AOYUE® 6031
Sirocco-Series
Lead-Free Repairing

INSTRUCTION MANUAL

Thank you for purchasing Aoyue 6031
Sirocco-Series Lead-Free Repairing System.

It is important to read the manual before using the equipment.
Please keep manual in accessible place for future reference.

AOYUE TONGYI ELECTRONIC EQUIPMENT FACTORY
Jishui Industrial Zone, Nantou, Zhongshan City,
Guangdong Province, P. R. China
www.aoyue.com

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CE   ESD SAFE   RoHS COMPLIANT

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 .

AIR NOZZLES*
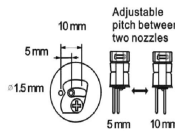
Straight Single
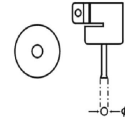
Nozzle Model	Nozzle Size, ϕ(mm)
1124	2.5
1130	4.4
1194	6
1195	8
1196	7
1197	9
1198	12

Bent Single
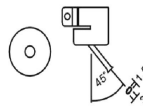
Nozzle Model	1142

Dual Single Adjustable

Nozzle Model	1325

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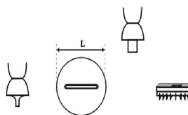
Nozzle Model	IC Package Size	Nozzle Length (mm)
1191	SIP 25L	26
1192	SIP 50L	52.5

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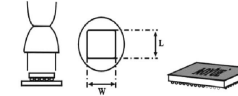
Nozzle Model	IC Package Size (mm)	Nozzle Size (mm) W	L
1010	BGA 9x9	10	10
1313	BGA 12x12	13	13
1616	BGA 15x15	16	16
1919	BGA 18x18	19	19
2828	BGA 27x27	28	28
3636	BGA 35x35	36	36
3939	BGA 38x38	39	39
4141	BGA 40x40	41	41

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
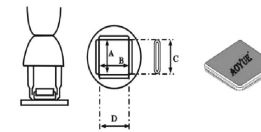
Nozzle Model	IC Package Size (mm)	A	B	C	D
1135	PLCC 17.5x17.5 (44pins)	18.5	18.5	15	15
1136	PLCC 20x20 (52pins)	21	21	19	19
1137	PLCC 25x25 (68pins)	26	26	24	24
1138	PLCC 30x30 (84pins)	31	31	29	29
1139	PLCC 7.3x12.5 (18pins)	9	14	69	69
1140	PLCC 11.5x11.5 (28pins)	13	13	15	10
1141	PLCC 11.5x14 (32pins)	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
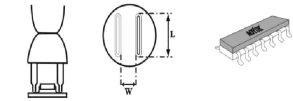
Nozzle Model	IC Package Size (mm)	Nozzle Size (mm) L	W
1131	SOP 4.4x10	10	4.8
1132	SOP 5.6x13	15	5.7
1133	SOP 7.5x15	16	7.2
1134	SOP 7.5x18	19	7.2
1257	SOP 11x21	21	11.7
1258	SOP 7.6x12.7	11.7	8.2
1259	SOP 13x28	29	13.5
1260	SOP 8.6x18	19	8.7

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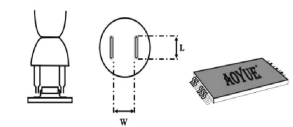
Nozzle Model	IC Package Size (mm)	Nozzle Size (mm) L	W
1185	TSOL 13x10	10	11.9
1187	TSOL 18.5x8	10	18.5
1186	TSOL 18x10	11.7	18.2

Quad Flat Pack
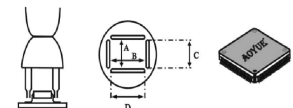
Nozzle Model	IC Package Size (mm)	A	B	C	D
1125	QFP 10x10	10.2	10.2	10	10
1126	QFP 14x14	15.2	15.2	15	15
1127	QFP 17.5x17.5	19.2	19.2	19	19
1128	QFP 14x20	15.2	21.2	15	21
1229	QFP 28x28	29.5	29.7	29	29
1215	QFP 42.5x42.5	42.5	42.5	40	40
1261	QFP 20x20	20.2	20.2	21	21
1262	QFP 12x12	12.2	12.2	12	12
1263	QFP 28x40	27.7	39.7	29	39
1264	QFP 40x40	40.2	40.2	39	39
1265	QFP 32x32	32.2	32.2	31	31

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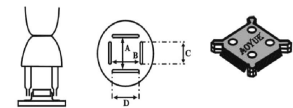
Nozzle Model	IC Package Size (mm)	A	B	C	D
1180	BQFP 17x17	18.2	18.2	13.6	13.6
1181	BQFP 19x19	19.2	19.2	16	16
1203	BQFP 35x35	35.2	35.2	30.6	30.6
1182	BQFP 24x24	24.2	24.2	21	21

(*) Sold Separately

NOTE: For Sirocco series hot-air gun, do not use single straight air nozzles lower than 6 mm in diameter.
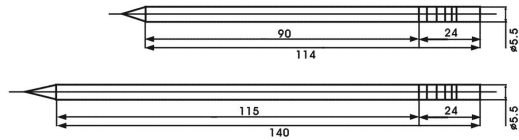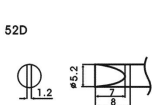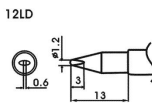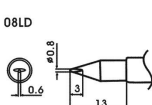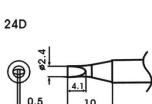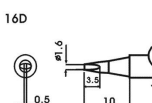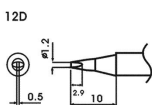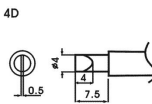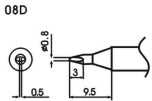
REPLACEMENT TIPS*

Bevel Type	Chisel Type	Conical Type	Blade Type
08D	1BC / 1BCF*	B	K
4D	2BC / 2BCF*	2B	KL
12D	3BC	I	KU
16D	1C	LB	
24D	4C / 4CF*	LI	Sharp-Bent Type
08LD	Flow Type	Tunnel Type	02J
12LD	2BCM	1401	1403
52D	3BCM	1404	1402
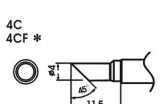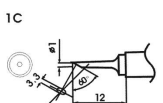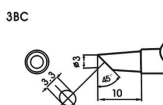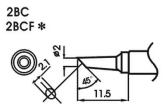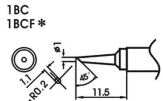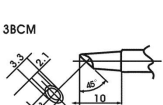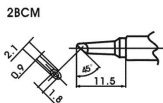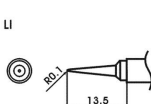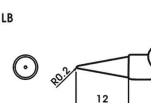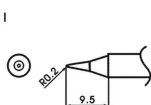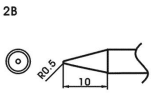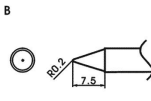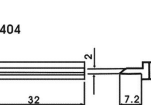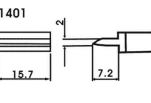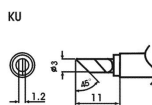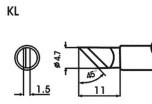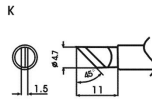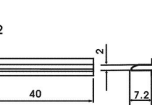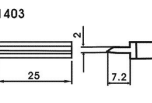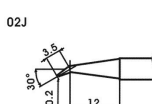
(*) Sold Separately

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PRODUCT DESCRIPTION

The Aoyue 6031 Sirocco-Series SMD Rework Station is a 2-in-1 equipment that combines the functionality of Hot Air Gun and Soldering Iron in one sophisticated package.

One of the notable features of this device is the auto-sleep mode of both the Hot Air Gun and Soldering Iron — both independent of each other. This functionality protects the device (and all its components) from excessive heat for added safety and system protection. The uniquely designed Hot Air Gun with integrated Sirocco-type fan provides efficient airflow and regulation for reworking components made of plastic materials. In addition, the well-crafted air gun provides easy-, snug-fit grip for manageable control of hot air direction. These and all the complete features will be discussed in greater detail in the succeeding sections of this manual.

Finally, the unique, innovative design with digital control and display panel provides precision, safety, and ease of use to match all reworking requirements.

BASIC TROUBLESHOOTING GUIDE

PROBLEM 5: SOLDERING IRON TEMPERATURE DISPLAY PANEL SHOWS "PLUG" CHARACTERS

Case 1: The system shows "PLUG" from the soldering iron temperature display panel .

SOLUTION 1: Check if the soldering iron connection assembly is properly connected and secured to the receptacle on the control panel.

SOLUTION 2: Make sure the soldering iron tip is properly inserted and secured inside the handle. Lose contacts between the tip and handle can also cause this error message.

SOLUTION 3: See "**Soldering Iron Error Messages**" on page 26 for further details.

PROBLEM 6: UNIT SHOWS UNCONVENTIONAL BEHAVIOR
Description: Unit operates erratically.
SOLUTION1: Try to switch OFF the device and switch ON again. Unplug the system from the main power source and plug in again when necessary

SOLUTION2: Restore unit to default factory setting. switch off/on the unit and while the product banner is scrolling press and hold the hot-air temperature up button until the banner finishes scrolling, the unit would revert to its default factory setting.

PROBLEM 7: DISPLAY AND OTHER DEVICE OPERATION ISSUES
SOLUTION: Try to switch OFF the device and switch ON again. Unplug the system from the main power source and plug in again when necessary

OTHER PROBLEMS NOT MENTIONED:
Contact the vendor.

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.

PROBLEM 2: HOT-AIR GUN TEMPERATURE DISPLAY IS ALWAYS ABOVE 500ºC

Description: Constant display of above 500ºC temperature from the panel then displays an "Err1" on the panel after a few minutes.

SOLUTION:

The thermal sensor may be broken and needs to be replaced.

PROBLEM 3: HOT-AIR GUN ACTUAL AIR TEMPERATURE IS NOT INCREASING

Description: Actual temperature reading is not increasing or decreasing based on desired level.

SOLUTION:

The heating element may be broken or is at the end of its life and needs to be replaced.

PROBLEM 4: 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.

PACKAGE INCLUSION

6031 Main Station
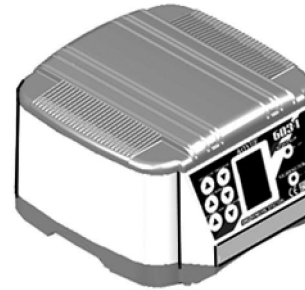
Hot Air Gun

Hot Air Gun Holder
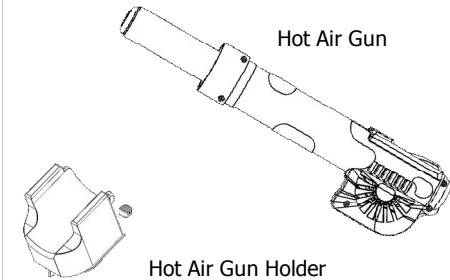
30150J
Heat Resistant Pad
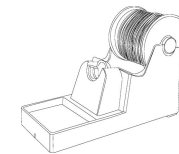
2630B Soldering Iron Holder
with Solder Wire Stand
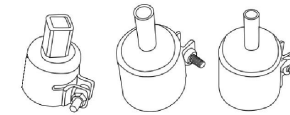
Air Nozzles
(1010, 1194, 1195)

LF-2B Tip
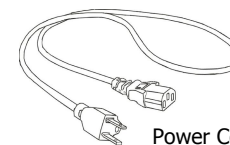
Power Cord

939 Vacuum
Suction Pen
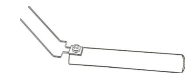
G001 IC Popper

SPARE PARTS GUIDE

PART NO.	DESCRIPTION
10094	Hot air gun heating element
30106S	Plastic handle of hot air gun
S009	Hot air gun complete handle
20962	Hot air gun metal pipe
P002	Diaphragm pump
30127S	Soldering Iron plastic handle
B011	Soldering Iron complete handle

SPECIFICATIONS

MAIN STATION	
Power Input	Available in 110V / 220V
Station Dimensions	204 (w) x 143 (h) x 212 (d) mm
Weight	2.5 Kgs.
HOT AIR GUN	
Power Consumption	600W
Temperature Range	100°C - 480°C
Heating Element Type	Metal Heating Core
Fan Type	Sirocco
Air Capacity	35 l/min (max)
SOLDERING IRON	
Power Consumption	60W
Temperature Range	200°C - 480°C
Heating Element Type	PTC Element
Output Voltage	24V

CARE & MAINTENANCE

Replacing the heating element of the Hot Air Gun

1. Detach screws shown in the illustration, and slide off the nozzle.
2. Pop out the heating element, detach the heating element by pulling away both side of the white plastic connector.
3. Unsolder the last two wires (Thermal sensor) connecting the hand piece and heating element together.
4. 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 .
5. Reattach the white plastic connector.
6. Replace the nozzle and refasten screws in the hand piece.

screws

screws
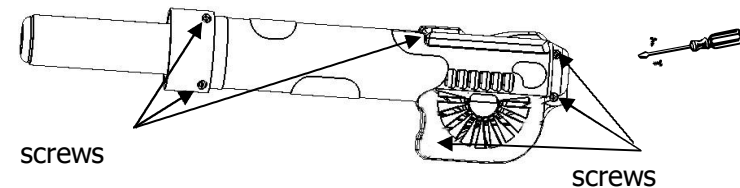
Replacing the Fan

1. When the fan has been deemed inoperable or damaged it may be re-placed 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 screws in the hand piece.

CARE & MAINTENANCE

Soldering Iron Tip

Always keep the solder-plated section of the tip/nozzle coated with a small amount of solder. Oxide coating on the tip of the nozzle reduces its heat conductivity. Coating the tip with a small amount of fresh solder ensures maximum heat conductivity is obtained.

Replacing the Soldering Iron Tip

1. Always unplug the device from the main power source when removing or replacing the soldering tip.
2. If the tip is hot, use the heat resistant pad to pull it out.
3. Insert the new tip fully into the handle. If the tip is not fully inserted (or if the tip is damaged), the device will show the following from the SOLDERING IRON TEMPERATURE display panel ("8").

Soldering Iron Error Messages

1. Soldering Iron connection assembly is not connected or not properly connected to the receptacle on the control panel.
2. Soldering iron tip is damaged and needs to be replaced.
3. Thermal sensor is either disconnected or damaged and needs to be fixed or replaced.
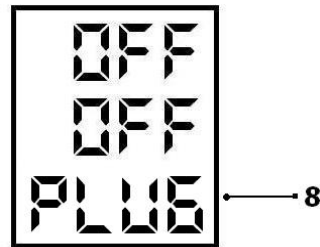
Checking the soldering iron connection cord for damages

1. Remove the soldering iron tip and nipple.
2. Push the socket out from the handle assembly.
3. Measure the resistance values between the connector and the lead wires at the socket are as follows:

Pin 1 - Red (+)
Pin 3 - Blue (ground)
Pin 5 - Black (-)
If any value exceeds 0Ω (shorted) or ∞ (infinitely large — open), replace the handle assembly.
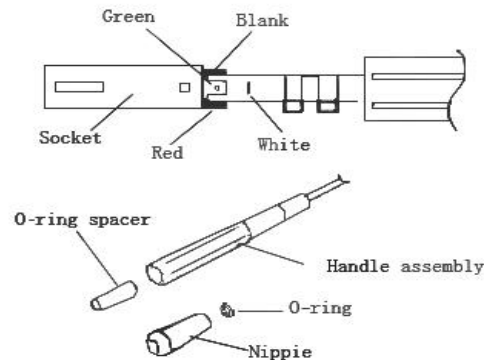
FUNCTIONS & FEATURES

- Microprocessor-controlled ESD safe equipment.
- Lead-free compatible, 2-in-1 multifunctional repairing system. Combines the functions of hot air gun and soldering iron in one package.
- Uniquely designed, easy-grip hand piece with integrated low-noise fan. Provides snug-fit clasp for easy control of hot air direction.
- Digital offset for easy digital temperature calibration from −70 to +70 degrees.
- Sirocco-type fan providing seamless airflow and circuit protection.
- Equipped with hand piece holder for saving bench space and safety.
- All digital display of hot air temperature, soldering iron temperature, and air pressure with touch type panel controls for precision and ease of use.
- Uniquely designed compound tip that integrates the ceramic heating element and sensor in just one component. Replacing tips is as easy as slipping it in/out of the compatible 24V soldering iron.
- User-programmable 1- to 30-minute idle-to-auto-sleep mode of hot air gun (with 5 minutes as default) — switches OFF fan and heating element when device is not in use for a long period.
- Built-in auto-cooling process that protects the system and its components from excessive heat, prolonging usage life.
- Built-in, user-programmable auto-sleep mode for soldering iron.
- Hot air gun convection-style heating allows low hot air pressure to pass on target device/s and concentrate on the solder joints. Usable as heat reflow device.
- Compatibility with different kind of soldering tips. See page 22.
- Compatibility with air nozzles of various types. See page 23.
- Suitable for various SMD and BGA reworking tasks.
- Excellent for reworking components made of plastic materials.

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 the main power source when moving the device from one location to another.
- Do not strike or subject the main unit (and all its components) to physical shock. Use carefully to avoid injury and 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 main power source if the unit will not be used for a long period.
  - Power OFF the device 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

Solder Iron Digital Temperature Calibration Example

- The external temperature sensor displays 248 to 252 degrees.
- The set temperature and displayed actual temperature of the soldering iron is 300 degrees.
- 300 — 248 = 52. An additional adjustment of 52 degrees is required.
- Enter calibration mode
- We increase from "0000" to "0052".
- Exit calibration mode.
- The external temperature sensor would now display 298 to 302 degrees.

NOTES:

- The calibrated data is saved into the memory an shall remain effective until it is recalibrated again or new data is entered.
- If the maximum of 70 degrees has already been added or subtracted pressing the air pressure down button would not exit from calibration mode. Instead turning off the soldering iron function switch would exit from the calibration mode.
- If the maximum of 70 degrees has already been added , increasing further the temperature offset would not be allowed but subtracting temperature offset would be available. And consequently when the maximum of 70 degrees has already been subtracted, decreasing the temperature offset further would be disabled but increasing the temperature offset would be allowed.
- Calibration will only make the newly calibrated point the most accurate. Other temperature points may be a little off.
- The soldering Iron has a lowest temperature limit such that when the temperature has been set to 200 degrees with external actual temperature also showing 200 degrees, further decreasing the temperature offset would be only have minimal effect to the actual temperature.
- **To reset the calibration settings to factory setting,** switch off and on the unit and while the product banner is scrolling press and hold the hot-air temperature up button until the banner finishes scrolling, the Set /Temperature calibration of the unit would revert to its default factory setting.

OPERATING GUIDELINES

K. Utilizing the Solder Iron Digital Temperature Calibration

By default, the system is properly calibrated but for some cases when an little adjustment of the soldering iron temperature is required the following procedure can be done.

1. Turn on the soldering iron function switch.
2. Set to appropriate temperature you want to calibrate. Place the tip of the soldering iron on an external temperature sensor.
3. The readings on the external temperature sensor should be more or less equal to the displayed temperature.
4. If there are large discrepancy in the temperature reading we can re-calibrate temperature setting.
5. While the solder iron is operating make sure the hot air gun is in off mode ("OFF" is displayed on the panels "6" and "7"), hold the air pressure **UP** button for a few seconds until four zeroes are displayed "0000" .
4. Adjust the temperature compensation using the **UP** and **DOWN** buttons of the Soldering iron adjustment buttons.
5. A zero "0" on the first digit signifies addition to the current temperature and a minus "-" on the first digit will subtract the displayed value from the current settings.
6. Confirm the change by pressing the air pressure down button.
7. The system will immediately switch back to operation and the tem-
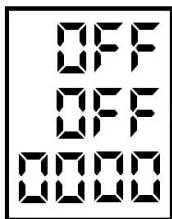
OFF OFF 0000	OFF OFF 0038	OFF OFF -030	OFF OFF H358
Initial display when in calibration mode	Increase temperature by 38 degrees	Decrease temperature by 30 degrees	Exit from calibration mode
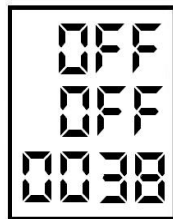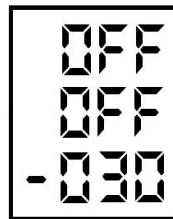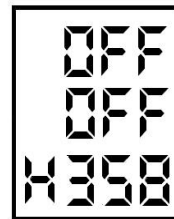
ASSEMBLY & PREPARATION

A. Soldering Iron

1. Install the solder wire to the soldering iron holder as in Figure 1.
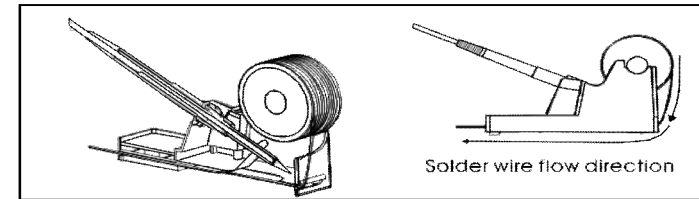
Figure 1. Soldering iron stand with solder wire holder

2. Connect the soldering iron cord assembly to the 3-pin output terminal found at the lower middle portion of the main unit. Refer to CONTROL PANEL GUIDE page for buttons and controls location.
3. Place the soldering iron to the soldering iron stand as shown above.

B. Hot Air Gun

The Hot Air Gun holder is originally detached for packaging purpose. To attach the Hot Air Gun holder,

1. Align the screw holes of the hot air gun holder to the two holes on the left side of the station.
2. Attach the holder with two screws onto the main unit.
3. Place the hot air gun in the sensor controlled hot air gun holder to prepare for usage.
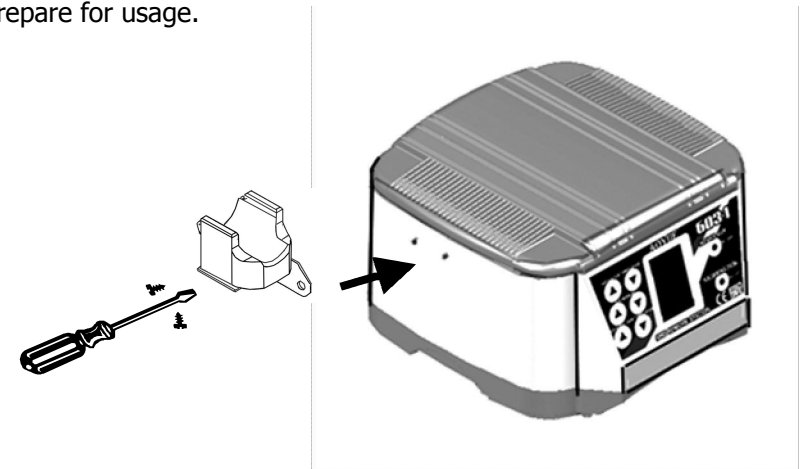
CONTROL PANEL GUIDE
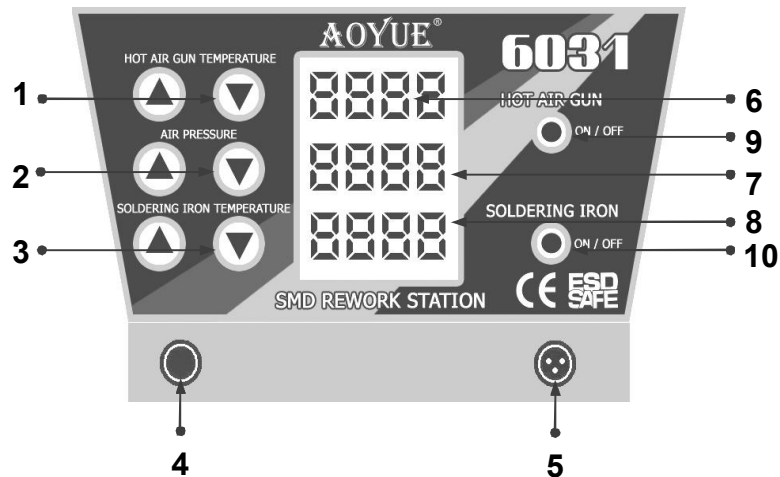
LEGEND:

1	—	Hot air gun temperature adjustment buttons
2	—	Hot air gun airflow adjustment buttons
3	—	Soldering iron temperature adjustment buttons
4	—	Hot air gun connection outlet
5	—	Soldering iron receptacle (3-pin)
6	—	Digital display panel of hot air gun temperature

Prefixes and meanings:

"H" - actual temperature

"h" - temperature being set

"C" - cooling down

"–––" - sleep off mode display

"0FF" - function deactivated display

7	—	Digital display panel of airflow level

Prefix and meaning:

"P" - both for actual airflow and airflow being set

8	—	Soldering iron temperature

Prefixes and meanings:

"H" - actual temperature

"h" - temperature being set

9	—	Hot air gun function switch
10	—	Soldering iron function switch

OPERATING GUIDELINES

J. Activating Soldering Iron Auto-Sleep Mode

Aside from the auto-sleep mode feature of the hot air gun, the device has a separate mechanism to put the soldering iron into SLEEP mode after being idle for a certain period. This is deactivated, by default, and the user must do the following set of procedures in order to activate this feature.

CONDITION: SOLDERING IRON function is inactive.

1. While soldering iron is "0FF" or in stand-by mode, push both UP and DOWN buttons of the SOLDERING IRON TEMPERATURE adjustment buttons ("3" from the CONTROL PANEL GUIDE page).

2. Wait until "t001" or "t0FF" (see figure **(a)** below) appears from soldering iron temperature display panel. This corresponds to a **1**-minute countdown **t**ime before the soldering iron goes to sleep mode.

3. Release the two buttons after the change in display.

4. Use the same two buttons to adjust the countdown time.

5. Confirm the change by activating the SOLDERING IRON switch. This will now be used as the countdown parameter before the soldering iron goes to sleep and will remain active until the soldering iron has been deactivated or when the system has been powered OFF.

6. To **DEACTIVATE** this feature, simply follow the above procedures. This time, select "t0FF" (see figure **(b)** below) .
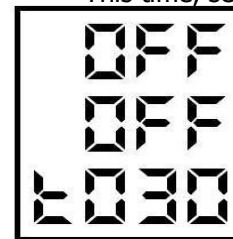
Sleep mode Activated (a)	Sleep mode Deactivated (b)	Soldering iron in sleep mode (c)
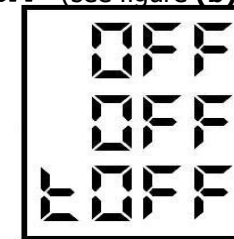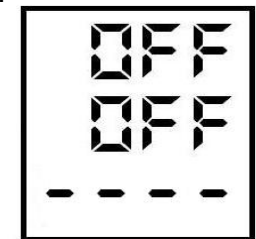
NOTE: During sleep mode, the soldering iron temperature display panel will show an all-dash, "––––" (see figure **(c)** above).

I. Changing SLEEP Mode Timer (HOT AIR GUN)

By default, the system has 5-minute countdown time before the hot air gun goes to sleep mode. This can be altered by the following procedure.

1. While the hot sir gun is on stand-by mode ("OFF" is displayed on the panels "6" and "7"), hold both **UP** and **DOWN** buttons of the <u>HOT AIR GUN TEMPERATURE</u> adjustment buttons.
2. Wait until "**t005**" is displayed on the Hot Air Gun Temperature display panel, "6".
3. Release the buttons when "**t005**" appears.
4. Adjust the time using the same **UP** and **DOWN** buttons of the <u>HOT AIR GUN TEMPERATURE</u> adjustment buttons.
5. Confirm the change by activating the <u>HOT AIR GUN</u> function switch.
6. The system will immediately switch back to operation and use the defined countdown parameter for the entire usage. It will return to

While system is on stand-by mode, press both UP and DOWN buttons of HOT AIR GUN TEMPERATURE adjustment buttons.

Wait until "L005" is displayed from hot air gun temperature display panel.

Adjust time using Hot Air Gun Temperature adjustment buttons ("1" from CONTROL PANEL GUIDE page).

Activate HOT AIR GUN function switch ("9" from CONTROL PANEL GUIDE page) to return to operation and use defined setting.

NOTE: The sleep mode timer is configurable between **1** and **30** minutes.

Note: Sleep mode settings for Hot-Air gun and Soldering Iron is saved into the memory an shall remain effective until it is reset or new data is entered.

IMPORTANT REMINDERS:
1. Make sure the equipment is placed on a flat stable surface and all 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.

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

A. INITIAL PROCEDURES

1. Make sure all function switches are deactivated and all terminal connections properly secured. Plug the device to the main power source using the power cord provided in the package.
2. Display panels 6 and 7 will temporarily show the product name in a scrolling manner then display "OFF" in every row once the scroll is finished (see below). The system will remain at this state until the user acti-

Initial display; product name in scrolling manner

Stand-by mode
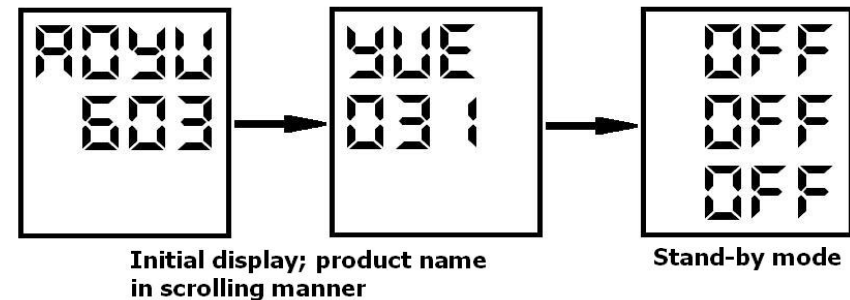
B. HOT AIR GUN

1. Follow initial procedures, "**A. INITIAL PROCEDURES**".
2. Activate "HOT AIR GUN" function switch ("9" from the control panel).
3. The system will immediately start to blow air at an airflow rate of **50** while rapidly and safely increasing the air temperature to **100°C** (default system operating parameters). These values will be reflected from the Hot Air Gun Air Temperature and Air Pressure display panels, "6" and "7" from the control panel, respectively.
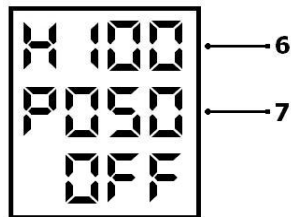
Default System Parameters (Hot Air Gun)

4. Adjust the air flow level using the AIR PRESSURE adjustment buttons ("**2**" from the control panel).
5. Adjust the hot air gun air temperature using the HOT AIR GUN TEMPERA-TURE adjustment buttons ("**1**" from the control panel). The prefix of the display for Hot Air Gun Temperature will change from "H" to "**h**" indicating that air temperature is being adjusted. It will return to "H" after a few seconds of releasing the buttons and while the temperature is gradually increasing or decreasing until the desired temperature is reached. In the

Air pressure has been increased prior to increasing air temperature

Air temperature is being increased; prefix changed temporarily to "h"

Final air temperature has been reached; prefix returned to "H"

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6. When job is finished, deactivate the SOLDERING IRON activation switch.
7. Wait for the soldering iron to cool down before detaching the soldering iron connection assembly from the 3-pin receptacle at the control panel (if necessary).
8. Allow sufficient time for the soldering iron to completely cool down before keeping in a safe storage. (Optional but recommended)

NOTE: The soldering iron operating temperature is adjustable between **200°C** and **480°C** with an increment of **2°** per step.

H. Auto-Sleep Mode (Hot Air Gun)

The device has a built-in auto-sleep mode feature such that if the Hot Air Gun sits on its handle and remained idle after a certain period, the device will switch to sleep mode (provided the power delivered to the system remain uninterrupted). This mechanism is triggered by a countdown timer so when the time has elapsed, the system will blow air (at room temperature) at maximum rate in order to bring down the temperature. During this time, the pref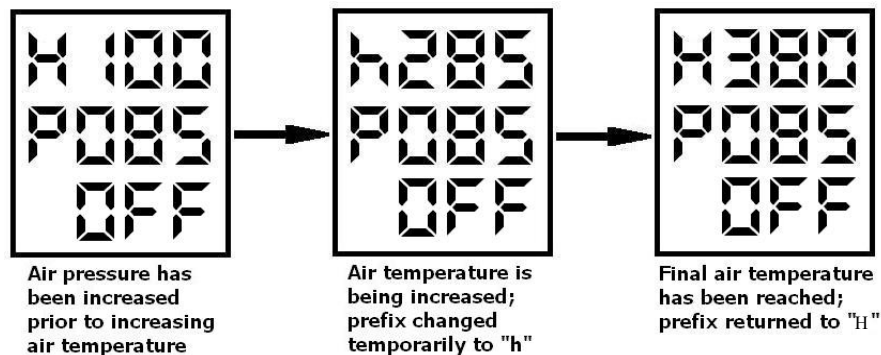ix of the display for Hot Air Gun air temperature will also change from "H" to "C". Once the temperature drops to approximately 90°C, the Hot Air Gun will automatically stop and show an all-dash display indicating that

Before countdown begins; hot air gun rests on the dock

Countdown time has elapsed; auto-cooling process started; air pressure level at maximum rate

Temperature is brought down to a safe level

Sleep mode activated; system will resume to work with defined parameters when the hot air gun is removed from the holder

The device will automatically resume operation with the last user-defined parameters, i.e., hot air gun temperature and airflow level, when the Hot Air Gun is lifted again or removed from the handle.

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G. SOLDERING IRON

1. Connect the Soldering Iron connection assembly to the receptacle located at the front of the control panel (item "5" from the CONTROL PANEL GUIDE page).
2. Follow the initial procedures ("**A. INITIAL PROCEDURES**").
3. Activate the SOLDERING IRON activation switch ("10" from control panel). This will automatically start to increase the temperature of the soldering iron to **350°C** (default).
4. Adjust the soldering iron temperature using the SOLDERING IRON TEMPERATURE adjustment buttons ("3" from the control panel). The prefix of the display for Hot Air Gun Temperature will change from "H" to "h" indicating that air temperature is being adjusted. It will return to "H" after a few seconds of releasing the buttons and while the temperature is gradually increasing or decreasing until the desired temperature is reached. In the example below, the final (desired) hot air gun temperature is 280°C.
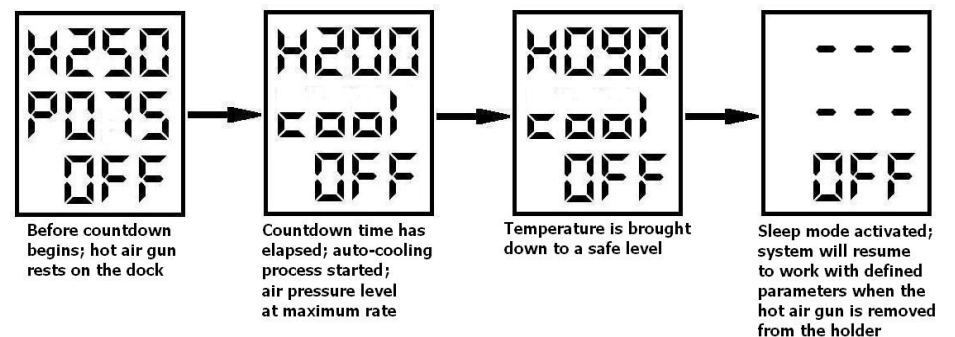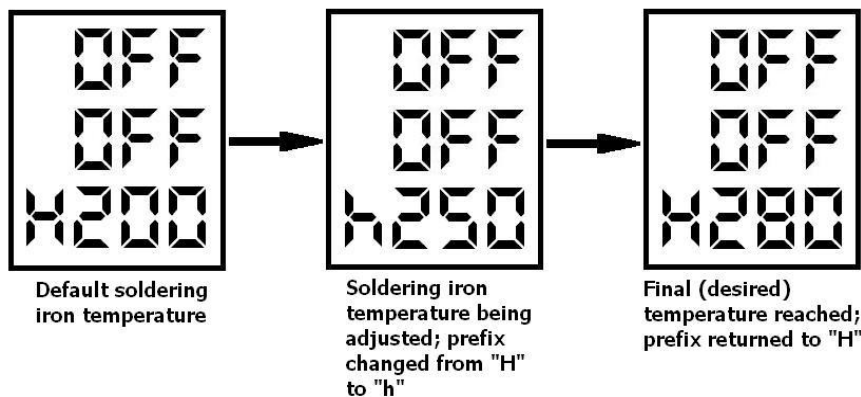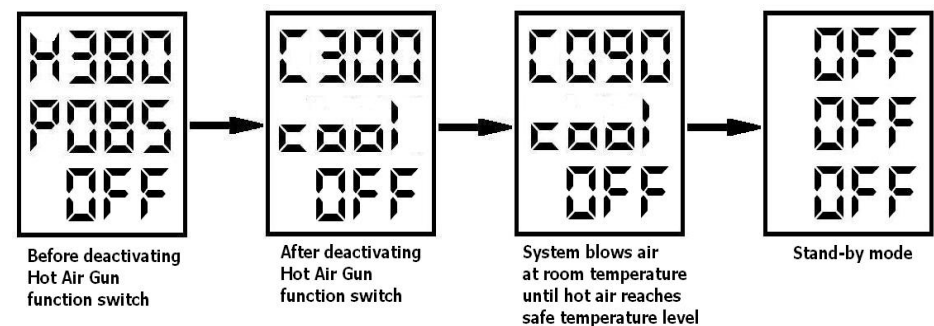

Default soldering iron temperature | Soldering iron temperature being adjusted; prefix changed from "H" to "h" | Final (desired) temperature reached; prefix returned to "H"

5. Start using the soldering iron as soon as the desired temperature is reached. Use the soldering iron temperature display panel for reference.

NOTE: The soldering iron has a memory function in which the last set temperature would be the initial set temperature whenever the unit is turned off

⚠ **IMPORTANT:** When adjusting the air temperature, it is strongly advised to increase the airflow level first in order to manage the system temperature. This is to protect the heating element inside the handle from excessive heat and avoid subjecting adjacent components of target device/s from thermal shock.

6. Reworking task can be started as soon as the desired hot air temperature and airflow level are reached, as also indicated from display panels "6" and "7", respectively.
7. When reworking is complete, return the Hot Air Gun to its holder and **DO NOT** immediately unplug the device from the main power source.
8. Deactivate the HOT AIR GUN activation switch first in order to activate the auto-cooling process. The system will start to blow air (at room temperature) at maximum rate to reduce heat from the hot air gun and bring the temperature down to a safe level of **90°C**. During this time, the prefix of hot air gun temperature display will also change from "H" to "C" while temperature is gradually decreasing. The air pressure level, likewise, will be at its highest reading as indicated from the display panel. Once the temperature drops to approximately **90°C** the hot air gun will automatically stop and display "OFF" on the panel. It is now safe to unplug the device from the main power source if the system reached this

Before deactivating Hot Air Gun function switch | After deactivating Hot Air Gun function switch | System blows air at room temperature until hot air reaches safe temperature level | Stand-by mode

9. Unplug the device from the main power source.
10. Allow the device (and its components) to completely cool down before keeping in a safe and dry place. (Optional but recommended).

C. SMD REWORKING 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 hot air gun function switch ("9" from the control panel).

> ⚠️ **IMPORTANT:** Set air level control knob first before adjusting the temperature knob to prevent burning out the heating element .

D. SMD EXTRACTION GUIDE

Proper care should be taken when extracting SMT devices and plastic components. Convection-style extraction is especially well-suited to handle highly sensitive devices. Likewise, the hand-held reflow gun is made specially for this type of application.

Follow these easy steps for convection-style extraction of SMD and plastic components.

Stage 1: Preheating

1. The target device should be pre heated in order to minimize thermal shock to the system. Use a preheating station if appropriate.
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.
3. Set air flow level to 50.
4. Set hot air temperature at about 250°C.
5. Lift the hot air gun and hold it vertically on top of the target device, leaving approximately 2cm of space between the mouthpiece of the hot air gun and the target device.
6. Begin preheating the target device by moving the hot air gun in a slow spiral motion upon the entire PCB.
7. Maintain this motion for 30 to 90 seconds.

7. Wait for the temperature to reach the desired 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 turn to solder and meld the PCB and target device together.
10. Allow the PCB to cool down.

> **ATTENTION:**
> - Temperature settings presented in these guidelines are provided only for reference purposes. Please refer to device manufacturer 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.

F. TRADITIONAL REWORKING GUIDE

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. 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.
2. Pick up the hot air gun.
3. Set the temperature to about 220 to 300 degrees Celsius.
3. Turn the airflow to around 16-30.

(**NOTE:** Air flow and temperature may vary depending on size of job)

4. Wait for the hot air temperature to reach the desired setting.
5. 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.
6. Use an air suction pen to safely remove the SMD.
7. Allow the PCB to cool down.

Soldering:

1. 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 to about 250 degrees Celsius.
6. Turn the airflow 16-30.

(**NOTE:** Air flow and temperature may vary depending on size of job)

Stage 2: SMD Extraction

1. The target device should be around 180°C after subjecting to pre-heat.
2. Lower the mouthpiece of the soldering gun a little to increase the effective temperature to 210°C
3. Continue the spiral motion but this time concentrate more on the target device.
4. The solder would be molten after around 30 seconds. The SMT device/s can now be extracted.
5. Use an air suction pen to safely remove the SMD.

Stage 3: Cooling Down

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

> ⚠ **WARNING:** Items can be very hot. Allow sufficient time for items to cool down before handling. Use proper equipment to handle hot objects.

E. SMD SOLDERING GUIDE (Convection-Style Reworking)

The hand-held convection-style reworking is a newly developed reworking technique that reproduces the reflow oven soldering process 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.

There are four stages developed to allow proper reflow of the target device. Follow these steps to achieve proper convection style reworking.

Stage 1: Preheating

1. 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.
2. Apply solder paste to PCB pads .
3. Set the airflow level at 50 .
4. Set the temperature to about 270 degrees Celsius.
5. Hold the hot air gun vertically on top of the target device, leaving approximately 3 cm of space between the mouthpiece of the hot air gun and the target device.
6. Lift the hot air gun.
7. Begin preheating the target device by moving the hot air gun in a slow spiral motion on top of it.
8. Maintain the gap between the hot air gun mouthpiece and target device while continuing this motion for 30 to 90 seconds.

> **NOTE:** For larger sized PCB boards concentrate on the immediate vicinity of the target device with a radius of about 3 to 5 cm.

Stage 2: Flux Activation

1. The entire PCB should be around 150 to 160 °C after stage 1.
2. To activate the flux lower the tip of the soldering gun by about 1cm. This would increase the effective temperature to about 180-200 °C
3. Continue the spiral motion but this time concentrate more on the target device.
4. Smoke would come out of the solder paste which means the flux is activated and doing its work.
5. Continue this motion for about 30 to 90 seconds while maintaining the gap between the hot air gun mouthpiece and the target device.

Stage 3: Reflow Soldering

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

Stage 4: Cooling

1. The PCB needs to slowly cool down in order to minimize thermal shock.
2. Gradually raise the hot air gun to a height of about 15 cm or half a foot from the target device or board.
3. Remove the hot air gun from the target device.
4. Allow the PCB to cool down.

> **NOTES:**
> 1. The height of the tip may be lowered or raised depending on the target device size the type of solder paste used.
> 2. Lead-free solder paste tends 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 avoid damage.