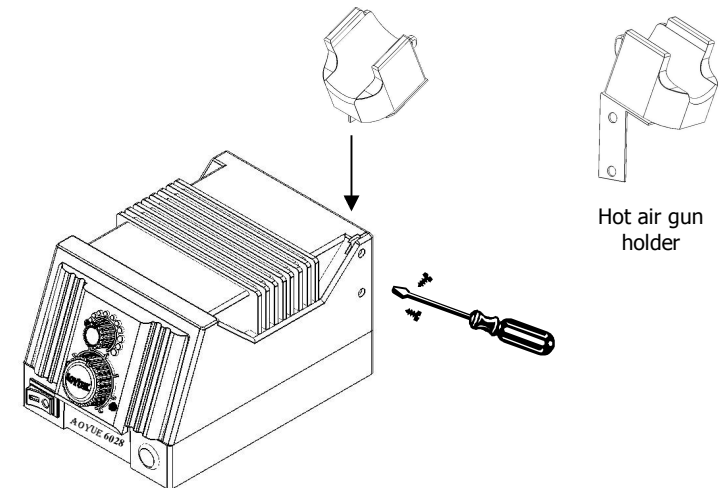
Note: Air flow and temperature may vary depending on size of components.

6. Wait for the heater LED to start blinking. This signifies that the hot air temperature has attained its temperature setting.
7. Place the hot air gun vertically on top of the target device. This will allow hot air to directly heat up the target device and melt the solder. Use appropriate nozzle for better extraction.
8. Use an air suction pen to safely remove the SMD.
9. Let PCB cool down.

ASSEMBLY and PREPARATION

Hot air gun holder

1. Install the Hot air gun holder, the hot air gun holder is detached for shipping purposes .
2. Slide in the metal arm of the hot air gun holder into the slit located at the top right edge of the main station.
3. Steady the holder such that the metal arm's screw holes match that of the main casing holes.
4. Attach the holder with the two screws provided in the package.

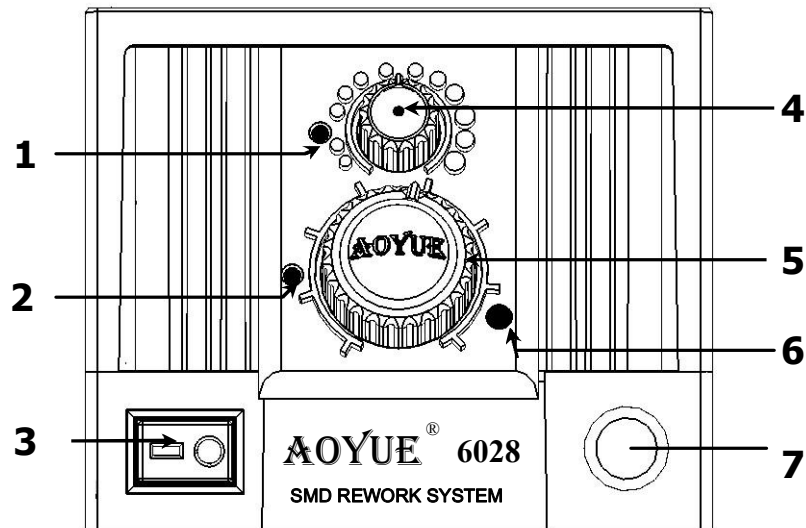


Hot air gun holder

Main station

1. Plug in the AC power cord into the receptacle located at the back of the unit.
2. Attach the other end of the power cord to the main power lines.
3. The unit is now ready for use.

CONTROL PANEL GUIDE



LEGEND:

- 1 — Main unit LED
- 2 — Heater LED
- 3 — Main power switch
- 4 — Air level control knob
- 5 — Temperature control knob
- 6 — Calibration utility terminal
- 7 — Hot air gun output

OPERATING GUIDELINES

Stage 2: Flux activating

1. The entire PCB temperature should be around 150 to 160 °C after stage 1.
2. To activate flux, lower the nozzle of the hot air gun by about 1cm, this would increase the effective temp. to 180-200 °C
3. Continue the spiraling motion this time concentrating more on the devices targeted.
4. Smoke would come out of the solder paste/flux which means the flux is activated and is doing its work.
5. Continue this motion for 30 to 90 seconds.

Stage 3: Reflow soldering

1. The entire PCB temperature would be around 180 to 200 °C after performing stage 2.
2. Lower the hot air gun nozzle another 0.5 cm. This would increase the effective temperature to 220 to 260 °C .
3. Continue the spiraling motion but limit motion on the devices targeted.
4. The solder paste would now melt and bond with the target device to the PCB.
5. Normal reflow time is around 30 to 90 seconds.

REMINDER:

1. Height of the tip may be lowered or elevated depending on the type of solder paste used, and target device size.
2. Lead free solder paste tend to need a higher temperature to reflow .
3. Larger IC packaging may need a longer time before reflow occurs.
4. Plastic components would need a lower temperature to decrease damage to it.

Stage 4: Cooling

1. The PCB needs to slowly cool down in order to minimize thermal shock.
2. Gradually elevate the hot air gun to a height of 15cm or half a foot from the target board. Then remove the hot air gun from the target device
3. Let PCB cool down .

OPERATING GUIDELINES

C. REWORKING GUIDE:

Convection style reworking :

The hand held convection style reworking is a newly developed reworking style that reproduces the reflow oven soldering stages using only a portable hand held reflow gun.

The system is specially designed to accommodate the necessary safety precautions in reworking highly sensitive and sophisticated SMD devices ,ICs, and components of plastic composition.

Four stages are developed to allow proper reflow of the target device. Follow these stages to allow proper convection style reworking.

Stage 1: Preheating

1. Follow procedures in, "**A. INITIAL PROCEDURES**".
2. Prepare the unit to be worked upon on a stable elevated surface. A working platform with locking mechanisms to secure the PCB is highly recommended. Use a preheating station if appropriate.
3. Apply solder paste to PCB.
4. Lift up the hot air gun from the holder.
5. Turn the airflow control knob to medium airflow.
6. Set the temperature control knob to about 270 degrees Celsius.
7. Hold the hot air gun vertically on top of the target device, leaving approximately 3 cm of space between the tip of the hot air gun and the target device.
8. Begin preheating the target device by moving the hot air gun in a slow spiral motion upon the target device. Continue this motion for 1 to 2 minutes.

Note: For larger sized PCB boards concentrate on the immediate vicinity of the target device. With a radius of about 3 to 5 cm.

OPERATING GUIDELINES

REMINDERS:

1. Make sure the equipment is placed on a flat stable surface and all the heat-generating components placed on their respective holders or stands.
2. Ensure all function switches are OFF prior to reworking.
3. Ensure all terminal connections are properly secured.
4. Air flow can be increased by turning the air level control knob ("4" from the panel) clockwise.
5. Air flow can be decreased by turning the air level control knob ("4" from the panel) counter-clockwise
6. Hot air gun temperature can be increased by turning the Temperature control knob ("5" from the panel) clockwise.
7. Hot air gun temperature can be decreased by turning the air level control knob ("5" from the panel) counter-clockwise
8. When air level is set at maximum a whirling sound can be heard from the hot air gun. This is normal as the increased power to the fan induced more air to flow thru the hot air gun.



IMPORTANT: Please refer to the **CONTROL PANEL GUIDE** page for buttons and display panel directory.

OPERATING GUIDELINES

A. INITIAL PROCEDURES

1. Plug the device to the main power source using the power cord provided in the package.
2. Secure the hot air gun on its holder.
3. With all terminal connections properly secured, switch ON the device ("3" from the control panel).
4. The unit is now in sleep mode, with the main unit LED off, heating element and airflow off.
5. To activate the device lift off the hot air gun from its holder.
6. Hot air would then begin streaming out of the hot air gun nozzle.
7. Placing the hot air gun back to its holder would deactivate the heating element and let the unit cool down , the heating element LED would not be lit.

IMPORTANT: Set the air level first before increasing the temperature to avoid the heating element burning out pre-maturely.

B. SMD EXTRACTION GUIDE:

Proper care should be made when extracting SMT devices and plastic components. Therefore proper procedures should also be followed. The convection style extraction is especially well suited to tend to these highly sensitive devices and the hand held reflow gun is made specially for convection style extraction.

Follow these easy steps for convection style extraction of components:

Stage 1 : Preheating

1. The target device should be pre-heated to minimize thermal shock to the system.
2. Follow the steps in "**A. INITIAL PROCEDURES**".
3. Prepare the unit to be worked upon on a stable elevated surface. A working platform with locking mechanisms to secure the PCB is highly recommended. Use a preheating station if appropriate.

OPERATING GUIDELINES

4. Turn the airflow knob to medium airflow.
5. Turn the temperature knob at about 250°C.
6. Lift up the hot air gun and hold it vertically on top of the target device, leaving approximately 2cm of space between the tip of the hot air gun and the target device.
7. Begin preheating the target device by moving the hot air gun in a slow spiral motion upon the entire PCB. Continue this motion for 1 to 2 minutes.

Stage 2 : SMD extraction

1. The target device should be pre-heated to around 180°C.
2. Lower the hot air gun nozzle a little bit to increase the effective temperature to 210 °C
3. Continue the spiraling motion this time concentrating more on the devices targeted.
4. The solder would melt after around 30 seconds and the SMT devices can now be extracted.



WARNING:
Items can be very hot allow items to be cool down before handling. Use proper equipment to handle hot objects.

Stage 3: Cool down

1. The printed circuit board needs to slowly cool down in order to minimize thermal shock.
2. Gradually elevate the hot air gun to a height of 15cm or half a foot from the target board. Then remove the hot air gun from the target device
3. Let PCB cool down naturally.