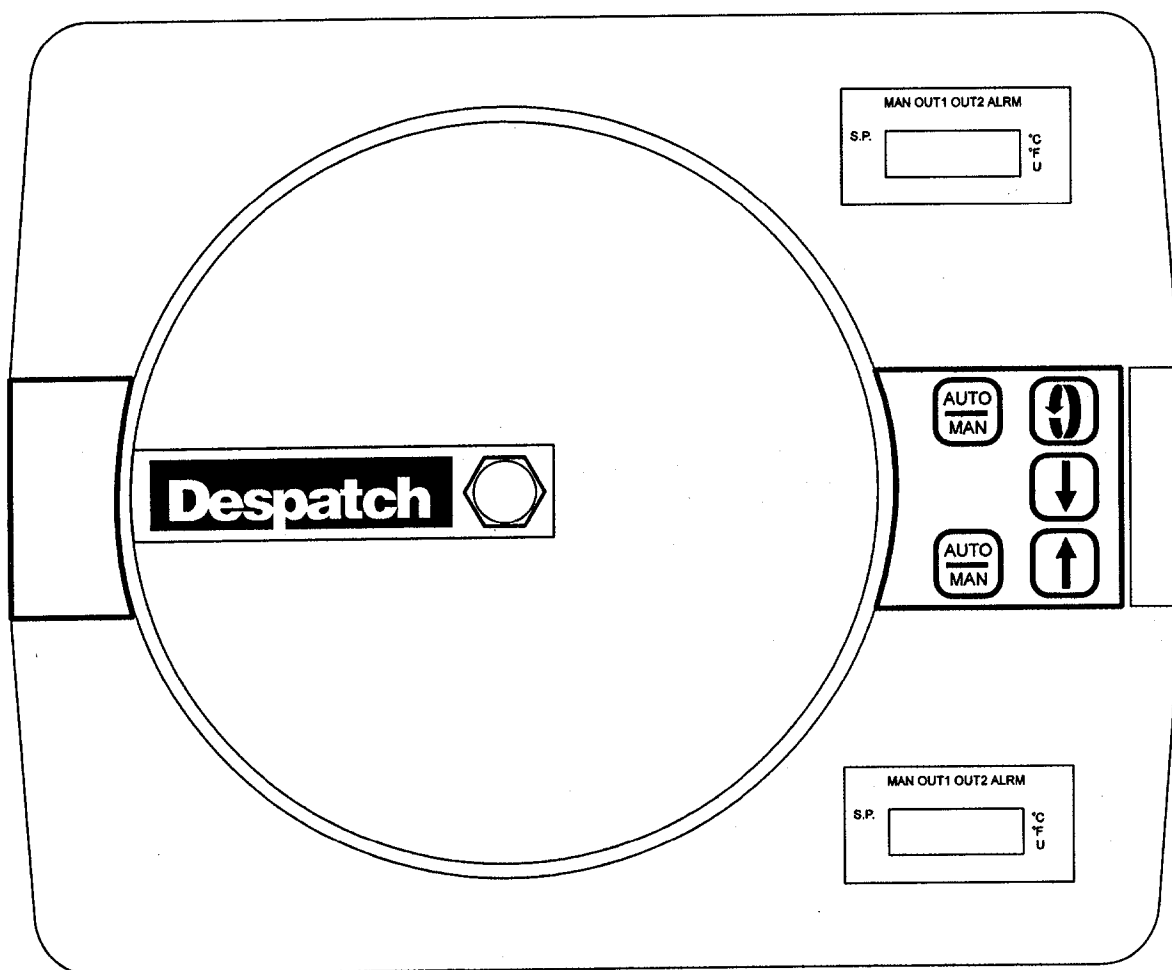


Instruction Manual for the Despatch/Partlow MRC7000 Control and MRC7700 Control



Notice

Users of this equipment must comply with operating procedures and training of operation personnel as required by the Occupational Safety and Health Act (OSHA) of 1970, Section 6 and relevant safety standards, as well as other safety rules and regulations of state and local governments. Refer to the relevant safety standards in OSHA and National Fire Protection Association (NFPA), section 86 of 1990.

Caution

Setup and maintenance of the equipment should be performed by qualified personnel who are experienced in handling all facets of this type of system. Improper setup and operation of this equipment could cause an explosion that may result in equipment damage, personal injury or possible death.

Dear Customer,

Thank you for choosing Despatch Industries. We appreciate the opportunity to work with you and to meet your heat processing needs. We believe that you have selected the finest equipment available in the heat processing industry.

At Despatch, our service does not end after the purchase and delivery of our equipment. For this reason we have created the Service Products Division within Despatch. The Service Products Division features our Response Center for customer service. The Response Center will direct and track your service call to ensure satisfaction.

Whenever you need service or replacement parts, contact the Response Center at 1-800-473-7373: FAX 612-781-5353.

Thank you for choosing Despatch.

Sincerely,

Despatch Industries

PREFACE

This manual is your guide to the MRC7000/MRC7700 control. It is organized to give you the information you need quickly and easily.

The INTRODUCTION section provides an overview of the control.

The THEORY OF OPERATION section details the function and operation of the control.

The INSTRUCTIONS section provides details on unpacking, installing, operating and maintaining the control.

The APPENDIX section contains Special Instructions for operating the control instrument and a Troubleshooting Table.

An efficient way to learn about the control would be to read the manual while working with the control. This will give you practical hands-on experience with information in the manual and the control.

While reading this manual, if a term or section of information is not fully understood, look up that item in the appropriate section. Then go back and reread that section. Information skipped, not understood or misunderstood could create the possibility of operating the equipment in an unsafe manner. This could cause damage to the oven or personnel or reduce the efficiency of the equipment.

NOTE:
Read the entire INTRODUCTION and THEORY OF OPERATION before installing the oven.

WARNING:
Failure to heed warnings in this instruction manual and on the oven could result in death, personal injury or property damage.

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INTRODUCTION

This INTRODUCTION section provides an overview of the MRC7000/MRC7700 controller. The microprocessor based single loop controller is capable of measuring, displaying and controlling temperature flow and level from a variety of inputs.

The controller is easy to use. Control functions, alarm settings and other parameters are easily entered through the front keypad. All user's data can be protected from unauthorized changes with its ENABLE mode security system. Battery back-up protects against data loss during AC power outages.

In this application the controller has been factory configured to control temperature and humidity conditions in your Despatch chamber. Under normal conditions, you should not have to reprogram this controller. We have, however, included reprogramming instructions in this manual to help guide you through the process if it should become necessary.

NOTE:

Your control has already been configured at Despatch. Use this manual as a guide.

CAUTION:

Before making changes to your control instrument, consult with the Despatch Industries Service Products Division at 1-800-473-7373

INSTRUCTIONS

Operating

To power up the controller, start the oven fans. The following sequence will take place.

- Controller model number
- Software revision
- Tag number
- A series of self tests.
- **Ctrl** or **oFF** for a few seconds
- Current oven temperature for 7 to 10 seconds
- Green **S.P.** (setpoint) LED will light up and the current controller setpoint will display for a few seconds

The display will alternate between the oven temperature and the setpoint.

To view the setpoint at any time

Momentarily press the ↑ key or the ↓ key. The green **S.P.** light will come on and the current setpoint will be displayed.

To operate as a single setpoint controller

- Press the ⓪ key until **Ctrl** appears in the display.
- Press the ↓ key. The display will momentarily blank, then the current oven temperature will be displayed.

The controller is now in the control mode and will control oven temperature to setpoint.

NOTE:
The MRC7000/MRC7700 installed on your oven has been factory configured. No changes are required for proper operation.

Operating (Cont.)

To change the setpoint

On single pen units

Press and hold the ↑ key to increase the setpoint, or the ↓ key to decrease the setpoint.

On 2-pen units

1. Select a pen.

Press the ↑ key to select the upper pen, or pen 1.

Press the ↓ key to select the lower pen, or pen 2.

2. Press and hold the ↑ key to increase the setpoint, or the ↓ key to decrease the setpoint.

The new setpoint will continue to be displayed for 3 seconds to 5 seconds before changing back to the current process value.

To run a profile

1. Press the ⓪ key until the desired profile number is in the display. (P1, P2, . . . ,P8)
2. Press the ↓ key or the **RUN** key.

Run will display for a few seconds, followed by the current oven temperature. The **SEG1** and the **RAMP** indicators will be on, indicating that the control is ramping in Segment 1. As the profile continues the segment indicators and the **RAMP** and **SOAK** LEDs will indicate the status of the controller.

To abort a profile

1. Press the **Run/Hold** key to stop the profile at its preset position.
2. Press the ⓪ key until **OFF** appears in the display. Press the ↓ key.

The profile is now aborted and the controller is in the off mode.

Enable Mode

The enable mode is used to turn on or off access to the various modes of the controller: such as the program mode and the tune mode.

NOTE:
If you cannot enter the enable mode, consult Despatch Industries Service Products at 1-800-473-7373 for instructions.

1. Press and hold the ↑ key and the ↓ key for approximately 10 seconds. The following sequence will take place.
 - All LEDs will light up on the front of the instrument.
 - After about 10 seconds **EnAb** will be displayed.
2. Release the ↑ key and the ↓ key. **EtSt** will be displayed.
3. Press the Ⓚ key. Either **oFF** or **oN** will be displayed, indicating whether access to the **tESt** mode is on or off.
 - If access is off, pressing the ↑ key will turn access on.
 - If access is on, pressing the ↓ key will turn access off.
4. Press the Ⓚ key to bring up the next mode.
5. Continue on through all the modes, turning access off or on as required.
6. After scrolling through all selections, **EtSt** will be displayed again. Press the ↑ key to exit the enable mode.

NOTE:
If no entry is made for 10 seconds, the control will leave the enable mode.

Once set up and operating correctly all modes should be turned off except for the **EPC, EPE, ESPC** modes.

Table 1 Enable Mode

Display Code	Setting	Description
Etst	Off	Test mode
ECAL	Off	Calibration mode
EPro	Off	Program mode
Etun	Off	Tune mode
ESby	Off	Standby mode
ESPS	Off	Setpoint select mode
EPC	On	Profile continue mode
EPE	On	Profile entry mode
ESPC	On	Setpoint change mode

Program Mode

The Program Mode is used to re-configure the controller. We have included complete instructions in this manual for re-configuring the controller installed on your chamber. If you want more details on display codes and settings refer to Program Mode Configuration Procedure in the Partlow manual. Refer to Table 2 for the Partlow 7000, Table 3 for the Partlow 7700, when re-configuring the controller. The following questions will help you determine which settings apply to your application.

Is your chamber gas heated or electrically heated? If your chamber is gas heated, you should use the settings listed in the Gas column. If your chamber is electric heated, you should use the settings listed in the Electric column.

Is the controller installed on a 16000 Series chamber or a LEY chamber? If so you should use the temperature and humidity settings listed in the Table 2 for the Partlow 7000, Table 3 for the Partlow 7700.

NOTE:

All codes may not show up. This depends on hardware configuration and options ordered with the instrument.

MRC7000 Series

Table 2 Program Mode Software Reference

Codes	Pen 1			Pen 2			Codes	Unit		
	Gas	Elec.	16000	Gas	Elec	16000		Gas	Elec	16000
inPS	1	1	20	-	-	20	rLyA	-	-	12
iCor	0	0	0	-	-	0	tLyb	-	-	11
out1	6	4	4	-	-	4	rLyC	-	-	10
o1uL	100	100	100	-	-	100	rLyd	-	-	9
o1LL	0	0	0	-	-	0	rLyE	-	-	8
out2	-	-	3	-	-	3	rLyF	-	-	7
o2uL	-	-	100	-	-	100	rLyg	-	-	6
o2LL	-	-	0	-	-	0	rLyh	5	5	5
AL1	0	0	0	-	-	0	CurA	-	-	-
AL2	0	0	0	-	-	0	Curb	-	-	-
diSP	2	2	2	-	-	2	CurC	-	-	-
dPoS	0	0	0	-	-	0	Curd	-	-	-
Euu	-	-	-	-	-	1000	CoAr	-	-	-
EuL	-	-	-	-	-	0	Cobr	-	-	-
HyCo	0	0	0	-	-	0	CoCr	-	-	-
HyAo	0	0	0	-	-	0	Codr	-	-	-
rSP	0	0	0	-	-	0	Crt	24*	24*	24*
rSPu	-	-	-	-	-	-	Coo	1	1	1
rSPL	-	-	-	-	-	-	CCon	-	-	-
SPuL	***	***	***	-	-	100	CbS	-	-	-
SPLL	***	***	***	-	-	0	CAd1	-	-	-
AtFr	0	0	0	-	-	0	CAd2	-	-	-
Prnd	0	0	0	-	-	0				
dFF	1	1	1	-	-	1				
PFF	1	1	1	-	-	1				
Pout	0	0	0	-	-	0				
Pou	0	0	0	-	-	0				
PoL	0	0	0	-	-	0				
Cru	**	**	**	-	-	100				
CL	**	**	**	-	-	0				
P1EC	0	0	0	-	-	0				
P2EC	0	0	0	-	-	0				
PAEC	0	0	0	-	-	0				

- * 24 for 24 hours, 168 for 7-day chart rotation.
- ** Enter upper and lower chart range.
- *** Enter minimum and maximum operating setpoints.

MRC7000 Series (Cont.)

Record your settings for future reference. Use the worksheet on page 24 of this manual for this purpose.

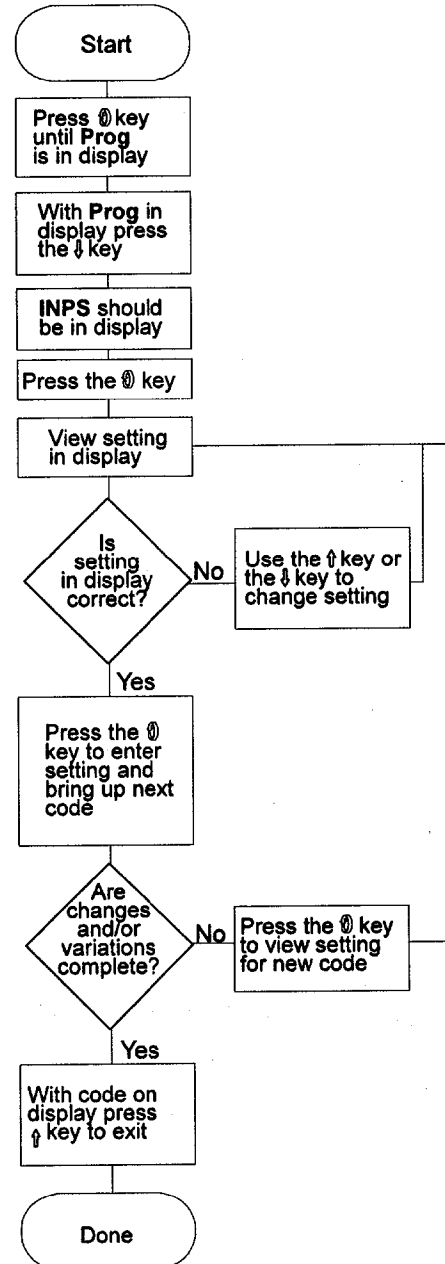
1. Press **⓪** key until **Prog** appears in display. If **Prog** is not displayed, refer to the Enable mode section of this manual.
2. Press **↓** key. You are now in the program mode. **InPS** should be in the display.
3. Press the **⓪** key to view the setting for the display code **InPS**.
 - If the setting does not have to be changed, move on to step 6 in these instructions.
 - If the setting needs to be changed, continue on to step 4 in these instructions.
4. Press the **↑** key or **↓** key to change the setting. Refer to Table 2 for the correct setting.
5. When the correct setting is displayed press the **⓪** key to enter the new setting into memory and bring up the next code.
6. Press the **⓪** key to view the next setting.
7. Repeat steps 3 through 6 until you are satisfied all settings have been correctly entered.

On the 2-pen model, the lower display will show the parameters and values for Pen 2.

1. Press the **⓪** key to scroll down through the parameters and their values for Pen 2.
2. Use the **↑** key or the **↓** key to adjust the values. The unit parameters will be programmed in the upper display. The relays and/or the current outputs are assigned as a control output or alarm and to either Pen 1 or Pen 2. Chart rotation time is also set in the unit.

NOTE:

If no entry is made for 30 seconds, the control will exit the program mode.



MRC7700 Series

Table 3 Program Mode Software Reference

Codes	Pen 1	Pen 2	Codes	Unit
iSi1	20		rLyA	12
iCi1	0		tLyb	11
iSi2	20		rLyC	10
iCi2	0		rLyd	9
PEnS	1	3	rLyE	8
rHC	-	0	rLyF	7
out1	4	4	rLyg	6
oLuL	100	100	rLyh	5
o1LL	0	0	CurA	-
out2	3	3	Curb	-
o2uL	100	100	CurC	-
o2LL	0	0	Curd	-
AL1	0	0	CoAr	-
AL2	0	0	Cobr	-
diSP	2	2	CoCr	-
dPoS	0	0	Codr	-
Euu	-	1000	Ptb	2
EuL	-	0	PiA	1
HyCo	0	0	rrh	-
HyAo	0	0	PPC	-
rSP		-	Crt	*
rSPu		-	Coo	1
rSPL		-	CCon	-
SPuL	180	100	CbS	-
SPLL	-73	0	CAd1	-
AtFr	0	0	CAd2	-
Pmd	0	0		
dFF	1	1		
PFF	1	1		
Pout	0	0		
Pou	0	0		
PoL	0	0		
Cru	200	100		
CrL	-100	0		
P1EC	0	0		
P2EC	0	0		
PAEC	0	0		

MRC7700 Series (Cont.)

Record your settings for future reference. Use the worksheet on page 25 of this manual for this purpose.

1. Press **⓪** key until **Prog** appears in display. If **Prog** is not displayed, refer to the Enable mode section of this manual.
2. Press **↓** key. You are now in the program mode. **Pen1** should be in the display.
3. Press the **↓** key to view the setting for the display code **Isi1**.

If the setting does not have to be changed, move on to step 6 in these instructions.

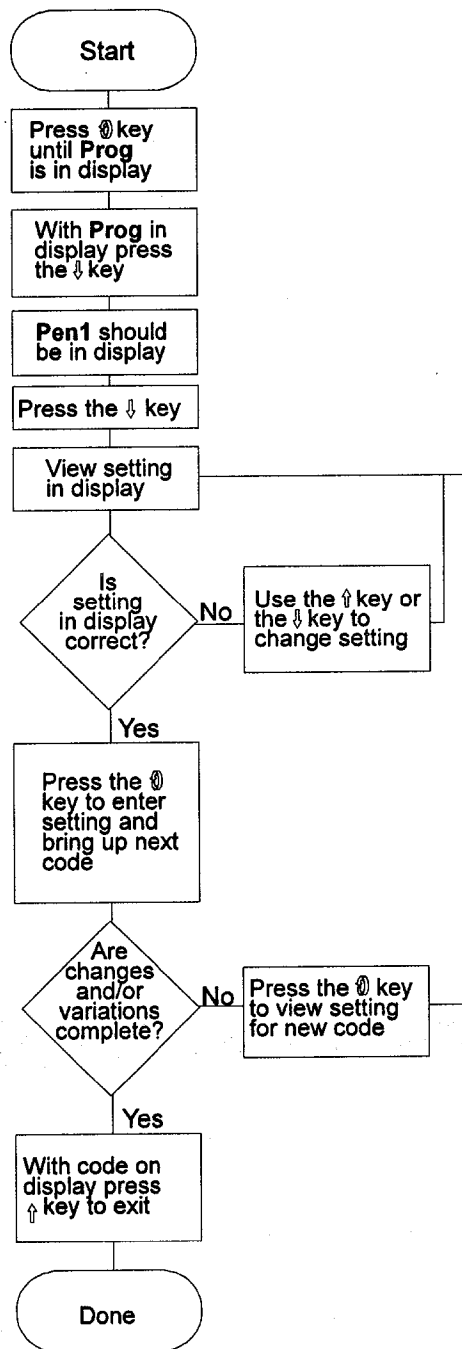
If the setting needs to be changed, continue on to step 4 in these instructions.

4. Press the **↑** key or **↓** key to change the setting. Refer to Table 3 for the correct setting.
5. When the correct setting is displayed press the **⓪** key to enter the new setting into memory and bring up the next code.
6. Press the **⓪** key to view the next setting.
7. Repeat steps 3 through 6 until you are satisfied all settings have been correctly entered.

On the 2-pen model, the lower display will show the parameters and values for Pen 2.

8. Press the **⓪** key to scroll down through the parameters and their values for Pen 2.
9. Use the **↑** key or the **↓** key to adjust the values. The unit parameters will be programmed in the upper display. The relays and/or the current outputs are assigned as a control output or alarm and to either Pen 1 or Pen 2. Chart rotation time is also set in the unit.

NOTE:
If no entry is made for 30 seconds, the control will exit the program mode.



Tune Mode

Refer to this table when changing in the Tune mode.

Table 4 Typical Tune Display/Code Setting Guide

Display	MRC7000 Series				MRC7700	
	Heat Settingd for Ovens		16000/LEY Chambers Control Setting		Pen 1	Pen 2
SoP PAL1					0 —	
dAL1 bAL1					— —	
PAL2 dAL2					— —	
bAL2 SPRD	—	—	0	0	—	
Pb1 Pb2	10 —	35 —	10 10	60 60	10 10	60 60
rSEt ArSt	0 0.5	0 0.5	0 0.5	0 0.5	0	0
ArS1 ArS2					0.5 0.5	0.5 0.5
rt1 rt2					0 0	0 0
rAtE Ct1	20*	0	0 1	0 1	0 1	0 1
Ct2 SEnS	—	—	7	7	7 —	7 —
FoP bAro	0	0	0	0	0 —	0 29.9

* If the oven is equipped with solid state relays (SSR),
CT1=1.

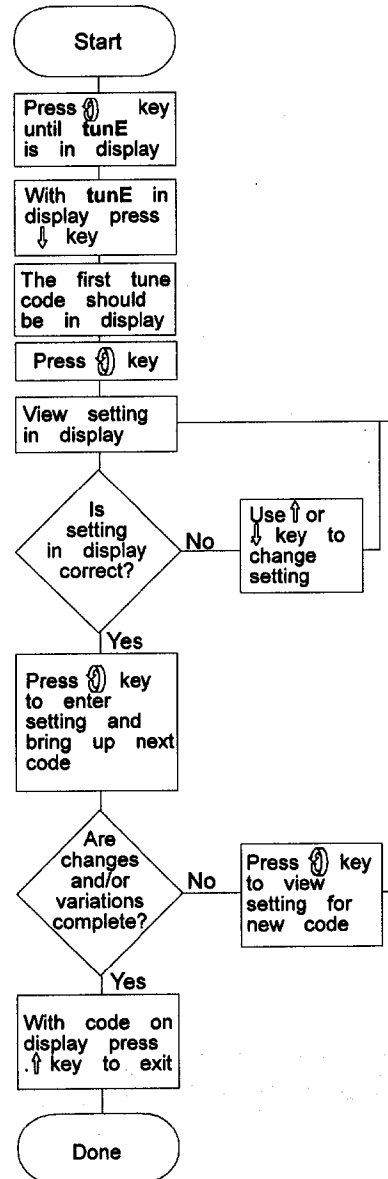
Tune Mode (Cont.)

The controller tune settings have been factory set for an empty oven. Load mass, fresh air and exhaust damper settings will affect tuning parameters. Some experimentation is required to determine the optimum settings. Record your settings for future reference. Use the worksheet on page 21 of this manual for this purpose.

These instructions should be adequate for adjusting tune parameters. If you want more details on the display codes and settings, refer to Tune Mode Configuration Procedure in the Partlow manual.

1. Press $\text{\textcircled{0}}$ key until **tunE** appears in display. If **tunE** is not displayed, refer to the Enable mode section of this manual.
2. Press \downarrow key. You are now in the tune mode. **Pb1** should be in the display. If **FOP** is displayed, review the program mode parameters.
3. Press the $\text{\textcircled{0}}$ key to view the setting for the display code **Pb1**.
 - If the setting does not have to be changed, move on to step 6.
 - If the setting needs to be changed, continue on to step 4.
4. Press the \downarrow key or \uparrow key to change the setting. Refer to Table 3 for the typical Despatch settings.
5. When the correct setting is displayed press the $\text{\textcircled{0}}$ key to enter the new setting into memory and bring up the next code.
6. Press the $\text{\textcircled{0}}$ key to view the next setting.
7. Repeat steps 3 through 6 until you are satisfied all settings have been correctly entered.

NOTE:
If no entry is made for 30 seconds, the control will exit the tune mode.



NOTE:
These are typical settings only. Each oven/process has its own settings.

Profile Mode

The Partlow control is capable of storing eight profiles with up to six (6) segments in each profile. Each segment consists of a timed ramp to temperature and soak period at that temperature. If longer profiles (more segments) are required, profiles can be linked together to form one long profile. Before trying to enter a profile, draw a diagram like that shown in figure 1 to determine the number of segments required for the profile.

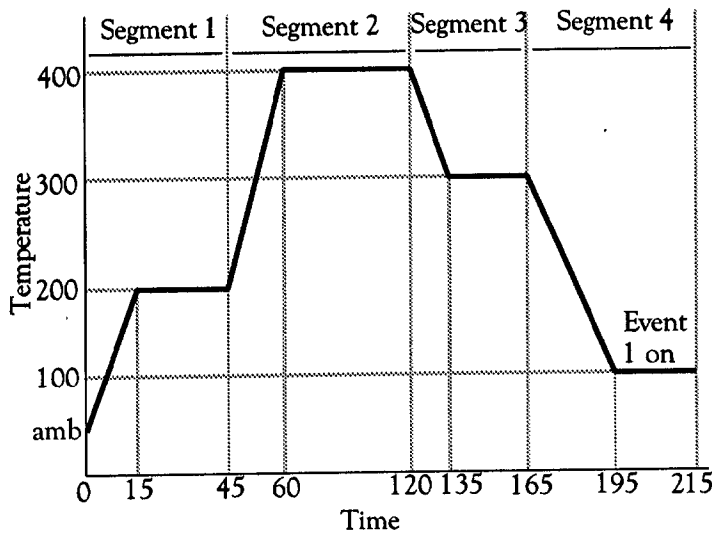


Figure 1 illustrates a sample profile with 4 segments.

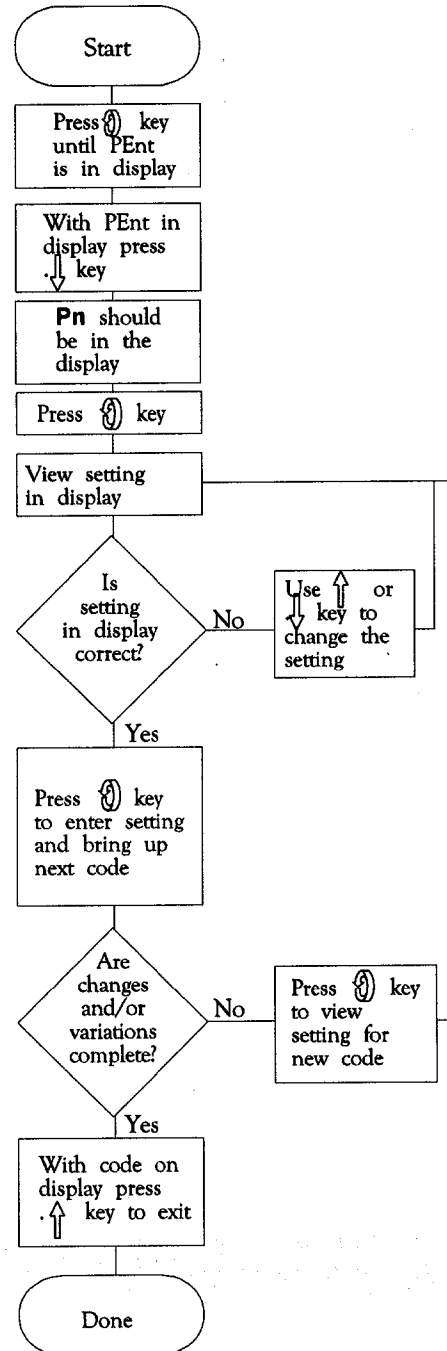
Next fill in the blanks on the profile data worksheet. This worksheet will now be used to enter the profile into the instrument.

	Pn	<u>1</u>	Profile number	
	ns	<u>4</u>	Number of segments	
	SEG1	SEG2	SEG3	SEG4
rt	<u>0.15</u>	rt <u>0.15</u>	rt <u>0.15</u>	rt <u>0.30</u>
SP	<u>200</u>	SP <u>400</u>	SP <u>300</u>	SP <u>100</u>
E1	<u>OFF</u>	E1 <u>OFF</u>	E1 <u>OFF</u>	E1 <u>OFF</u>
St	<u>0.30</u>	St <u>1.00</u>	St <u>0.30</u>	St <u>0.20</u>
E1	<u>OFF</u>	E1 <u>OFF</u>	E1 <u>OFF</u>	E1 <u>ON</u>
	PLCt	<u>1</u>	Loops	
	dhru	<u>0</u>	Degrees	
	dhrd	<u>0</u>	Degrees	
	PEnd	<u>0</u>	All outputs off	

Profile Mode (Cont.)

To enter a profile

1. Enter the profile by pressing the **Ⓜ** key until **PEnt** appears in the display.
2. Press the **↓** key. Now **Pn** will be displayed.
3. Press the **Ⓜ** key. A profile number (tag number) will be displayed.
4. Use the **↑** key or the **↓** key to change the profile number.
5. Press the **Ⓜ** key to enter the new number. **nS** will be displayed.
6. Press the **Ⓜ** key.
7. Enter the number of segments in the profile.
8. Press the **Ⓜ** key. The **SEG 1** LED will light and **rt** (ramp time) will be displayed.
9. Use the **↑** key or the **↓** key to change the ramp time setting.
10. Press the **Ⓜ** key. **SP** will be displayed.
11. Use the **↑** key or the **↓** key to change the setpoint.
12. Press the **Ⓜ** key. **E1** will be displayed if events are programmed.
13. Use the **↑** key or the **↓** key to turn events on or off during ramp time.
14. Press the **Ⓜ** key. **St** (Soak time) will be displayed.
15. Use the **↑** key or the **↓** key to change the soak time.
16. Press the **Ⓜ** key. **E1** will be displayed if events are programmed.
17. Use the **↑** key or the **↓** key to change the soak time.



Profile Mode (Cont.)

Continue on in this fashion with the rest of the segments. As you step through each segment, the **SEG 2** through **SEG 6** indicators, as well as the **RAMP** and **SOAK** LEDs, will light up along the top of the instrument. They indicate which segment of the profile you are currently in. When **Pn** appears in the display again the profile is complete. Press the up key to exit the profile entry mode.

To view the time remaining while the profile is running, press the $\text{\textcircled{0}}$ key and the \downarrow key. The display will cycle through several parameters, including **tr** for the time remaining in that segment. Press the $\text{\textcircled{0}}$ key to stop the cycling.

To view the percentage output while the profile is running, press the $\text{\textcircled{0}}$ key and the \uparrow key. The display will alternate between the process variable and the percentage output. Press the $\text{\textcircled{0}}$ key to stop cycling.

Profile Data Worksheet

Pn _____ Profile number, 1 - 8

ns _____ Number of segments, 1 - 6

	SEG1	SEG2	SEG3	SEG4	SEG5	SEG
rt	_____	_____	_____	_____	_____	_____
SP	_____	_____	_____	_____	_____	_____
E1	_____	_____	_____	_____	_____	_____
E2	_____	_____	_____	_____	_____	_____
E3	_____	_____	_____	_____	_____	_____
St	_____	_____	_____	_____	_____	_____
E1	_____	_____	_____	_____	_____	_____
E2	_____	_____	_____	_____	_____	_____
E3	_____	_____	_____	_____	_____	_____

PLCt _____ 0 - Continuous, 1 - 9,999 Loops

dhru _____ 0 - Disabled, 1 - 3,000 Degrees

dhrd _____ 0 - Disabled, 1 - 3,000 Degrees

PEnd _____ -1 Hold at last setpoint

- 0 All outputs off
- 1 Run profile #1
- 2 Run profile #2
- 3 Run profile #3
- 4 Run profile #4
- 5 Run profile #5
- 6 Run profile #6
- 7 Run profile #7
- 8 Run profile #8

TROUBLESHOOTING

For your convenience, we have included a troubleshooting section in this manual. This section covers problems which may occur in the Despatch application of the controller. The Partlow manual has a more detailed troubleshooting section. We recommend that you refer to both manuals.

Clean up most errors by performing (CAL 1, Master Clear, Re-configure Hardware):

Common Errors are:

- Error #16 - Perform a CAL 1.
- Error #17 - Master clear, reconfigure the Hardware, perform CAL 1.
- Error "LO" - Perform a CAL2, then a CAL3.
- Error #18 - Perform CAL 8
- Pens recording does not agree with display(s) - perform a CAL 9.

NOTE:

Look for the 12-digit model number underneath the chart on the control, directly beneath the Despatch logo.

CAL 1

1. Enable the CAL mode by pressing ↑ key and the ↓ key simultaneously for approximately 15 seconds (EnAb will appear on the display).
2. Release keys (**EtSt** will appear on the display). Enable mode is ON.
3. Press the ↓ key until **ECAL** appears on the display.
4. Press the Ⓚ key. Display will say **OFF**. Press the ↑ key (display will change to **on**).
5. Press the Ⓚ key. Display will say **EPro**. Press the ↑ key (display will return to **OFF** or **Ctrl** modes).
6. Repeat pressing the Ⓚ key until the display says **CAL**. Then press the ↓ key (display will change to **CAL 1**).
7. Press and hold the ↓ key, then press the Ⓚ key. The display will blank momentarily. Release the keys. **CAL 1** is complete.
8. Re-install the program and tuning software parameters. Refer to the program mode and the tune mode sections of this manual.
9. Turn off the program mode by following steps 1 through 5. In step 4, use the ↓ key to turn the mode off.

NOTE:

Record/save the program and tuning parameters prior to performing a **CAL 1**. All of the software values will be reset to the default values during a **CAL 1!!!!**

Reconfigure Hardware

You should reconfigure the controller only if the incorrect model number is displayed when the controller is powered up.

1. Turn the controller power on while pressing the $\text{\textcircled{0}}$ key and the \downarrow key simultaneously until the display blinks. Release the $\text{\textcircled{0}}$ key first, then release the \downarrow key.
2. The first four digits of the hardware configuration will be displayed (example 7100). Press the \uparrow key and change hardware configuration back to basic controller (example 7110).
3. Next press the $\text{\textcircled{0}}$ key and the second four digits of the hardware configuration will be displayed (example 0000-).
4. Press the \uparrow key and change hardware configuration back to basic controller (example 0001-).
5. Press the $\text{\textcircled{0}}$ key. Controller will self test.

The program mode parameters and the tune mode parameters will need to be re-entered. Refer to the program mode and the tune mode sections of this manual.

Master Clear

These instructions are for the controller hardware and software matrix.

1. Insert the controller into case while pressing the ↑ key and the ↓ key simultaneously until the display blinks.
2. Re-install the hardware configuration. Refer to the Reconfigure Hardware section.
3. Re-install the program and tuning software parameters.






Before you call Despatch for help, obtain the following information from the controller.

- Controller part number (displayed on power up).
- Controller software revision level (displayed on power up).
- Controller serial number (listed on sticker on the front of the controller).

NOTE:

Record/save the program, tuning and profile parameters prior to performing a **MASTER CLEAR**. The hardware configuration and all of the software values will be reset to the default values during a **MASTER CLEAR!!!!**

CAL 8


1. Press the ↑ key and the ↓ key simultaneously for approximately 15 seconds. **EnAb** will appear in the display.
2. Release the arrow keys. **EtSt** will appear on the display. The enable mode is on.
3. Press the ↓ key until **ECAL** appears on the display.
4. Press the  key. **oFF** will appear in the display.
5. Press the ↑ key. **on** will appear in the display.
6. Press the  key. **EPro** will appear in the display.
7. Press the ↑ key. **oFF** or **Ctrl** will appear in the display.
8. Repeat pressing the  key until **CAL** appears in the display.
9. Press the ↓ key. **CAL 1** will appear in the display.
10. Repeatedly press the  key until **CAL 8** appears on the display.
11. Press the  key and the ↓ key simultaneously. The display will blank momentarily. **CAL 8** is complete
12. Reinstall the profile parameters. Refer to page 13 of this manual.

NOTE:


Record and save the profile parameters prior to performing a **CAL 8**. All of the profile parameters will be erased during a **CAL 8!!!**

CAL 9




This procedure is used to calibrate the pen(s) at 0% and at 100% of the chart span.

1. Connect valid inputs to TB 4 and TB 5.
2. Perform CAL 1 instructions 1 through 6 to display CAL 1. Refer to page ? of this manual.
3. Press the  key several times until CAL 9 is displayed.

For single pen instruments

- a. Push and hold the ↓ key while simultaneously pressing the  key.
- b. Release both keys. **Pen1** will display.

For 2-pen instruments

- a. Press the ↓ key to toggle between Pen 1 and Pen 2.
 - b. When the desired pen is displayed, press the  key. **dELy** will display as the selected pen moves toward the hub. **PENL** will display.
 - c. Use the ↑ key or the ↓ key to adjust the pen to the low end, or 0% of the chart.
 - d. Press the  key. **SCAn** will appear for 10 seconds and the pen location value will be saved in memory. **dELy** will display as the pen moves to the outer edge of the chart. **PENh** will display.
 - e. Use the ↑ key or the ↓ key to adjust the pen to the high end, or 100% of the chart.
 - f. Press the  key. **SCAn** will appear for 10 seconds and the pen location value will be saved in memory. **dELy** will display as the pen moves to about midscale. When CAL 9 is displayed, calibration is complete. CAL 9 can be repeated on second pen if required.
4. Immediately press the ↑ key twice to exit the CAL mode and save parameters. If the control times out, the parameters will not be saved.

NOTE:

You can not check the settings by repeating the CAL 9, as it discards the previous setting.

WORK SHEETS

We have provided a tuning worksheet and a programming worksheet for your convenience.

Tuning

Refer to the tuning instructions in this manual when filling out the tuning worksheet. If you require more information on tuning display codes, refer to the Partlow manual.

Table 5 Typical Tune Display/Code Setting Worksheet for MRC7000 and MRC7700 Controllers

Display	MRC7000 Series			MRC7700	
	Heat Settings for Ovens	16000/LEY Chambers Control Settings		Pen 1	Pen 2
SoP					
PAL1					
dAL1					
bAL1					
PAL2					
dAL2					
bAL2					
SPRD					
Pb1					
Pb2					
rSEt					
ArSt					
ArS1					
ArS2					
r1					
r2					
rAtE					
Ct1					
Ct2					
SEtS					
FoP					
bAve					

Programming

Refer to the programming instructions in this manual when filling out the programming worksheet. If you require more information on programming display codes, refer to the Partlow manual.

Table 6 Program Mode Software Worksheet for the MRC7000 Controller

Codes	Pen 1			Pen 2			Codes	Unit		
	Gas	Elec.	16000	Gas	Elec.	16000		Gas	Elec.	16000
inPS iCor							rLyA tLyb			
out1 oLuL							rLyC rLyd			
oILL out2							rLyE rLyF			
o2uL o2LL							rLyg rLyh			
AL1 AL2							CurA Curb			
diSP dPoS							CurC Curd			
Euu EuL							CoAr Cobr			
HyCo HyAo							CoCr Codr			
rSP rSPu							Crt Coo	*	*	*
rSPL SPuL	***	***	***				CCon CbS			
SPLL AtFr	***	***	***				CAd1 CAd2			
Pmd dFF										
PFF Pout										
Pou PoL										
Cru CrL	**	**	**							
P1EC P2EC										
PAEC										

- * 24 for 24 hours, 168 for 7-day chart rotation.
- ** Enter upper and lower chart range.
- *** Enter minimum and maximum operating setpoints.

Programming (Cont.)

Table 7 Program Mode Software Worksheet for the MRC7700 Controller

Codes	Pen 1	Pen 2	Codes	Unit
iSi1 iCi1			rLyA tLyb	
iSi2 iCi2			rLyC rLyd	
PEnS rHC			rLyE rLyF	
out1 o1uL			rLyg rLyh	
o1LL out2			CurA Curb	
o2uL o2LL			CurC Curd	
AL1 AL2			CoAr Cobr	
diSP dPoS			CoCr Codr	
Euu EuL			Ptb PiA	
HyCo HyAo			rrh PPC	
rSP rSPu			Crt Coo	*
rSPL SPuL	***	***	CCon CbS	
SPLL AtFr	***	***	CAd1 CAd2	
Pmd dFF				
PFF Pout				
Pou PoL				
Cru CrL	** **	** **		
PIEC P2EC				
PAEC				

- * 24 for 24 hours, 168 for 7-day chart rotation
- ** Enter upper and lower chart range
- *** Enter minimum and maximum operating setpoints