MACHINE SOLUTIONS INC.

USER MANUAL

BEAHM DESIGNS

Balloon Bonder 520-B Model

BEAHM DESIGNS

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Original Instructions

Overview

The Beahm Designs Inc. Model 520-B CE Split Die Balloon Bonder is a system for the purpose of thermal bonding or welding thermoplastic components to other materials by means of a pair of heated dies while providing protection of the balloon or region of the materials from the process heat by means of a cooling chamber. The system features two die heads that remain at a constant process temperature vs. cycling the heat on and off. Each die head features one half of the bond diameter and are “opened” or separated from each other to allow the components to be positioned within the bored diameter. Digital timers control the bond and cool durations and integrated tooling secure the components during the process.

Contents

Included with the system are the following contents:

- Die Base and Control Unit
- IEC Power Cord

Installation

Note: See Maintenance section for facilities requirements

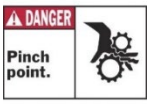
- Place the system on a level, sturdy surface at an ergonomically viable height for the user
- Connect the electrical umbilical to the die base unit.
- Connect the power cord to the main control unit.
- Connect the air supply to the system and then to a clean, dry, and filtered compressed air source.

Safety

- Use of eye protection when working with compressed gases and heated materials is advised.
- The maximum observed Sound Pressure Level is below 70 dB(A).

Caution: high voltage. Remove power and use safety precautions when servicing.

Caution: hot surface. Contact may cause burn. Allow to cool before servicing.



Caution: pinch point. Keep hands and body parts clear while in operation.

User Alerts

Do not to use the equipment other than as prescribed. Examples: Do not attempt to sit on or climb on the equipment, do not place heavy objects or containers of liquid on the machine, do not to insert any foreign objects into the machine and do not attempt to bypass any guards or otherwise operate the machine in any manner other than that in which it is explicitly intended.

This equipment is not for use with materials that can decompose or ignite below the maximum operating temperature of the machine. Hazards are materials that outgas hazardous substances and or ignite. This equipment is not for use in an ATEX environment.

Installation

Note: The equipment is not for use with materials that can decompose or ignite below the maximum operating temperature of the machine. Hazards are materials that outgas hazardous substances and or ignite. (260°C/500°F)

Note: This equipment is not for use in an ATEX environment.

Set Up and Configuration

Proper alignment of the tooling is crucial to optimizing process results and repeatability. The following guidelines are the recommended methods however all applications vary, and several iterations of tooling process development may be required and may not follow all of the recommended guidelines.

Grip/Positioning Nests

This is the most forgiving of the tooling. The included, standard vee configurations are more than adequate for most applications. More important than the guide design and dimensions is alignment with the die heads. Refer to the maintenance section for the alignment procedure. Customized nests and tooling are available. Contact Beahm Designs' sales to review the application and request a quote.

System Options

Many optional accessories are available to enhance the functionality of the system and improve process yield. Contact Beahm Designs' sales department or visit our web site

www.machinesolutions.com for more information on available accessories and to request a quote. Examples of available accessories are:
-Vision systems with or without on-screen crosshair line generators.
-Laser line generators.
-Extended product support trays/guides.
-Product grip nests/alignment tooling.

Installation instructions are included with each specific accessory.

Controls and Features

Located on the front and rear panels are the following controls and/or displays and their function.

Description	Function
Main power switch	Toggles system power and air on and off.
AC power on indicator	Indicates when system AC power on by illuminating, off when not illuminated.
Start switch	Initiates process sequence.
Stop/Abort	Interrupts the process sequence and resets the system timer.
Reset switch	Resets the system after power up and if E Stop is depressed
Front Die temperature controller	Controls the temperature of the front die head.
Rear Die temperature controller	Controls the temperature of the rear die head.
Weld Duration Timer	Controls the duration that the die heads are closed and/or in contact with the product.
Cool Duration Timer	Controls the duration the cooling air flows.
E Stop	Disrupts power to heaters and internal components.
Die temperature ready indicator	Indicates when the set temperature of the dies is reached, and a process can be initiated.
Gripper and shield toggles	Toggles the gripper and cooling shield assembly open/close.

Table 1: Controls and Features

Parameter Settings

Setting temperature

- Depress and hold the up or down arrow key of the temperature controller to scroll to the desired temperature. After 2 seconds the new value will be accepted, and the temperature will ramp to the new set point.

Setting heat duration

- Depress the upper or lower half of the corresponding time digit to change its value.

- Depress the STOP/ABORT switch to reset the timer to the new value.

Setting Cool duration

- Depress the upper or lower half of the corresponding time digit to change its value.
- Depress the STOP/RESET switch to reset the timer to the new value.

Adjusting Die Head Pressure

- Remove top plate on the control unit and rotate the **R1** regulator screw clockwise or counterclockwise until the pressure gauge displays the desired value.

System Operation

1. Position the components to be processed such that the balloon or region to be cooled during the process is within the cooling chamber.
2. Position the bond region outside of the shield assembly and in-line with the die heads.
3. Toggle (close) the gripper and shield assembly.
4. Depress the start button or foot switch to initiate the process sequence.
5. Upon completion of the cooling cycle, toggle (open) the gripper and shield assembly and remove the materials.

Maintenance

Caution: pinch point/crush hazard. Keep fingers, hands, and clothing clear of moving parts.

1. Use 99% isopropyl alcohol to wipe down the outside of the machine. Do not attempt to clean the inside of the machine. Machine should not be washed down.
2. Cleaning should be with a soft dry cloth only.

Warning

Note: Ensure the machine is unplugged for any servicing or maintenance work.

Note: Perform these steps ONLY when the machine is at room temperature.

Exchanging Die Heads

Note: Perform these steps ONLY when the die heads are at room temperature.

1. Remove both guards from the top of the remote assembly.
2. Unscrew set screws holding in thermocouples to the dies a few turns and remove thermocouples. Take care to not fully remove the set screws.
3. Remove the fasteners of each die head and remove the die heads.
4. Position the replacement die heads on the die bases.
5. Re-install the fasteners at the base of each die head, DO NOT tighten the fasteners.
6. Manually close the die heads and ensure that they are aligned left-to-right and, while holding the heads together, tighten the fasteners.

7. Re-install both guards to the top of the remote assembly.
8. Verify alignment.

Aligning Tooling

Note: Alignment should be performed on a prepared product subassembly.
Alignment MUST be performed with system power off and dies at ambient temperature.
Alignment must be performed on a flat and reasonably level surface.

1. Prepare a product/materials assembly.
2. Position the assembly within the vee guide and shield assembly.
3. Remove the guards from the top of the remote assembly.
4. Close the die around the material subassembly.
5. Using the adjustment screw of the positioning stage adjust the Z-axis of the vee guide assembly until the material assembly is aligned with the die head bore.
6. Adjust the Z-axis and Y-axis of the shield assembly until it is aligned with the die head bore.
7. Open the dies and remove the product/material subassembly.
8. Replace the guards on the remote assembly.

System Specifications

Description	Range	Resolution	Accuracy
Temperature Controller	Ambient-500°F	1.0 deg.	±.25% F.S.
Die Temperature	Ambient-500°F	N/A	±10°F
Heat Duration	1-9999 seconds	1.0 sec	± .1 sec
Cool Duration	1-9999 seconds	1.0 sec	± .1 sec
Die Pressure	0-60 psi	2.0 psi	± 1.5% F.S.

Table 2: System Specifications

Machine Specifications

Line Voltage	120/240 VAC (depends on configuration) 50/60 Hz. 500 watt max.
Operating environment	• 60 – 75°F (15 - 24°C) • 0 – 85% relative humidity, noncondensing
Storage temperature	32 – 120°F (0 – 48°C)
Approximate machine weight	50 lbs.
Approximate machine dimensions: Control Unit	Height: 7 in. Width: 22.5 in. Depth: 14 in.

Approximate machine dimensions: Die Base	Height: 6 in. Width: 9.5 in. Depth: 11 in.

Table 3: Machine Specifications

Calibration

IMPORTANT NOTES:

A) It is recommended that calibration be performed by a certified service, preferably with the system in the location of use. Calibration procedures are the domain of these service providers.

B) Calibration refers to the process of verifying that each of the systems' instruments that control a process parameter is within manufacturers' specification.

C) Calibration DOES NOT refer to the process of measuring the temperature at the center of the tooling and "matching" the value to the temperature controller set point.

D) The measured value at the tooling may not match the temperature controller set point and the.

1. Calibrate the temperature controller annually.
2. Calibrate the timers annually.
3. Calibrate the pressure gauge annually.

Tuning Temperature Controllers (OMRON Model E5GCQX1DCM000)

Note: Auto tuning can be performed at any temperature set point within the system operating specifications however best results are attained at temperatures about 300 Deg. F

1. Depress the "SQUARE" button once.
2. Depress the "CIRCLE" button once.
3. Depress the "UP" arrow button once.
4. Depress the "SQUARE" button once.
5. The system will resume standard operation automatically upon completion of tune sequence. No further action is required. If fluctuation persists, contact technical support.

Critical Spare Parts

(Contact Beahm Designs for current Price and delivery)

Part Number	Description
130118-001	VALVE, TOGGLE, 4WAY, 2 POSITION
1343250-001	VALVE, 2-WAY 24 VCD, MAC
1339452-001	VALVE, 5-2, 24VDC, BODY PORTED, SIDE BRACKET
1143311-001	RELAY, SOLID STATE, DIN MOUNT 25A DC/AC
1143303-001	TIMER, DIGITAL, LT4H, 24 VDC, COLOR LCD, 8 MODES

1143287-001	RELAY, 4VDC INTEGRATED
1143288-001	RELAY, MODULE THIN, 6mm WIDE, 24V
110114-002	CONTROLLER, TEMPERATURE, 1/32 DIN, 24 VDC
1144537-001	HEATER, CARTRIDGE, 120VAC, 1.5IN, 100W (configuration specific)
1143132-001	HEATER, CARTRIDGE, 220VAC, 1.5IN, 100W (configuration specific)
110295-001	FAN, 40MM, 24 VDC

Table 4: Critical Spare Parts with descriptions

Diagnostics (Troubleshooting)

Issue	Possible Causes	Solution
Temperature not stable	Die heads replaced. Thermocouple loose	Auto-tune Re-install thermocouple(s)
Die heads do not close	Air pressure too low Timer set to "0" Valve defective	Increase air pressure Increase Heat Duration Replace valve
Die head(s) do not heat	Loose connection to main control unit. Defective Temperature controller.	Verify secure connections Replace temperature controller.
.Err code in display	Temperature controller software failure.	Replace temperature controller.
System will not power on.	Emergency stop switch depressed. IEC power cord not fully connected.	Rotate switch knob to engage. Verify installation.

Table 5: Diagnostics and Trouble Shooting

Facilities Requirements

- Voltage: 120/240 VAC (depends on configuration) 50/60 Hz.
- Wattage: 500 max.
- Compressed Air: 60-125 psi, 0.5 SCFM, filtered 50 micron or greater, oil and water free.

Warranty

Beahm Designs Inc. (BDI) products are backed by a 1 year warranty on parts and labor. Warranty is void for any Product returned if BDI determines that:

1. The asserted defect is not present,
2. The asserted defect is attributable to misuse, improper installation, alteration (including removing or obliterating labels and opening or removing external covers (unless authorized to

do so by Beahm Designs), accident or mishandling while in the possession of someone other than Beahm Designs, Inc.

3. The Product was not sold to you as new.

Return Material Authorization (RMA)

No Product may be returned directly BDI without first contacting BDI for a Return Material Authorization ("RMA") number. If it is determined that the Product may be defective, you will be given an RMA number and instructions for Product return. End Users are required to include a copy of the RMA receipt inside the return box to receive replacement product under warranty. An unauthorized return, i.e., one for which an RMA number has not been issued, will be returned to you at your expense. To request an RMA, please call 928-556-3109 or email info@machinesolutions.com

For additional information on Beahm Designs, Balloon Bonder, please visit http://machinesolutions.com/our-products/