QUARTZ REFLOW OVEN HOT AIR 06 SDO ONE

Translation of the Original Instruction

Content

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Leaflet

The HotAir06 SDO ONE is a solder oven suitable for lead free solder processes using SMD components.

The oven is working with full convection forced air during the preheat process. After entering the reflow stage powerful quartz heaters are added to speed to solder temperature within a short ramp.

Once the reflow set point is reached the lamp power will be reduced to a minimum. At this point 85% of the heating is performed by forced hot air heater.

This unique feature makes the oven suitable to solder big SMD components and/or components with pads under their casing while using lead free paste.

With good maintenance and proper use the HotAir06 SDO ONE oven will serve your solder needs for a long time with high quality solder results.

Some of the features include:

- Outstanding reflow soldering quality for SMD and hybrid
- Cures SMD adhesive
- Two microprocessor controlled heat zones
- Upon request, we can also supply bigger units and conveyorized units.

Technical Data

Power requirements	200 – 230 VAC. / 50-60Hz
Max. power consumption	3680W
Pre-heat zone	2180W
Reflow zone	1500W
Max. PCB substrate surface	300 x 370mm
Pre-heat time	1 – 999 sec.
Pre-heat temperature	60 -240 °C
Reflow time	1 – 999 sec.
Reflow temperature	100 – 290 °C
Heat up time	approx. 8 minutes
Net weight	+/- 22Kg
Options (not standard)	N2 inert gas connection with flow meter

All specifications are subject to change without notice.

EG-Declaration of Conformity

EG-Konformitätserklärung/Declaration of Conformity

Hersteller / Supplier:	Bungard Elektronik GmbH & Co. KG Rilkestraße 1 51570 Windeck Germany
Bevollmächtigte Person für die Zusammenstellung der technischen Unterlagen: Person in charge	Jürgen Bungard, Geschäftsführer /general director Rilkestraße 1 51570 Windeck Germany
Produkt:	Reflow Ofen HotAir06 SDO ONE

Hiermit erklären wir, dass die oben beschriebenen Maschinen allen einschlägigen Bestimmungen der Maschinenrichtlinie 2006/42/EG entspricht.

Die oben genannte Maschine erfüllt die Anforderungen der nachfolgend genannten Richtlinien und Normen:

We hereby declare that the machines described above complies with all relevant provisions of the Machinery Directive 2006/42/EC.

The above machine meets the requirements of the following guidelines and standards:

- Maschinenrichtlinie 2006/42/EG / Machinery Directive 2006/42/EC
- EMV-Richtlinie 2014/30/EG / EMC Directive 2014/10830EC
- Niederspannungsrichtlinie 2014/35/EG / Low Voltage Directive 2014/35/EC

- DIN EN 60204-1 Sicherheit von Maschinen - Elektrische Ausrüstung von Maschinen - Teil 1: Allgemeine Anforderungen / Safety of machinery - Electrical equipment of machines - Part 1: General requirements
- DIN EN ISO 14121-1 Sicherheit von Maschinen - Risikobeurteilung - Teil 1: Leitsätze / Safety of machinery - Risk assessment - Part 1: Principles
- DIN EN ISO 12100-1 Sicherheit von Maschinen - Allgemeine Gestaltungsleitsätze, Risikobeurteilung und Risikominderung / Safety of machinery - Basic concepts, risk assessment and risk reduction
- DIN EN 55014-1 2012-05 Elektromagnetische Verträglichkeit, Anforderungen an Haushaltsgeräte, Elektrowerkzeuge und ähnliche Elektrogeräte, Teil 1: Störaussendung / Electromagnetic compatibility Requirements for household appliances, electric tools and similar electrical appliances Part 1: Emission
- DIN EN 55014-2-2009-06 Elektromagnetische Verträglichkeit - Anforderungen an Haushaltgeräte, Elektro-werkzeuge und ähnliche Geräte - Teil 2: Störfestigkeit - / Electromagnetic compatibility - Requirements for household appliances, electric tools and similar apparatus - Part 2: Immunity
- Niederspannungsrichtlinie / Low Voltage Directive 2014/35/EG
- Maschinenrichtlinie / Machinery Directive 2006/42/EG/37/EG

Windeck, 10.1.2019

Jürgen Bungard Geschäftsführer

Intended Use of Machine

The HotAir06 SDO ONE is a solder oven for SMD component with the use of lead free paste.

All other applications require our written consent or happen on full risk of the user.

The Bungard GmbH & Co. KG accepts no liability for damages incurred in non-authorised use or application of the machine.

Safety Instructions

IMPORTANT SAFETY RULES FORCED AIR CONVECTION OVEN

General

Please read the following instructions carefully and pay particular attention to information on operating safety and set up.

Keep these instructions at a safe place. It contains information which also refer for later maintenance and cleaning.

The machines are not designed to be embedded or interconnected with other machines or systems. They may only be used in specially equipped rooms and be operated only by qualified staff (knowledge in soldering recommended). Children and pets are to be kept away!

Place of installation

The oven is developed to install it free standing on a flat, dry surface. This surface or table must be capable to carry a weight of at least 30 Kg. The oven should be used at normal room temperatures (around 15 to 25 degrees. Do not install the oven in a closed cupboard or box (danger of fire). Do not install the oven near a heating element or stove, or in a wet environment. Do not place the unit near heat sources such as radiators, hot air ducts, furnace and the like.

Electricity

The machine is made from certified parts according to standard practice for electrical safety. This does not relieve the user of his duty of care when handling electrically powered devices.

The main switch disconnects the machine from the power supply. We presuppose that the safety fuses of the circuit and the residual current circuit are provided by the building's power supply (fuse 16A).

This oven must have a dedicated power outlet which may only be used by this oven.

High voltage - ONLY QUALIFIED PERSONS MAY OPEN THE CASING:

Don’t put the plug and the line cord into any kind of liquid. Avoid situations that liquids or other materials entering the oven through door latching or ventilation grate.

In the case this is happening:

Switch off the oven immediately and, pull the plug from the wall socket.

Be sure the line cord is not making a sharp hook or is hanging on sharp things. Avoid line cord to be in contact with warm or hot surfaces. In case of damage only qualified persons may replace the line cord.

After completion of work, the main switch should always be turned off.

Before all maintenance work on the machine (cleaning, etc.) turn off machine and pull the plug. Inside the machine are high voltages which can be lead to death or serious injuries.

Pay attention to the warning signs on the machine. If you are not going to use the unit for some time, remove the plug from the socket.

Risk of fire and burning:

When the oven is in production mode it is dangerous to leave the oven unattended, high temperature and long producing times can cause to overheat the oven (risk of fire!). When you place in - or take out – a PCB when oven is at working temperature, use protective gloves or a heat resistant

tool. We recommend the use of our PCB carrier 625 to handle the placement an removal of the PCB.

When the oven produces too much smoke, pull the plug and close the door. This will extinct the flames.

Do not put any flammable materials near or on the reflow–oven, don't block the ventilation grate.

Don't touch the cover of the oven, it can be hot. **You risk serious burning of your skin**.

Exhaust

Use the oven only in well ventilated rooms. Follow the safety rules of your paste supplier. During the soldering process gas and heat may be emissioned. The gases can be affect your health.

We recommend our extraction hood and fume extractor options!

Normal use:

The oven is developed only for soldering of PCBs , don't use the oven for food, animals or heating of other materials. You will lose warranty if you don't commit to those rules.

Don't use the oven when it's damaged or not working properly.

Check the properly working of the oven by following the checklist below:

1. Check the door. The door must not be bent or damaged. After firing-up on the oven check the closing mechanism by opening and closing door. The oven must respond to it. If not **DON'T USE THE OVEN** but contact your dealer. Don't use the oven when there is a piece of material between the door latch and ceiling's. When the door or ceilings are damaged it's dangerous to use the oven
2. Check the hinge and safety door handles. Don't use the oven if they are broken or loose.
3. Check the door sealing. Are they are not damaged?
4. Check if there are no dents in the oven space
5. Check the line cord, plug and outlet. Be sure they are not damaged.

Clean the oven frequently, residues in the oven may cause fire or other dangerous situations.

Maintenance

The unit should only be maintained and repaired only by qualified personnel. Never try to do more in the way of maintenance to your unit than the operating instructions allow. Beyond that, always consult an expert for repair work.

Setup

Take over from the transport agent

After receiving and unpacking, check the machine for possible transport damages. In case of transport damage, please inform your insurance, the transport company and the manufacturer / supplier.

Place of installation

The oven must be standing level and there must be sufficient room to the machine for operation and maintenance (approx 1m on all sides). When setting up the machine all safety regulations and other local regulations are to be observed.

The oven should be installed on a good accessible table. The surface must be flat and heat resistant and able to support a load of 30kg.

Inside the box you will find:

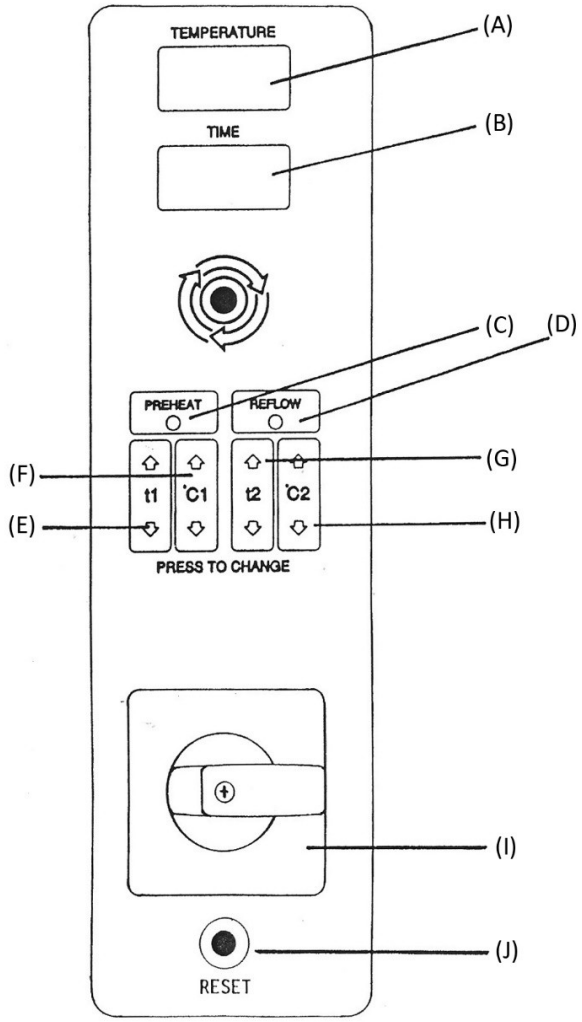
One spare quartz lamp	One tube XADO lubricant
This manual	The oven

Connections

Finally connect the machine to the mains (220V / 50Hz). Do not use the building socket for other electrical devices! The building supply line must be protected by a 16 amp fuse. The machine itself has an automatic 15 A fuse.

Composition

Descriptions of function switches:



(A) Temperature display: Depending on the cycle, the preheat or reflow temperature is displayed. The decimal point on the far right shows the status of the hot air heating. If the point lights on, heating is powered and the temperature rises. The decimal point one digit to the left has the same function for the quartz heating.

(B) Time display: Depending of the cycle you will see the actual preheat or reflow time left. When the oven is in stand by position, you will see the set preheat time.

(C) and (D) Status LED: Depending on the status the LEDs show a different behaviour.

a. Both LED's are blinking in Red and Green. This will be the situation when the oven is heating up or cool down and means the oven is not ready.

b. Both LED's are steady Green. The oven is ready to solder with.

c. LED C is blinking and LED D is steady Green. You have started a solder cycle and the oven is busy with preheating. You will see that the time bar is counting down and shows the seconds left for reflow.

d. LED C is steady Red and LED D is blinking. The reflow process is running and you will see the quartz lamps are turned on. Both decimal points at the temperature display will be on and temperature is rising fast.

c. Both LED's are steady Green. You will also hear an acoustic signal and the temperature and time bar shows the message "oPn dOr". The solder cycle is completed and you are asked to open the drawer.

WARNING! Use protective gloves or a heat resistant tool to remove the PCB.

(E) Rocker switch to set the preheat time between 1 and 999 seconds.

(F) Rocker switch to set the preheat set point temperature between 60 and 240 °C.

(G) Rocker switch to set the reflow time between 1 and 999 seconds.

(H) Rocker switch to set the reflow set point temperature between 100 and 290 °C.

LED C and LED D are blinking in opposite colours. An error has occurred. An Error code will be shown in the display. See at Cleaning and Maintenance for more information.

(I) Main switch

(J) The reset button. Initiates a "hard reboot" of the microcontroller. The machine behaves as if the main switch is switched off and on again. Sometimes the program will be confused by user input, e.g. When the drawer is opened during the soldering process.

Operating

Soldering your first PCB

We assume, the oven is set up at its final destination and connected. Make sure the door is closed. Turn on the main switch. The oven will now start heating up to the preheat set point. To speed up this heating process both heaters are used. Both LED's (C-D) are blinking alternating green and red during this stage. In the time panel you will see the preheat time. It will be stable in this stage. In the temperature panel you can see how the temperature is rising to the preheat set point. During the heat-up time you can edit the temperature and time settings of both zones. In that case the heat up process is interrupted and continued after editing is finished. If the set point temperature is reached the quartz heater will turn off. This can cause the temperature to drop. When the temperature drops below a certain point (it depends on the height of the set point) the quartz will be activated again. This cycle is repeated for several times until the preheat temperature is reached and established. When the preheat temperature is reached at a stable level, the LED's (C-D) will stop blinking, accompanied by an acoustic signal. The oven is now ready for soldering PCB boards with SMD components.

REMARK. When the oven is ready for use and is not used for a period of 30 minutes it will shut down automatically. This will also happen if the drawer is opened to start a solder job and not closed within 2 minutes. When this happens, simply push at the "Reset" button **J** to restart the oven. The same cycle now is started as if you turn main switch off and on again.


Solder paste and PCB contain materials which can release gas and smoke when heated. Especially the gases and smoke from the solder paste can affect your health! Therefore arrange enough room ventilation. We recommend the use of our "Extraction hood" combined with our fume extractor FE-400I which is capable to suck off the gases and smoke fast enough.

When the oven is ready to solder and you've set all the parameters in the right manner you can start to solder.


Open the drawer and carefully place your PCB on the middle of the rooster. This should preferable be done within two minutes. If the drawer is not closed within two minutes, the oven will switch off automatically!
WARNING! Use protective gloves or a heat resistant tool to place the PCB in position.

Close the drawer. As you can see the temperature has dropped a few degrees, that's normal.

The pre heating cycle is started after closing the drawer. On the time display you will see the time decreasing. The temperature display is showing the actual temperature.

When the timer is reaching zero the reflow stage is automatically started. The quartz lamps are turned on for 100% and the temperature display shows a rapidly rising temperature. The time display is decreasing in seconds. When the reflow set point is reached you will see that the quartz lamp are no longer at 100% power but about 15%. This means that the main part of soldering is caused by forced hot air which makes the machine unique in its class.


When the time is reaching zero the solder cycle is ended and the oven gives an acoustic signal. On the display the message: "oPn dOr" appears. To avoid burning of your PCB, take out the PCB immediately! Open the drawer to maximum, so PCB and oven can cool down.

WARNING. The air coming out of the oven is **VERY HOT**. You can easily burn your skin seriously! **KEEP DISTANCE!**

When the oven is near preheat set point you can remove your PCB from the oven and deposit it on a heat resistant surface.

WARNING! Use protective gloves or a heat resistant tool to remove the PCB from the drawer!

The oven will cool down to a much lower temperature as the preheat set point, that's normal. How much depends of the preheat- and reflow-setpoints. At a certain point the oven demands that you

close the drawer (CLS DOr). After you've done this you will see that the temperature is rising to the set preheating temperature. When preheat temperature is reached the oven will beep and the status LED's will burn steady.

Congratulations! You just finished soldering you first PCB! You now can restart the cycle from point 1.

Changing the soldering parameters.

If you are an experience operator you know that soldering is more than just heating your product until the paste is melting. For the rather inexperienced users we recommend to read about soldering as much as you can. Ask your paste supplier for advice because the paste together with the SMD components demand the solder heating curve and timing.

To create a good solder curve you have to set the temperatures and times from both the preheating and the reflow process. This can be done with the push buttons E-F for preheating and G-H for reflow parameters. Editing the value during a soldering cycle isn't possible. You can interrupt the soldering process by opening the drawer. This will terminated the solder process!

The gap between preheat and reflow temperature cannot be set at less than 40°C. The min. preheat set point value is 60 °C with and max. 240 °C. The timing reaches from 1 to 999 seconds.

For the reflow temperature this limits are between 100 °C and 290 °C. The time also reaches from 1 to 999 seconds.

Not all possible settings will give reasonable results. Your board will be either too cold or burned, if you use extreme settings.

There is no standard setting available, because settings depend on both solder paste and components. As mentioned before: ask your solder paste supplier about best practice.

If you are inexperienced and you will solder a PCB with lead free solder paste use these settings to start from:

Use a solder paste with a melt point of 217 °C.

Pre-heat time: 300 sec. and Pre-temperature: 180 °C.

Reflow time: 70 sec. and Reflow temperature: 230 °C.

Remember! Those settings do not guarantee good results but a guideline!

Cleaning and Maintenance

Error codes:

LED C and LED D are blinking in opposite colours. An error has occurred. An Error code will be shown in the display. Please contact your supplier and report the error code.

Err 1 = E2Prom write error

Err 2 = Error in Reflow unit, mostly one of the lamps is broken

Err 3 = Error in Preheater unit.

Err 4 = Unone thermocouple error

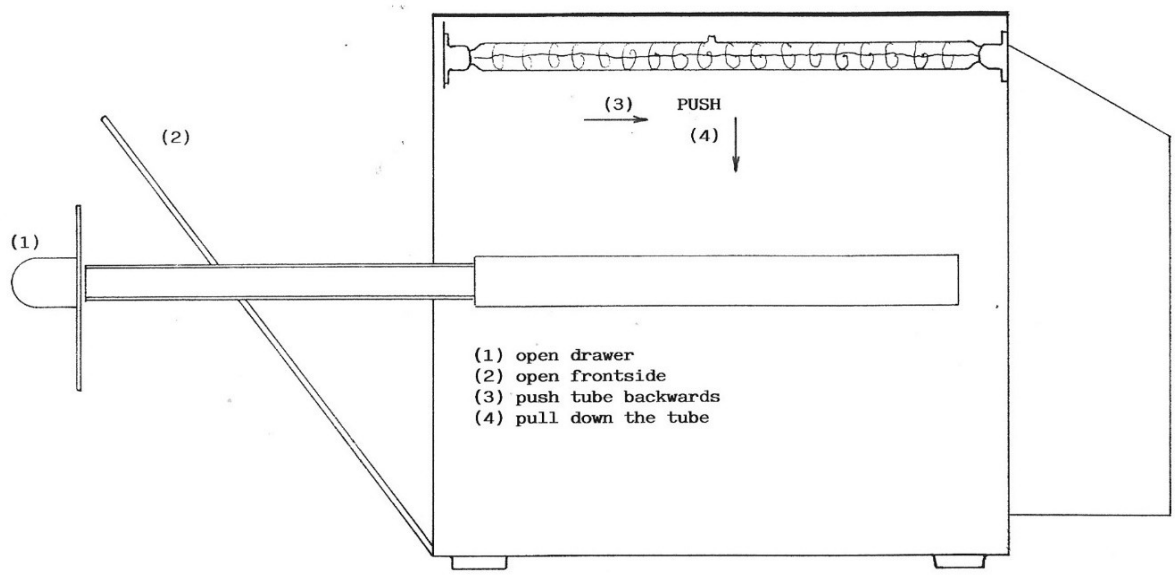
Err 5 = Thermocouple connected to VCC

Err 6 = Thermocouple connected GND

Err 7 = Thermocouple not connected or broken

Changing quartz lamps

The lifetime of quartz lamps is limited. After +/- 1000 hours lamps need to be replaced. Ask your dealer for new lamps. Changing the lamps is not problematic. Remove the two screws at the top of the door. Now open the door and replace the lamps. (See the sketch below.)



Lubricating drawer slides

Enclosed in the package there was a small tube of XADO. This is a special heat resistant lubricant. Apply it on the bars with a narrow tassel. Open and close the drawer a few times. Now you need to "burn in" this lubricant. It will give a lot of smoke. Therefore you need to do this procedure in a well ventilated area. Apply a normal solder cycle several times.

Spare Parts and Options

Inert gas extension (Optional)

ATTENTION! Provide adequate ventilation or use a protective mask. Make sure that the gas used is non-toxic and non-explosive when heated !

Inert gas is used to prevent oxidation of the solder paste during soldering. With this extension it is possible to use an inert gas such as NO2.

We recommend the use of NO2. If you want to use another gas, make sure that the gas used is non-toxic and non-explosive when heated !! The use of our "suction hood" is strongly recommended so that only a minimum of gas escapes into the room. Even when using the hood make sure there is a good room ventilation to avoid damage to health.

Do not use more gas than the process needs!

The flow meter on the oven has a scale for air or nitrogen. If you are using other gases, then the scale shows only a gas flow, but you can not measure exact quantities.

Due to the construction of the oven, you can not perform a 100% inert process because a little air will always enter into the process chamber. We recommend a gas flow between 100-400 l / h at a pressure of 2 to 4 bar use. The flow meter is limited to 500 l / h.

The inert gas is heated before it flows into the process chamber and will not disturb the temperature profile.

Guarantee

All machines are submitted before distribution to examination on function and continuous operation firmness. On the machine we grant a work warranty of 12 months to our customers starting from purchase date on accuracy in material and processing. We warrant at our choice by exchange of incorrect parts or by repair of the machine in our house. Old parts change into our possession.

Disclaimer of Warranty

Bungard GmbH & Co. KG reserves the right to change or enhance its machines or machine specifications according to its judgement, if necessary. Bungard cannot be held responsible to implement aforesaid changes into machines sold already.

Bungard products and services are liable to the current prices and conditions, which are subject to change.

The instructions and definitions in this document are also subject to change and mark no assurance on the part of Bungard.

This manual contains informations of the Bungard HotAir06 SDO ONE and is the translated English version.

Please regard the “Sales terms and delivery conditions”. These are available after fulfilment of the contract. We don't furnish a guarantee or warranty in cause of damages at material or hurts of people because of

Incorrect use of the machine

Wrong setup, installing and operating of the machine or incapable service

Use of the machine with defective safety equipment

Non-observance of the service manual in regard to transport, stocking, setup, installation and service of the machine

Unlicensed modifications at the machine

Incorrect or incomplete repairs

Destructive force effect at the machine in cause of foreign objects or external use of force

Use of non-original spare parts

normal wear parts.

We cannot accept subsequent claims from damage or destruction of work pieces worked on in the machine, because we have no knowledge or control over the operating conditions at your site. This is valid in a general manner also for requirements from damage to articles, buildings and persons as well as the environment.

We do not warrant that the function of the machine will meet the customer's requirements or that the operation of the machine will to this regard be error free.

In no event will we be liable to the customer for any incidental, consequential, or indirect damages of any kind, including loss of profit and prosecution for environmental pollution, even if we could have been aware of the possibility of such damages.

All information was arranged with great care. We reserve ourselves however mistake and technical changes without previous announcement.

Running the machine in corroding, humid, dusty, extremely hot or explosive atmosphere happens at the operator's own risk and responsibility.

We explicitly exclude any warranty for damages resulting from running the machine in in corroding, humid, dusty, extremely hot or explosive atmosphere.

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