

# MACHINE SOLUTIONS INC.



USER MANUAL

## BEAHM DESIGNS *Balloon Bonder 420-B Model*



**BEAHM**  
DESIGNS

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## Equipment User Manual

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### Welcome

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Machine Solutions, Inc. (MSI) would like to take this opportunity to thank you for purchasing your new 420-B Balloon Bonder machine. At MSI, we are dedicated to bringing innovative process development solutions to both medical device and nonmedical organizations. The MSI proprietary segmental technology has been successfully implemented in manufacturing clean rooms on five continents, and continues to expand – meeting, growing, and facilitating the abilities of device companies around the globe. MSI looks forward to helping your organization provide life-improving devices to your customers, today and tomorrow.

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### Overview

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Thermal Die Bonder with Axial Compression. This system is equipped with dual Pneumatic tubing grips, centerline adjustment, adjustable compression, and variable timed cooling. The 420B provides a low-cost quick tool alternative to RF die bonding. The seven-parameter operation is easy to set-up and use and simplifies system calibration and process validation. This system provides you with fast, highly repeatable bonds. It also allows you to perform highly precise bonds for demanding applications such as short balloon bonds and ultra smooth lap & butt welds. Adjustable clamp pressure varies compression force on joint. Ultra compact design provides you with greater workspace.

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### Contents

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Included with the system are the following contents:

- Axial Compression Thermal Die Bonder
  - IEC Power Cord
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### Installation

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**Note: See Maintenance section for facilities requirements**

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

## Safety

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- 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.**

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## User Alerts

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Do not 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.

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## Installation

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**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)**

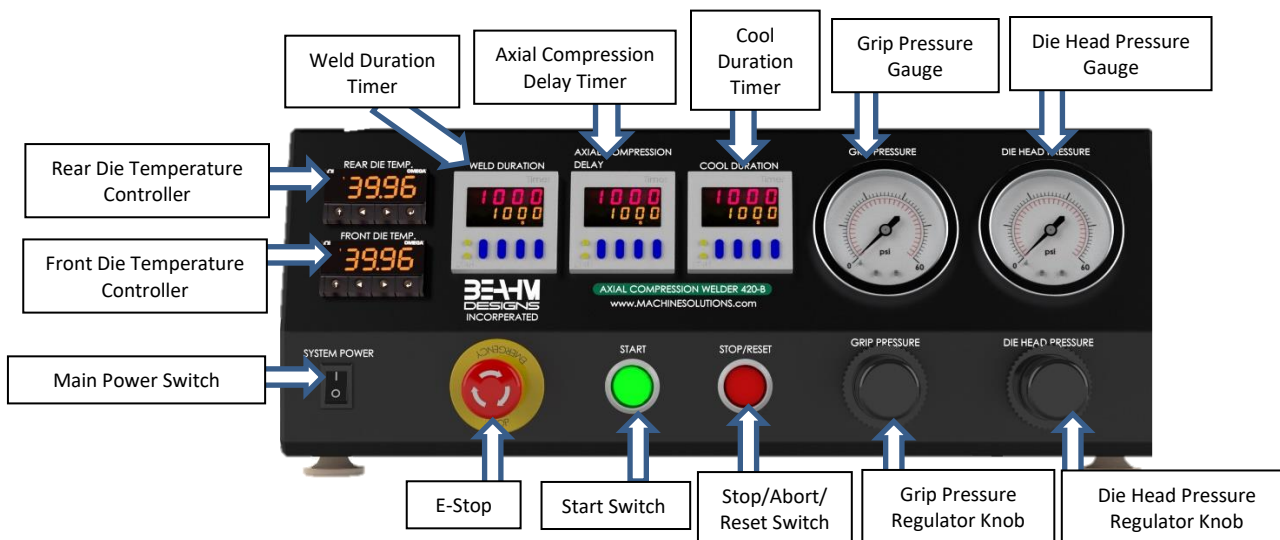
**Note: This equipment is not for use in an ATEX environment.**

### Controls and Features

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

Description	Function
<b>Main power switch</b>	Toggles system power and air on and off.
<b>Start switch</b>	Initiates process sequence.
<b>Stop/Abort/Reset</b>	Interrupts the process sequence and resets the system timer. Resets the system after power up and if E Stop is depressed
<b>Front Die temperature controller</b>	Controls the temperature of the front die head.
<b>Rear Die temperature controller</b>	Controls the temperature of the rear die head.
<b>Axial Compression Delay Timer</b>	Controls compression delay time.
<b>Weld Duration Timer</b>	Controls the duration that the die heads are closed and/or in contact with the product.
<b>Cool Duration Timer</b>	Controls the duration the cooling air flows.
<b>E Stop</b>	Disrupts power to heaters and internal components.

**Table 1. Control and Display Functions**



**Figure 1. 420-B Front Panel**

## Parameter Settings

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### Pressure Regulator Setting

- Rotate the regulator knob clockwise to increase air pressure, counterclockwise to decrease air pressure output to the die head actuation cylinder.

### Process Timer Setting

- Depress the upper half of the blue rocker buttons to increase time duration, depress the lower half of the blue rocker button to decrease the time duration. Depress the timer reset button to accept the new value.

## System Operation

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Hot die jaws will become hot during operation and depending on temperature set-point, can cause **severe** skin burns if contact occurs.

1. Switch main power on.
2. Set the die temperature on EACH temperature controller.
3. Set heat timer to desired duration in seconds.
4. Set Axial Compression Delay Timer to desired duration in seconds.
5. Set Cool Timer to desired duration in seconds.
6. Adjust Die Head pressure.
7. Adjust Tubing Grip Pressure.
8. Position components to be bonded within thermal jaws.
9. Depress footswitch/push start button.
10. Remove components upon completion of cool duration.

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Temperature Controllers (Omega Platinum Model)

Please note, the Omega temperature controllers have been auto tuned and are set for optimal performance. Contact Beahm Designs for further diagnostics and instructions.

PID Configuration (PRoG > PId.S)

	<p>Navigate to the desired setting. Settings include the following:</p> <ul style="list-style-type: none"> <li>• ACtN – Action direction moves up or down to SP1.</li> <li>• A.to – Autotuning Timeout sets a maximum amount of time for Autotuning.</li> <li>• AUto – Initiates Autotuning</li> <li>• GAIN – Select the proportional, integral, and derivative factors for manual tuning.</li> <li>• %Lo – Low clamping limit for Pulse and Analog outputs</li> <li>• %HI – High clamping limit for Pulse and Analog outputs</li> <li>• AdPt – Fuzzy logic adaptive tuning</li> </ul>
	Select the desired parameter.

Action Response (PRoG > PId > ACtN)

	Select the Direction (ACtN) parameter.
	<p>Navigate to the desired setting. Settings include the following:</p> <ul style="list-style-type: none"> <li>• RVRS – “Reverse Action”: Increase to SP1, such as heating (factory default)</li> <li>• dRCt – “Direct Action”: Decrease to SP1, such as cooling</li> <li>• RVRS/dRCt – Increase or Decrease to SP1, such as heating/cooling</li> </ul>
	Select the indicated setting.

Autotune Timeout (PRoG > PId > A.to)

	Select the Autotune Timeout (A.to) parameter.
	Set the amount of time before the Autotune process gives up and times out in Minutes and Seconds (MM.SS). Slowly responding systems should have a longer time-out setting.
	Select the indicated setting.



Autotune (PRoG > PId > TUNE)

↵	Select the Autotune (AUto) command. The unit displays StRt.
↵	Confirm Autotune activation. The unit attempts to optimize the P, I, and d settings by stimulating the system and measuring the response. If the A.to time out period expires before the Autotune operation can complete, the unit displays a failure message E007. If the Autotune operation completes successfully, the unit displays the message “doNE” and the Run mode is switched to IDLE.

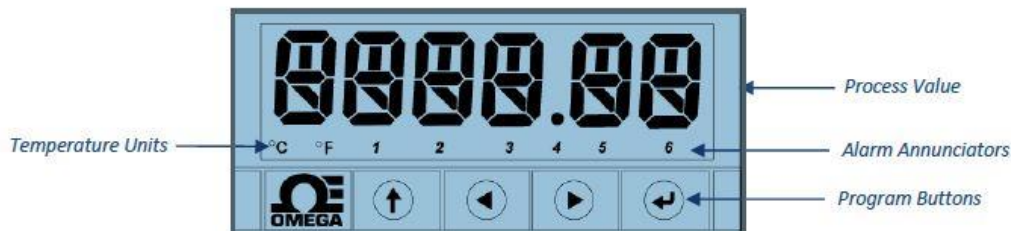
The Autotune function will select the tuning algorithm depending on the stability of current process and the error difference between current process and the Control Setpoint (SP1). If the process is relatively stable (i.e: at room temperature), a bump test will be performed to determine the plant characteristics.

If the process is hot, or if the process is within 10% of Control Setpoint, limit cycle oscillation will be performed with the tuning setpoint taken at the process value when the Autotune function is triggered. Autotuning may be performed as many times as needed or when the operating conditions (i.e: process load, or setpoint) have changed significantly. To obtain good tuning results, ensure the process is stable prior to triggering autotune function. The process is stable when it is at ambient temperature, or it is tracking Control Setpoint (SP1) in auto mode.

Adjusting Temperature on Controllers (Omega Platinum Model)

1. Press the right arrow button one time until “SP-1” is displayed. ▶
2. Press the enter button to access the temperature screen. ↵
3. Use the left and right arrow buttons to set desired temperature. ◀▶
4. Once the desired temperature is set, press the enter button to return to the main screen. Heaters ↵ ramp to correct temperature.





Temperature Controller Layout and Description of Button Actions



**Figure 2. Controller Layout**

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-  The UP button moves up a level in the menu structure. Pressing and holding the UP button navigates to the top level of any menu (**oPER**, **PRoG**, or **INIt**). This can be useful if you get lost in the menu structure.
-  The LEFT button moves across a set of menu choices at a given level (up in the Section 4 menu structure tables). When changing numerical settings, press the LEFT button to make the next digit (one digit to the left) active.
-  The RIGHT button moves across a set of menu choices at a given level (down in the Section 4 menu structure tables). The RIGHT button also scrolls numerical values up with overflow to 0 for the flashing digit selected.
-  The ENTER button selects a menu item and goes down a level, or it enters a numerical value or parameter choice.

**Figure 3. Description of Button Actions**

**NOTE:** For a more detailed look at the complete menu structure, please refer to the following pages. A full description of features can be found here:  
<https://assets.omega.com/manuals/M5451.pdf>.

### Resetting the temperature controller

**NOTE:** Press '↑' to select the operator menu (Oper)

**NOTE:** See the following chart for the correct settings for the Beahm 420B. Settings to change in **RED**.

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1. Initialization Mode Menu (INIt)

a. The following table maps the Initialization Mode (INIt) navigation:

Level 2	Level 3	Level 4	Level 5	Level 6	Level 7	Level 8	Notes
INPt	t.C.	k					Type K thermocouple
		J					Type J thermocouple
		t					Type T thermocouple
		E					Type E thermocouple
		N					Type N thermocouple
		R					Type R thermocouple
		S					Type S thermocouple
		b					Type B thermocouple
		C					Type C thermocouple
	Rtd	N.wIR	3 wl				3-wire RTD
			4 wl				4-wire RTD
			2 wl				2-wire RTD
		A.CRV	385.1				385 calibration curve, 100 Ω
			385.5				385 calibration curve, 500 Ω
			385.t				385 calibration curve, 1000 Ω
			392				392 calibration curve, 100 Ω
			391.6				391.6 calibration curve, 100 Ω
	thRM	2.25k					2250 Ω thermistor
		5k					5000 Ω thermistor
		10k					10,000 Ω thermistor
	PRoC	4-20					Process input range: 4 to 20 mA
			<i>Note: This Manual and Live Scaling submenu is the same for all PRoC ranges.</i>				
		MANL	Rd.1	___			Low display reading
			IN.1	___			Manual input for Rd.1
			Rd.2	___			High display reading
			IN.2	___			Manual input for Rd.2
		LIVE	Rd.1	___			Low display reading
			IN.1	___			Live Rd.1 input, ENTER for current
			Rd.2	___			High display reading
			IN.2	___			Live Rd.2 input, ENTER for current
		0-24					Process input range: 0 to 24 mA
		+10					Process input range: -10 to +10 V
			<i>Note: +- 1.0 and +-0.1 support SNGL, DIFF and RtIO tYPE</i>				
		+1	tYPE	SNGL			Process input range: -1 to +1 V

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Level 2	Level 3	Level 4	Level 5	Level 6	Level 7	Level 8	Notes
				DIFF			Differential between AIN+ and AIN-
				RtLO			Ratiometric between AIN+ and AIN-
		+0.1					Process input range: -0.1 to +0.1 V
			<i>Note: The + 0.05 input supports dIFF and RtIO tYPE</i>				
		+0.05	tYPE	dIFF			Differential between AIN+ and AIN-
				RtLO			Ratiometric between AIN+ and AIN-
							Process input range: -0.05 to +0.05 V
tARE	dSbL						Disable tARE feature
	ENbL						Enable tARE on oPER menu
	RMt						Enable tARE on oPER and Digital Input
LINR	N.PNT	_____					Specifies the number of points to use
			<i>Note: The Manual / Live inputs repeat from 1..10, represented by n</i>				
	MANL	Rd.n	_____				Low display reading
		IN.n	_____				Manual input for Rd.n
	LIVE	Rd.n	_____				Low display reading
		IN.n	_____				Live Rd.n input, ENTER for current
RdG	dEC.P	FFF.F					Reading format -999.9 to +999.9
		FFFF					Reading format -9999 to +9999
		FF.FF					Reading format -99.99 to +99.99
		F.FFF					Reading format -9.999 to +9.999
	°FC	°C					Degrees Celsius annunciator
		°F					Degrees Fahrenheit annunciator
		NoNE					Turns off for non-temperature units
	d.RNd	_____					Display Rounding
	FLtR	8					Readings per displayed value: 8
		16					16
		32					32
		64					64
		128					128
		1					2
		2					3
		4					4
			<i>Note: Four digit displays offer 2 annunciators, Six digit displays offer 6</i>				
	ANN.n	ALM.1					Alarm 1 status mapped to "1"
		ALM.2					Alarm 2 status mapped to "1"
		oUt#					Output state selections by name
	NCLR	GRN					Default display color: Green
		REd					Red

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Level 2	Level 3	Level 4	Level 5	Level 6	Level 7	Level 8	Notes
		AMbR					Amber
	bRGt	HIGH					High display brightness
		MEd					Medium display brightness
		Low					Low display brightness
EctN	5 V						Excitation voltage: 5 V
	10 V						10 V
	12 V						12 V
	24 V						24 V
	0 V						Excitation off
CoMM	USB						Configure the USB port
<i>Note: This PRot submenu is the same for USB, Ethernet, and Serial ports.</i>							
		PRot	oMEG	ModE	CMD		Waits for commands from other end
					CoNt	___	Transmit continuously every ###.# sec
				dAt.F	StAt	No	
						yES	Includes Alarm status bytes
					RdNG	yES	Includes process reading
						No	
					PEAk	No	
						yES	Includes highest process reading
					VALy	No	
						yES	Includes lowest process reading
					UNIT	No	
						yES	Send unit with value (F, C, V, mV, mA)
				_LF_	No		
					yES		Appends line feed after each send
				ECHo	yES		Retransmits received commands
					No		
				SEPR	_CR_		Carriage Return separator in CoNt
					SPCE		Space separator in CoNt Mode
			M.bUS	RtU			Standard Modbus protocol
				ASCI			Omega ASCII protocol
		AddR	___				USB requires Address
	EtHN	PRot					Ethernet port configuration
		AddR	___				Ethernet "Telnet" requires Address
	SER	PRot					Serial port configuration
		C.PAR	bUS.F	232C			Single device Serial Comm Mode
				485			Multiple devices Serial Comm Mode
			bAUd	19.2			Baud rate: 19,200 Bd

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Level 2	Level 3	Level 4	Level 5	Level 6	Level 7	Level 8	Notes
				9600			9,600 Bd
				4800			4,800 Bd
				2400			2,400 Bd
				1200			1,200 Bd
				57.6			57,600 Bd
				115.2			115,200 Bd
			PRty	odd			Odd parity check used
				EVEN			Even parity check used
				NoNE			No parity bit is used
				oFF			Parity bit is fixed as a zero
			dAtA	8bit			8 bit data format
				7bit			7 bit data format
			StoP	1bit			1 stop bit
				2bit			2 stop bits gives a "force 1" parity bit
		AddR	___				Address for 485, placeholder for 232
SFty	PwoN	RSM					RUN on power up if not previously faulted
		wAlt					Power on: oPER Mode, ENTER to run
		RUN					RUN's automatically on power up
	RUN.M	dSbL					ENTER in Stby, PAUS, StoP runs
		ENbL					ENTER in modes above displays RUN
	SP.LM	SP.Lo	___				Low Setpoint limit
		SP.HI	___				High Setpoint limit
	SEN.M						Sensor Monitor
		LPbk	dSbL				Loop break timeout disabled
			ENbL				Loop break timeout value (MM.SS)
		o.CRk	ENbl				Open Input circuit detection enabled
			dSbL				Open Input circuit detection disabled
		E.LAt	ENbl				Latch sensor error enabled
			dSbL				Latch sensor error disabled
	OUT.M						Output Monitor
		oUt1					oUt1 is replaced by output type
			o.brk				Output break detection
				dSbL			Output break detection disabled
				ENbl	P.dEV	___	Output break process deviation
					P.tME	___	Output break time deviation
		oUt2					oUt2 is replaced by output type
		oUt3					oUt3 is replaced by output type
		E.LAt	ENbl				Latch output error enabled

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Level 2	Level 3	Level 4	Level 5	Level 6	Level 7	Level 8	Notes
			dSbL				Latch output error disabled
t.CAL	NoNE						Manual temperature calibration
	1.PNt						Set offset, default = 0
	2.PNt	R.Lo					Set range low point, default = 0
		R.HI					Set range high point, default = 999.9
	ICE.P	ok?					Reset 32°F/0°C reference value
		dSbL					Clears the ICE.P offset value
SAVE	___						Download current settings to USB
LoAd	___						Upload settings from USB stick
VER.N	1.00.0						Displays firmware revision number
VER.U	ok?						ENTER downloads firmware update
F.dFt	ok?						ENTER resets to factory defaults
I.Pwd	No						No required password for INIt Mode
	yES	___					Set password for INIt Mode
P.Pwd	No						No password for PRoG Mode
	yES	___					Set password for PRoG Mode

## 2. Programming Mode Menu (PRoG)

a. The following table maps the Programming Mode (PRoG) navigation:

Level 2	Level 3	Level 4	Level 5	Level 6	Notes
SP1	___				Process goal for PID, default goal for oN.oF
SP2	ASbo				Setpoint 2 value can track SP1, SP2 is an absolute value
	dEVI				SP2 is a deviation value
ALM.1	<i>Note: This submenu is the same for all other Alarm configurations.</i>				
	tyPE	oFF			ALM.1 is not used for display or outputs
		AboV			Alarm: process value above Alarm trigger
		bELo			Alarm: process value below Alarm trigger
		HI.Lo.			Alarm: process value outside Alarm triggers
		bANd			Alarm: process value between Alarm triggers
	Ab.dV	AbSo			Absolute Mode; use ALR.H and ALR.L as triggers
		d.SP1			Deviation Mode; triggers are deviations from SP1
		d.SP2			Deviation Mode; triggers are deviations from SP2
		CN.SP			Tracks the Ramp & Soak instantaneous setpoint
	ALR.H	___			Alarm high parameter for trigger calculations
	ALR.L	___			Alarm low parameter for trigger calculations
	A.CLR	REd			Red display when Alarm is active

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Level 2	Level 3	Level 4	Level 5	Level 6	Notes
		AMbR			Amber display when Alarm is active
		GRN			Green display when Alarm is active
		dEft			Color does not change for Alarm
	HI.HI	oFF			High High / Low Low Alarm Mode turned off
		oN	---		Offset value for active High High / Low Low Mode
	LtCH	No			Alarm does not latch
		yES			Alarm latches until cleared via front panel
		both			Alarm latches, cleared via front panel or digital input
		RMt			Alarm latches until cleared via digital input
	CtCL	N.o.			Output activated with Alarm
		N.C.			Output deactivated with Alarm
	A.P.oN	yES			Alarm active at power on
		No			Alarm inactive at power on
	dE.oN	---			Delay turning off Alarm (sec), default = 1.0
	dE.oF	---			Delay turning off Alarm (sec), default = 0.0
ALM.2					Alarm 2
oUt1					oUt1 is replaced by output type
<i>Note:</i> This submenu is the same for all other outputs.					
	ModE	oFF			Output does nothing
		PId			PID Control Mode
			ActN	RVRS	Reverse acting control (heating)
				dRct	Direct acting control (cooling)
				RV.DR	Reverse/Direct acting control (heating/cooling)
		PId.2			PID 2 Control Mode
			ActN	RVRS	Reverse acting control (heating)
				dRct	Direct acting control (cooling)
				RV.DR	Reverse/Direct acting control (heating/cooling)
		oN.oF	ActN	RVRS	Off when > SP1, on when < SP1
				dRct	Off when < SP1, on when > SP1
			dEAd	---	Deadband value, default = 5
			S.Pnt	SP1	Either Setpoint can be used of on/off, default is SP1
				SP2	Specifying SP2 allows two outputs to be set for heat/cool
	ALM.1				Output is an Alarm using ALM.1 configuration
	ALM.2				Output is an Alarm using ALM.2 configuration
	RtRN	Rd1	---		Process value for oUt1
		oUt1	---		Output value for Rd1
		Rd2	---		Process value for oUt2
		oUt2	---		Output value for Rd2



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Level 2	Level 3	Level 4	Level 5	Level 6	Notes
		RE.oN			Activate during Ramp events
		SE.oN			Activate during Soak events
		SEN.E			Activate if any sensor error is detected
		OPL.E			Activate if any output is open loop
	CyCL	___			PWM pulse width in seconds
	RNGE	0-10			Analog Output Range: 0–10 Volts
		0-5			0–5 Volts
		0-20			0–20 mA
		4-20			4–20 mA
		0-24			0–24 mA
oUt2					oUt2 is replaced by output type
oUt3					oUt3 is replaced by output type (1/8 DIN can have up to 6)
PId	ACTN	RVRS			Increase to SP1 (i.e., heating)
		dRct			Decrease to SP1 (i.e., cooling)
		RV.DR			Increase or Decrease to SP1 (i.e., heating/cooling)
	A.to	___			Set timeout time for autotune
	tUNE	StRt			Initiates autotune after StRt confirmation
	GAIN	_P_	___		Manual Proportional Band setting
		_I_	___		Manual Integral Factor setting
		_d_	___		Manual Derivative Factor setting
	rCg	___			Relative Cool Gain (heating/cooling mode)
	oFst	___			Control Offset
	dEAd	___			Control Dead band/Overlap band (in process unit)
	%Lo	___			Low clamping limit for Pulse, Analog Outputs
	%HI	___			High clamping limit for Pulse, Analog Outputs
	AdPt	ENbL			Enable fuzzy logic adaptive tuning
		dSbL			Disable fuzzy logic adaptive tuning
PId.2	<i>Note:</i> This menu is the same for PID menu.				
RM.SP	oFF				Use SP1, not remote Setpoint
	oN	4–20			Remote analog input sets SP1; range: 4–20 mA
					<i>Note:</i> This submenu is the same for all RM.SP ranges.
		RS.Lo	___		Min Setpoint for scaled range
		IN.Lo	___		Input value for RS.Lo
		RS.HI	___		Max Setpoint for scaled range
		IN.HI	___		Input value for RS.HI
		0–24			0–24 mA
		0–10			0–10 V
		0–1			0–1 V

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Level 2	Level 3	Level 4	Level 5	Level 6	Notes
M.RMP	R.CtL	No			Multi-Ramp/Soak Mode off
		yES			Multi-Ramp/Soak Mode on
		RMt			M.RMP on, start with digital input
	S.PRG	___			Select program (number for M.RMP program), options 1–99
	M.tRk	RAMP			Guaranteed Ramp: soak SP must be reached in ramp time
		SoAk			Guaranteed Soak: soak time always preserved
		CYCL			Guaranteed Cycle: ramp can extend but cycle time can't
			Note: tIM.F does not appear for 6 digit display that use a HH:MM:SS format		
	tIM.F	MM:SS			"Minutes : Seconds" default time format for R/S programs
		HH:MM			"Hours : Minutes" default time format for R/S programs
	E.Act	StOP			Stop running at the end of the program
		HOLd			Continue to hold at the last soak setpoint at program end
		LINK	___		Start the specified ramp & soak program at program end
	N.SEG	___			1 to 8 Ramp/Soak segments (8 each, 16 total)
	S.SEG	___			Select segment number to edit, entry replaces # below
			MRT.#	___	Time for Ramp number, default = 10
			MRE.#	oFF	Ramp events on for this segment
				oN	Ramp events off for this segment
			MSP.#	___	Setpoint value for Soak number
			MSt.#	___	Time for Soak number, default = 10
			MSE.#	oFF	Soak events off for this segment
				oN	Soak events on for this segment















3. Operating Mode Menu (oPER)
  - a. The following table maps the Operating Mode (oPER) navigation:

Level 2	Level 3	Level 4	Notes
RUN			Normal Run Mode, process value displayed, SP1 in optional secondary display
SP1	___		Shortcut to change Setpoint 1, current Setpoint 1 value in main display
SP2	___		Shortcut to change Setpoint 2, current Setpoint 2 value in main display
MANL	M.Cnt	___	Manual Mode, the RIGHT and LEFT buttons control output, displays M##.#
	M.INP	___	Manual Mode, the RIGHT and LEFT buttons simulate the input for testing
PAUS			Pause and hold at current process value, display flashes
StOP			Stop controlling, turn off outputs, process value rotating flash, Alarms remain
L.RSt			Clears any latched Alarms; Alarms menu also allows digital input reset
VALy			Displays the lowest input reading since the VALy was last cleared
PEAk			Displays the highest input reading since the PEAk was last cleared

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Level 2	Level 3	Level 4	Notes
Stby			Standby Mode, outputs, and Alarm conditions disabled, displays Stby
tARE			TARE option - only available if enabled in INPt

### Changing Temperature Units on the Omega Temperature Controller

1. Press the up button  until "oPER" appears on the screen.
2. Press the right arrow  until "1 NI t" appears on the screen. Press enter. 
3. Press the right arrow  until "RdG" appears on the screen. Press enter. 
4. "dEC.P" should be on screen. Press right arrow  to show "°F °C" on the screen. Press enter. 
5. Use arrows   to switch from °C to °F. Press enter. 
6. Press the up arrow  to go back to the "1 NI t" screen. Press the left arrow  to go back to "oPER". Press enter to  see "RUN" and press enter again to  return to normal operating status.

## 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

**Caution:** ensure that the die heads are cooled to within 15 degrees of ambient temperature before proceeding with replacement.

- Loosen the set screw located on the top of each die head and withdraw the thermocouple.
- Remove the four screws at the base of each die head.
- Position new die heads in place of removed die heads, install four screws at the base of each die head. Do not overtighten the screws.
- Install the thermocouple in the rear of each die head and gently tighten the set screw to hold them in place.

## 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

## 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.

## Critical Spare Parts

Part Number	Description
1153590-001	HEATER, CARTRIDGE, 120VAC, 1.5in, 100w (configuration specific)
1157788-001	HEATER, CARTRIDGE, 220VAC, 1.5IN, 100W (configuration specific)
1143133-001	THERMOCOUPLE, K TYPE, 0.125 OD
1153460-001	SOCKET TIMER
1143303-001	TIMER, DIGITAL, LT4H, 24VDC, COLOR LCD, 8 MODES
1161899-001	TEMP CONTROLLER
1143287-001	RELAY, 24VDC INTEGRATED
119106-001	RELAY, MODULE THIN, 24V, DIN RAIL N1PDT
1145619-001	RELAY, 24VDC, INTEGRATED, 4PDT
1343250-001	VALVE, 2-WAY 24 VCD, MAC
1330445-003	VALVE, 5-2, 24VDC, BODY PORTED

Table 3. Critical Spare Parts

## 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 4. Diagnostics (Troubleshooting)

## Facilities Requirements

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- 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.
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## Warranty

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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 to 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](tel:928-556-3109) or email [service@machinesolutions.com](mailto:service@machinesolutions.com)

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