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Spot Air System SMT Rework Station

**S D - 3 0 0 0**

**D I C R E W O R K S T A T I O N**

**Operation Manual**

**DENON INSTRUMENTS CO.,LTD**

# DIC SD-3000 SMT Rework Station

## INTRODUCTION

Thank you for your purchasing the SD-3000 SMD Rework Station.

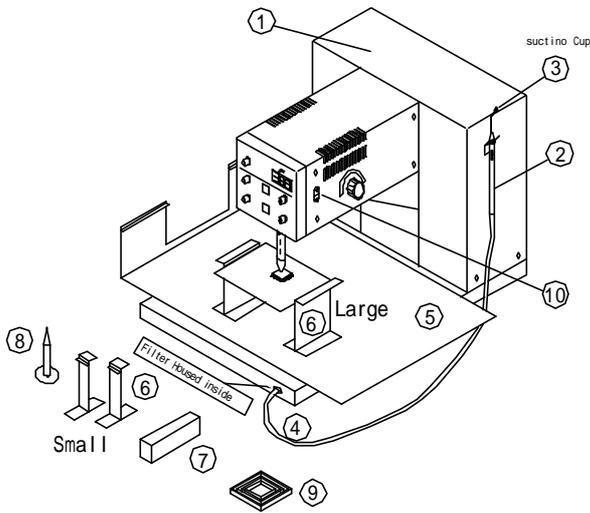
The SD-3000 is a highly reliable SMD rework station with hot air system that is applied for the removal and the placement of many shapes of QFP/SOP/BGA/Micro-Component (0603) and etc.

When the solder of the components is melted in a brief time by the hot air from the oscillating nozzle, the components can be quickly removed by the vacuum pick.

## FEATURES

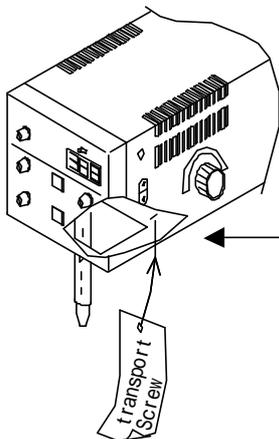
- 1 . The oscillation range of the nozzle can be adjusted up to 50 mm in the X axis (Right & Left) and/or Y axis (Back & Forth). This allows it to be used for any size of SMT parts up to 50mm.
- 2 . The temperature can be set and is displayed on the digital read out.
- 3 . The hot air is controlled by a heater with thermocouple, closed loop feedback circuit.
- 4 . For repeatability, there is a timer that allows the user to set up any run a complete heat cycle.
- 5 . The operation can be easily stopped at anytime using the STOP button. After pushing the button, the nozzle will come up and the heater will automatically turn off. The air will continue to flow in order to cool down the nozzle.
- 6 . The vacuum pick comes standard and is used to quickly remove the SMT parts when the solder has melting.
- 7 . The maximum PCB size that can be held is 420mm in depth and no limitation in width.
- 8 . For removal and placement of the micro component, the air flow is adjusted to a minimum volume in order to control the reflow.

# Machine Description and Accessories



Name of Each Portion and Accessories	
1 .	Main Body / Operation Manual
2 .	Vacuum Pick
3 .	Three(3) each Suction Pads
4 .	Five(5) each Filters
5 .	Base Plate 4 3 0 x 3 0 0 mm
6 .	Two(2) each for PCB Holder Small(P/#H-1) Two(2) each for PCB Holder Large(P/#H-2)
7 .	Plate Stand ( P/#S-1) for Base Plate
8 .	PCB Support Pin(P/#H-3)
9 .	Metal Frame (P/#20-10-10)
1 0 .	Auxiliary Start Switch /Stop Switch

## Basic Set Up



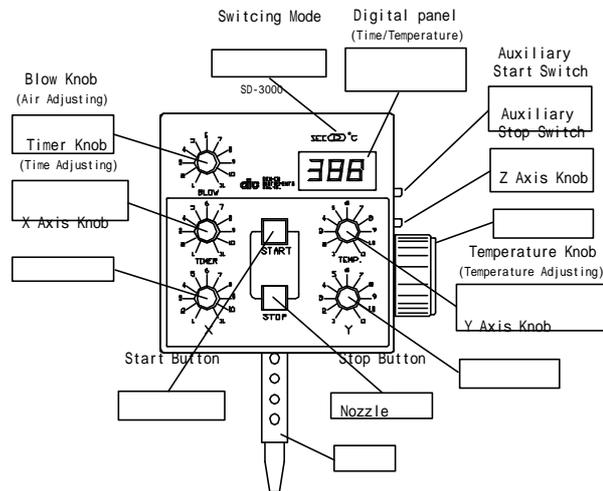
A Butterfly screw is fitted here to protect the internal parts during transport. Please remove it prior to connecting the power cord.

Be sure to fit in again at re-packing for transport. Set the X & Y axis knobs to 0 and turn left the Z knob to maximum. Then push the Start Button to get the Nozzle in the lowest position and switch off the power.

## Installation

- 1 . Place the main body on a level surface.
- 2 . Before turning on the Power, please confirm that the transport screw (A butterfly screw) is removed. The transport screw is designed to protect the internal parts of the unit during transport.

# Operation Panel



## Preparation

- 1 . Turn on the Power Switch.
- 2 . Turn right the Z Axis Knob to the uppermost position.
- 3 . Set the TIMER Knob to the maximum time.
- 4 . Set the TEMP Knob for adjusting temperature to 5. This is approximately 450 degrees C on the digital panel
- 5 . Place the PCB on the PCB Holders and adjust the Base Plate so that the target part for removal is positioned right under the Nozzle.

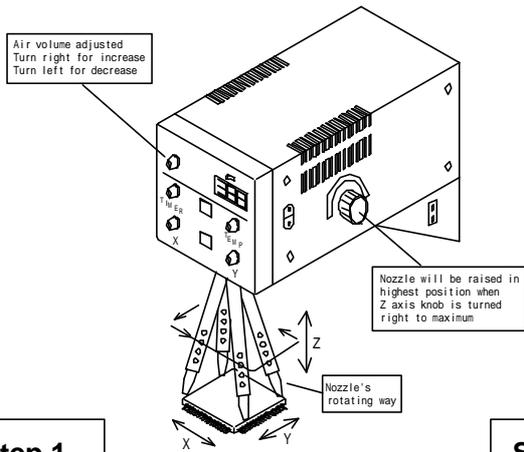
## Positioning of Nozzle

- 6 . Push the START Button (Green color) or Auxiliary Start Switch to lower the Nozzle.
- 7 . Turn left the Z Axis Knob to lower the Nozzle so that the Nozzle point is 1 mm above the surface of the target part.
- 8 . Adjust the length of the X and Y oscillation by the X Axis Knob and the Y Axis Knob so that the Nozzle moves over the solder joint of the target part.
9. For additional components, repeat steps 5-7.

## Removing the Component

11. Push the START Button or the Auxiliary Start Switch once more to switch on the Heater. This will start the air flow and will begin the reflow of the solder joints.
12. The Vacuum Pick can be switched on anytime while the air blow is on.
13. Watch the solder joint to confirm that the solder has melted.
14. Place a finger on the air escaping hole of the Vacuum Pick and contact the Vacuum Pad to the surface of the target part.
15. Push the STOP Button. The Nozzle will come up and the Heater will turn off. Then the air pump will automatically stop once the Nozzle has cooled down.
16. If you need to reflow the component further, simply push the START Button again.

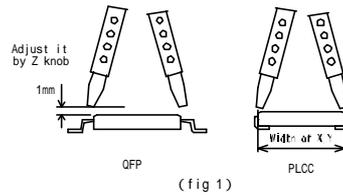
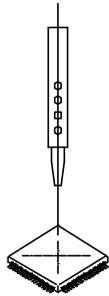
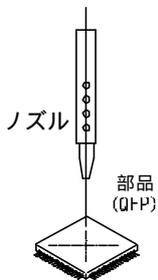
# ! Operation With Illustrations



**Step 1**

**Step 2**

**Step 3**



**Step 1**  
The Power is now on. Turn right the TIMER Knob to maximum when not using the Timer.

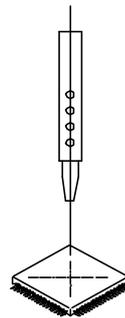
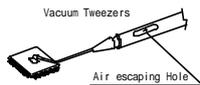
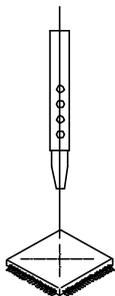
**Step 2**  
Set the X Knob to between 1 and 2. Push the START Button, and the Nozzle will lower.  
Decide the length of the Nozzle height by the Z Knob

**Step 3**  
Positioning of Nozzle  
Move the Base Plate and the PCB so that the Nozzle point circles over the circumference of the component.  
Adjust the length of X and Y by the X and Y Axis Knob.  
Start for Removal works  
Push the START Button once more, and the hot air will start blowing.

**Step 4**

**Step 5**

**Step 6**



**Step 4**  
The Nozzle will automatically come when the time reaches 0. The cycle can be stopped at any time by pushing the STOP Button. This will move the nozzle back to the home position.

**Step 5**  
Once you have confirmed visually that the solder is melted on all joints, put your finger over the air escape hole and lift the component with the Vacuum Pick.

**Step 6**  
Once the Nozzle has cooled down, the air pump will automatically stop. The cycle time from start to stop is indicated on the window of the digital panel. Set the cycle time in the timer for the doing the next component.

# Reworking Micro-Components

Place a magnifier such as Camera or Microscope in front of the Operation Panel to magnify the target point. (We will recommend our optional camera for this.) When reworking Micro-Components, you can not use the START/STOP Buttons on the front of the operation panel. Instead, use the auxiliary switch of the side of the operation panel. Use the following steps for reworking Micro-Components.

Make sure that the power switch is off then:

- 1 . Place the optional Auxiliary Holder on the PCB Holder.
- 2 . Set the Blow Knob between 1 and 3, set the X and Y Axis Knob at 0.
- 3 . With the start button pushed on, switch on the power switch.
- 4 . Set the temperature at 580 degrees C and the timer at approx.120 seconds on the Digital Panel.
- 5 . When you turn the Power Switch on, the Nozzle will move forward at an angle toward the front of the machine. This is so that you can perform the rework using the magnifier.

## 6. REMOVAL

- Magnifying the target area, switch on the Auxiliary Start Switch.
- Confirming the solder melting with eyes view, remove the component with the Vacuum Pick. Use the #20 for the suction nozzle. The #20 is the optional part.

## 6. PLACEMENT

- Place on the target area an adequate volume of flux, e.g., Koki-product TF-M201-6.
- Switch on the Auxiliary Stop Switch to activate the suction pump. While the main body is off, the suction pump will be activated with the Auxiliary Stop Switch.
- Using the vacuum pick, get a component from the tray to transfer to the target area. Use the #25 for the suction nozzle. The #25 is the optional part.
- Use a Stainless Steel Probe to position the component. The SMT Probe is also available as an option.
- Switch on the Auxiliary Start Switch to start reworking. You can observe the component making the self alignment with surface tension of the melted solder.

7. Switch on the Auxiliary Stop Switch. And the Nozzle will automatically come up with a cooling state. At this time, the heating time is indicated on the Digital Panel. When the heating time is set in the timer, the heating will automatically stop at the preset time.

# ! Recommended Air Flow for Rework Applications

The air volume is adjusted with the Blow Knob.

Reading of Knob	Air Volume	Application
Minimum	1.5 L/min.	Micro Component Rework
Maximum	8.0 L/min.	Standard Size SMT Rework

## ! Recommendations for Rework Using the SD-3000

1. When using the Vacuum Pick, hold it like a pen. Placing a finger on the air escape hole and let the Pick grab the component. Please see Step 5.
2. At times, there can be a great difference in the time to reflow the first component and the following components. This is because the heater is generally cold when starting so the first component will take a bit longer. Please keep this in mind when setting up the timers settings.
3. When reworking the large PCB, it is possible that a bending or a warping occurs on the board. Please adjust the Nozzle height by the Z Knob to avoid hitting the board if it happens to warp.
4. The bonding resin is at times used for the target component. In this case please use metal tweezers instead of the Vacuum Pick for the removal.
5. When removing the micro component like 0603, set the Blow Knob at minimum 1 and set the X & Y Axis Knob at minimum 0. When placing the micro component, please use flux for surface mount work like the Koki brand TF-M201-6.
6. When the PCB Holders (Accessories) can not be utilized for the support of the PCB due to the existence of the connectors fitted on the PCB, please use the PCB Support Pin that is also supplied as a standard accessory.
7. When reworking large components, please use the Metal Frames for more effective heating and also to prevent the hot air from reflowing the near-by parts.
8. When removing the DIPs or large BGAs, please preheat the reverse side of PCB at 120 degrees C for effective reworking. The PH-3100A is recommendable for this preheating.
9. The small PCB is apt to move itself. In this case please put a weight on it to keep the position of the PCB.
10. The removal time will vary according to the rework conditions, e.g., continuous or intermittent works, the size of components and the sort of PCB. When you setting the Timer, please take care of them.

## ! Specifications

<b>Reflow Type</b>	<b>Hot Air System, Blow Nozzle, 350W , 4 mm dia.</b>
<b>Air Volume</b>	<b>12L - 1.5 L/min for 8 Steps</b>
<b>Air Pump/Vacuum Pump</b>	<b>Built In</b>
<b>Nozzle Movement Range</b>	<b>X &amp; Y: 0-50mm    Z: 25mm</b>
<b>Temperature Adjustment</b>	<b>Adjustable with Temperature Knob</b>
<b>Timer Adjustment</b>	<b>Adjustable with Timer Knob for 10 - 20 seconds</b>
<b>Applicable PCB Size</b>	<b>Up to 420 mm Deep, No limit laterally</b>
<b>Power</b>	<b>AC100v, 120v or 230v    360w    50/60Hz</b>
<b>Dimensions</b>	<b>D300mm X H310mm X    W450mm</b>
<b>Weight</b>	<b>9 Kilograms</b>

## Major Parts for Replacement

Part Number	Description
32-06-00	Heater for 100 - 120V
32-06-50	Heater for 230 V
20-11-37	Filter for Vacuum Pick ( 10 pcs/set)
20-01-02	Suction Pad for Vacuum Pick ( 5pcs/set)
20-11-56	Dispensing Tip for Vacuum Pick ( Green Colored Portion)
20-13-26	Diaphragm for Air Pump
20-13-51	Diaphragm for Vacuum Pump
70-22-00	Seat Valve for Pumps

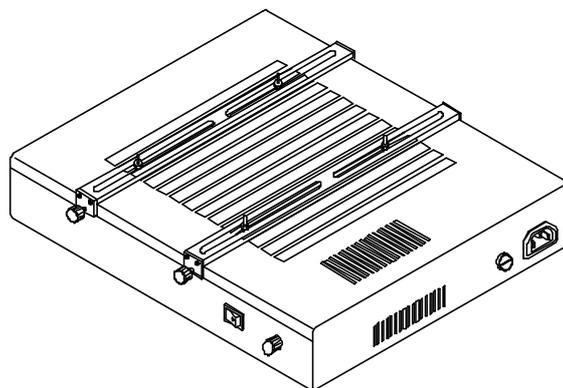
Remarks: Filter (20-11-37) for Vacuum Pick will get dark in 10-20 hours of continued use in hot air. Once the filter has become darkened needs to be replaced.

## Options

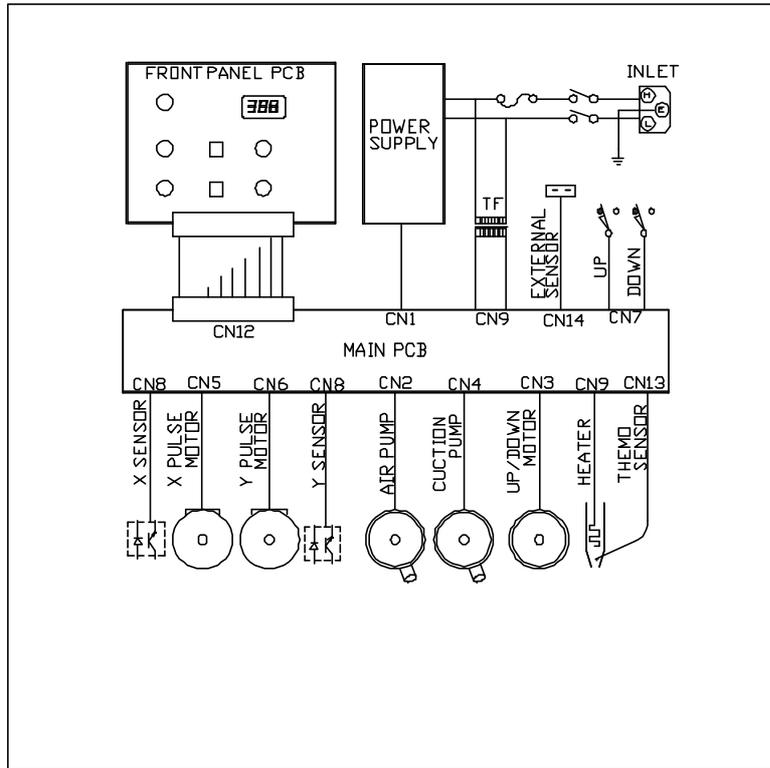
- Camera for Rework of Micro Component
- Auxiliary Holder for Small PCB
- SMT Pin for Rework of Micro Component
- Suction Nozzle #20 for Removal of Micro Components / #25 for Placement of Micro Component

## ! Recommended Item – Preheater PH-3100A

When the SD-3000 is used together with PH-3100A, you can conduct the reworking works faster and more effective. Especially it is recommended for the rework of the ceramic PCB and/or the big PCB.



## Circuit Block Diagram

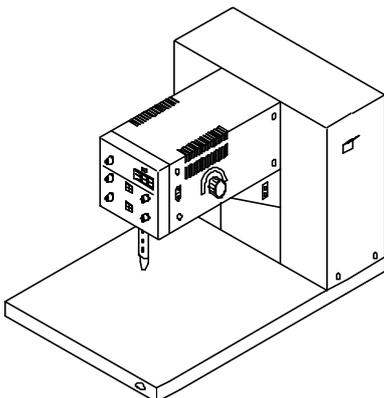


## Maintenance

The SD-3000 is designed to be low maintenance. However the replacement of major parts will be needed if trouble occurs. And the consumable parts will have to be changed from time to time when required. Please follow the instruction stated below when the parts replacements is needed.

### Removal of the Cover Plate

Remove the cover plate when replacing the major parts. Please remove the cover plate in the following steps.

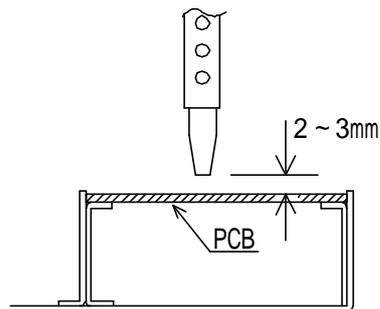


### Removal of Cover Plate

- 1 . Disconnect the Power
- 2 . Remove the screws in the Z Knob.
- 3 . Remove all of 14 screws fitted to the Cover Plate.
- 4 . When removing the Top Cover of the Front Panel, pull up the Top Cover, opening the under side of the Top Cover outwards.

A. Replacement of Heater Nozzle

1. Disconnect the AC cord.
2. Remove the Top Cover of the Front Panel.
3. Remove the Heater Lead Wire of the Connector.
4. Replace the Heater Nozzle.
5. Assemble the Nozzle so that the Nozzle Tip is 2 to 3 mm distant from the surface of the PCB as illustrated below.



B. Replacement of Main PCB

1. Disconnect the AC cord.
2. Remove the Cover Plate to access the Main PC Board.
3. Remove all connectors.
4. Remove the fitting parts (white) of the Main PC Board.
5. Remove the Main PC Board.
6. Re-assemble the new Main PC Board.

C. Replacement of Filter for Vacuum Pick

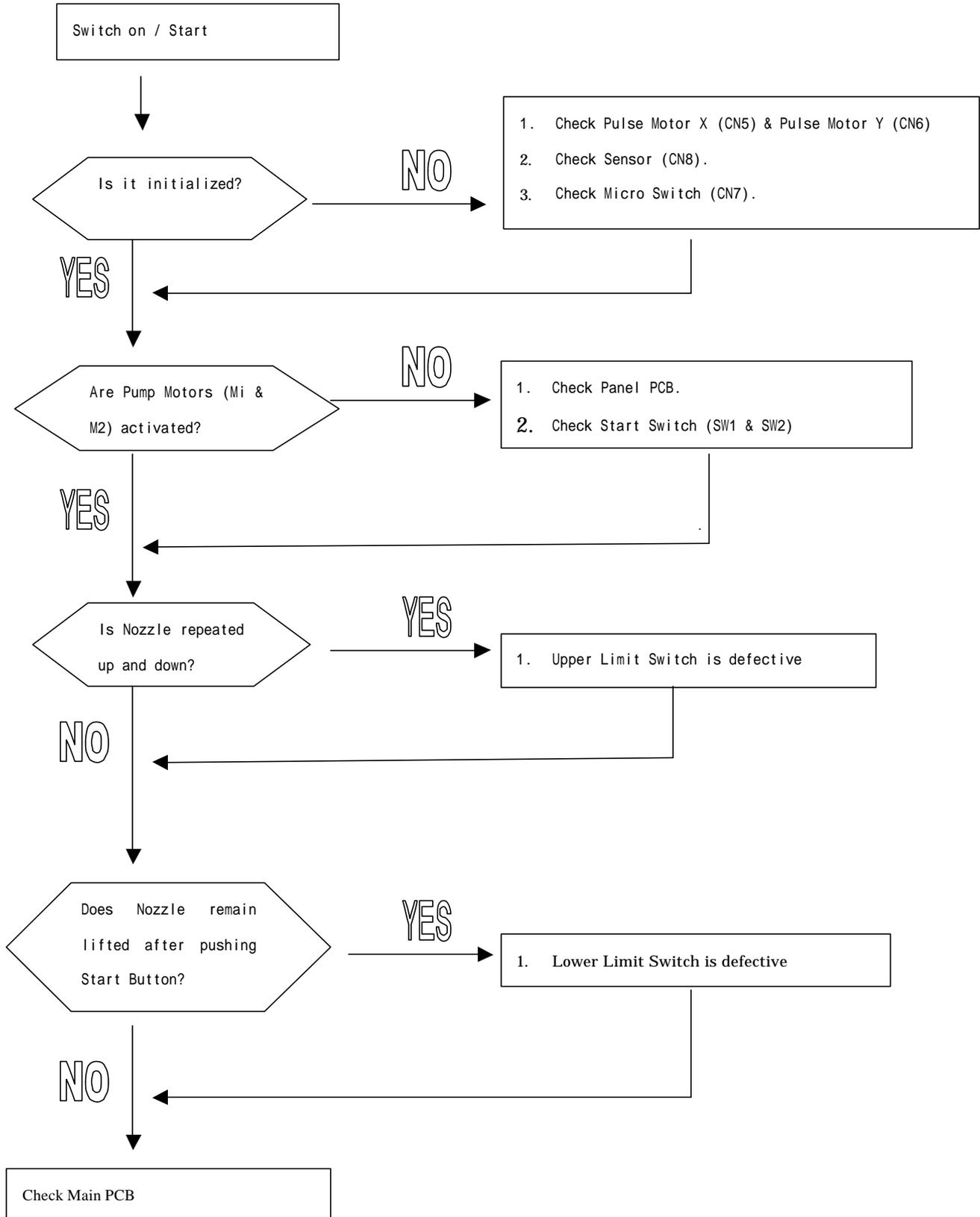
The Filter of the Vacuum Pick is housed in the Base Frame. Remove the Hose Joint fitted at the insertion port of the Base Frame by wrench, and take out the old Filter.

D. Replacement of Suction Pad for Vacuum Pick

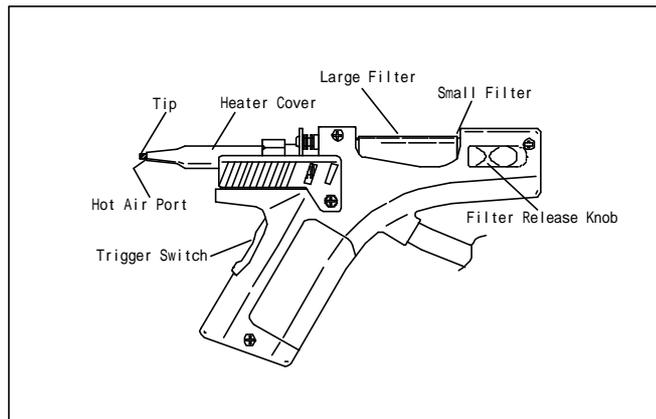
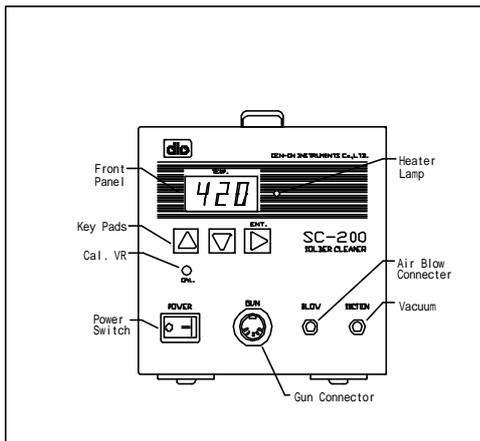
The Suction Pad is of rubber. When the rubber is injured or slackened, replace it.

# Trouble Shooting

The trouble shooting diagram below is an index so that you can quickly identify the cause of problem and restore the equipment to normal operation. If the problem cannot be solved please contact DENON directly or the service agent for further technical information on the repairs.



# SMT Solder Cleaner - SC-200 (Internal Pump) & SC-300(Shop Air)



1. By giving the heating element 120 watts of power, this solder cleaner has the power to keep the tip at or near the set temperature during the heaviest SMT continuous cleaning. The higher power and better recovery result in two significant benefits. First, there is much less clogging than with standard desoldering units. Second, there is no need to increase the tip temperature which therefore results in longer tip life.
2. By adding a hot air blowing feature during the cleaning, they are able to preheat the area to be soldered before the hot tip moves to the solder joints or pads. The hot air also keeps the hot tip from cooling while desoldering since it is not vacuuming cool air. This further prevents the clogging typically found in other desoldering tools.
3. Both the SC-200 & Sc300 systems are equipped to handle N2. The following specifications are for SC-200.

## Main Body

	SC-200
Power	AC100V/ 120V/ 230V
Air Supply	Internal Pump Built In
When using N2	Dia. 6mm Tube
Hor Air or N2	2.0 - 2.5 L/min
Dimensions	130H x 130W x 235D
Weight	5kg
Cord Length	2m

## Gun

Heater	Ceramic Heater
Insulation Resistance	Over 100MΩ at 400Deg.C
Vacuum Power	66.5 KPA
Max. Temperature	450 Degrees C
Dimensions	120 H x 195 W x 28 D
Weight	120g
Cord Length	1m

## Caution

The SD-3000S is manufactured and sold for the purpose of use in the factory and/or laboratory. Since the nozzle is hot, you must not touch it before the nozzle cooling down. And since the removed SMT parts are also hot, you must not touch it before it's cooling down. Even if the stop button is pushed, the machine is still in operation because the activated air pump cools down the nozzle. So do not turn off the power switch while the air pump operating. Otherwise, the machine will be damaged due to the overheating.

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