



CAL CONTROLLER OPERATOR'S MANUAL



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INSTRUMENT PANEL FEATURES

Green LED:

Actual Plenum Temperature

Green Display:

Process variable or
Function/Option

Upper Red LED:

Indicates High Temperature
Shut-down limit

Lower Red LED:

Indicates Low Temperature
Shut-down limit



Right Red LED:

Program Holdback indicator

Orange Display:

Plenum Temperature
Set-point

ADJUSTMENTS

To enter or exit **program mode**:

Press ▼▲ together for 3 seconds

To scroll through **functions**:

Press ▼ or ▲

To change **levels** or **options**:

Press and hold * while pressing ▼

To view set-point units

Press *

To increase temperature set-point

Press * ▲ together

To decrease temperature set-point:

Press * ▼ together

To reset latched alarm or tune fail:

Press ▼▲ together briefly

To run or hold a program:

Press * ▼ together for 3 seconds

NOTES: If in difficulty by becoming “lost” in program mode, press ▼ and ▲ together for 3 seconds to return to display mode, check the INSTRUMENT ADJUSTMENTS above and try again.

When in program mode, after 60 seconds of key inactivity the display will revert to either **inPt : nonE** or, if the initial configuration has been completed, the measured value. Any settings already completed will be retained. During Program Configuration it is recommended that this feature is inhibited. Select **ProG StAY** in level 4.

DIAGNOSTICS:

- (-AL-) this indicates both high and low plenum temperature condition that shutdown dryer. Reset dryer safety circuit.
- (iNPT – FaiL) these two words will flash back and forth. This condition is an invalid plenum chamber thermocouple signal back to Cal Controller. Check the thermocouple lead to Cal Controller.
- (dAtA – FaiL) these two words will flash back and forth. This condition is a failure of an internal component on the controller. Controller needs to be replaced.
- (tunE – FaiL) these two words will flash back and forth. The Cal Controller could not complete the auto-tune process. This will only occur when trying to auto-tune. Something happened in the process to make the auto-tuning process to become corrupted. Restart auto-tuning process again to establish good PID numbers to control temperature.

OPERATING INSTRUCTIONS FOR THE CAL CONTROLLER

All parameters for Cal Controller can be changed with power on to dryer. The disconnect must be powered on, so that the digital display on the unit is powered up. The display, in operating mode, shows two numbers. The top number is the actual temperature detected by the dryer sensor. The bottom number shows the current set point temperature. The controller will adjust the proportional valve output to drive the temperature to the set point. The controller has an Auto-tune function to optimize how it adjusts to get to the temperature.

1.0 How to Increase or Decrease Temperature Set-point.

- 1.1 Wait for unit to power up.
- 1.2 Press * and ▼ or ▲ to change the desired set point.

2.0 How to Initiate Auto-tune function.

- 2.1 Power up unit.
- 2.2 Press ▼▲ together for 3 seconds.
- 2.3 Press ▼ or ▲ until the word **TUNE** is displayed.
- 2.4 Press the * and ▼ or ▲ until **At.SP** is displayed.
- 2.5 Press ▼▲ together for 3 seconds.
- 2.6 The Auto-tune sequence begins. During this sequence, **TUNE** will flash on and off. Once auto-tuning is complete, the controller unit will display the actual and set-point temperature.
- 2.7 To abort auto-tune, press ▼▲ together for 3 seconds.
- 2.8 Press ▼ or ▲ until the word **TUNE** is displayed.
- 2.9 Press the * and ▼ or ▲ until **OFF** is displayed.
- 2.10 Press ▼▲ together for 3 seconds.
- 2.11 Auto-tuning is now disabled.

3.0 How to Change a Level

- 3.1 Press ▼▲ together for 3 seconds.
- 3.2 Press ▼ or ▲ separately to page through Parameters.
- 3.3 When **LEVL** is displayed press the * key with ▼ or ▲ to change level.
- 3.4 Press ▼ or ▲ separately to page through the Parameters for that level.

4.0 How to Change Parameter Values

- 4.1 Press ▼▲ together for 3 seconds.
- 4.2 Press ▼ or ▲ separately to page through Parameters.
- 4.3 Press the * key with ▼ or ▲ to change a Parameter Value.
- 4.4 Press ▼ or ▲ separately to go on to the next Parameter.
- 4.5 Press ▼▲ together for 3 seconds when finished.

CAL Controller Features:

- Cal Controller Unit displays set point and actual plenum temperature simultaneously.
- Cal Controller Unit uses a plenum temperature thermo couple to read Plenum temperature
- Cal Controller Unit uses a PID loop control to keep temperature within +/- 2 degrees in plenum chamber.
- Cal Controller Unit uses an auto-tuning feature to automatically set PID values. This allows the controller to maintain temperature tolerances as ambient conditions, media and gas pressure are changed.
- The proportional valve uses a butterfly actuator that takes 30 seconds to fully rotate 90 degrees.
- The proportional valve opens and closes from 0 to 1 to change gas flow and fluctuate the plenum temperature.
- When actual temperature is more than half of the band below set point, the valve will be fully open if the burner is lit. Until the ignition board is on, the valve should be closed (minimum endstop).
- Once actual temperature in plenum chamber nears the set-point temperature, the proportional valve starts to close and moves temperature slowly to set point.
- The bottom end of the proportional valve should be adjusted to leave a percentage always open. This is necessary to keep the burner lit.
- The travel of the proportional valve can be adjusted to either increase or decrease total amount open.
- Safety circuit for dryer is wired through controller, bypassed by the ignition switch in the off position.
- The high temperature limit shutdown is 40 degrees over set point.
- The low temperature limit shutdown is 40 degrees below set point,

Note: When first starting the dryer, the low temperature shutdown is inhibited and does not become active until it reaches 40 degrees of set point. If the burner loses flame and temperature drops more than 40 degrees, the controller will alarm and dryer will shutdown.

- Diagnostics will display alarm after shutting down dryer.



CAL Controller



Proportional Valve

CAL 9500p PROGRAMMABLE CONTROLLER (95D11PA000)[M-C 1257038]

FUNCTION	OPTIONS	SETTINGS	FUNCTION	OPTIONS	SETTINGS	FUNCTION	OPTIONS	SETTINGS
LEVEL 4	dEr.S	<i>0.5</i>	LEVEL 1	tunE	Off	LEVEL C	Addr	1
	di.SS	<i>6</i>		bAnd	30		bAud	<i>9600</i>
	no.AL	<i>oFF</i>		int.t	1.5		dAtA	<i>18n1</i>
	ProG	<i>Auto</i>		der.T	oFF		dbuC	<i>oFF</i>
	LoCk	<i>nonE</i>		dAC	1.5	LEVEL A (Analogue)	An.hi	<i>1000</i>
SEt.L	<i>oFF</i>	CYC.t		0.1	An.lo		<i>0</i>	
LEVEL 3	SP1.d	AnLG		ofst	<i>0</i>		hi.in	<i>50.0</i>
	SP2.d	<i>rLY</i>		SP.LY	<i>oFF</i>		Lo.in	<i>10.0</i>
	burn	<i>up.SC</i>		SEt.2	40		dECP	<i>0000</i>
	rEv.d	<i>1r.2d</i>		bnd.2	5		SP3.A	dv.Lo
	rEv.L	<i>1n.2n</i>	CYC.2	on.of	SP3.b		hoLd	
	SPAn	<i>0.0</i>	LEVEL P	ProG	<i>1</i>		SEt.3	-40
	Zero	<i>0.0</i>		run	<i>oFF</i>		hYS.3	<i>3.6</i>
	ChEk	<i>oFF</i>		FAiL	<i>rSEt</i>		brn.3	<i>uPSC</i>
	rEAD	<i>*</i>		St.u	<i>PV</i>	rEU.3	<i>3d</i>	
	tECh	<i>*</i>		Spru	<i>hour</i>			
	Ver	<i>953.1</i>		SEG	<i>1</i>			
	rSET	<i>nonE</i>		tYPE	<i>SPr</i>			
	LEVEL 2	SP1.P		<i>100</i>	Sint	<i>cont</i>		
hAnd		oFF		PCYC	<i>cont</i>			
PL.1		<i>100</i>		Sub.P	<i>nonE</i>			
PL.2		<i>100</i>	SPrr	<i>100</i>				
SP2.A		dV.hi	t.SP	<i>*</i>				
SP2.b		LtCh						
diSP		<i>1</i>						
hi.SC		260						

Bold = Mathews Company Setting
Italic = default (factory) setting