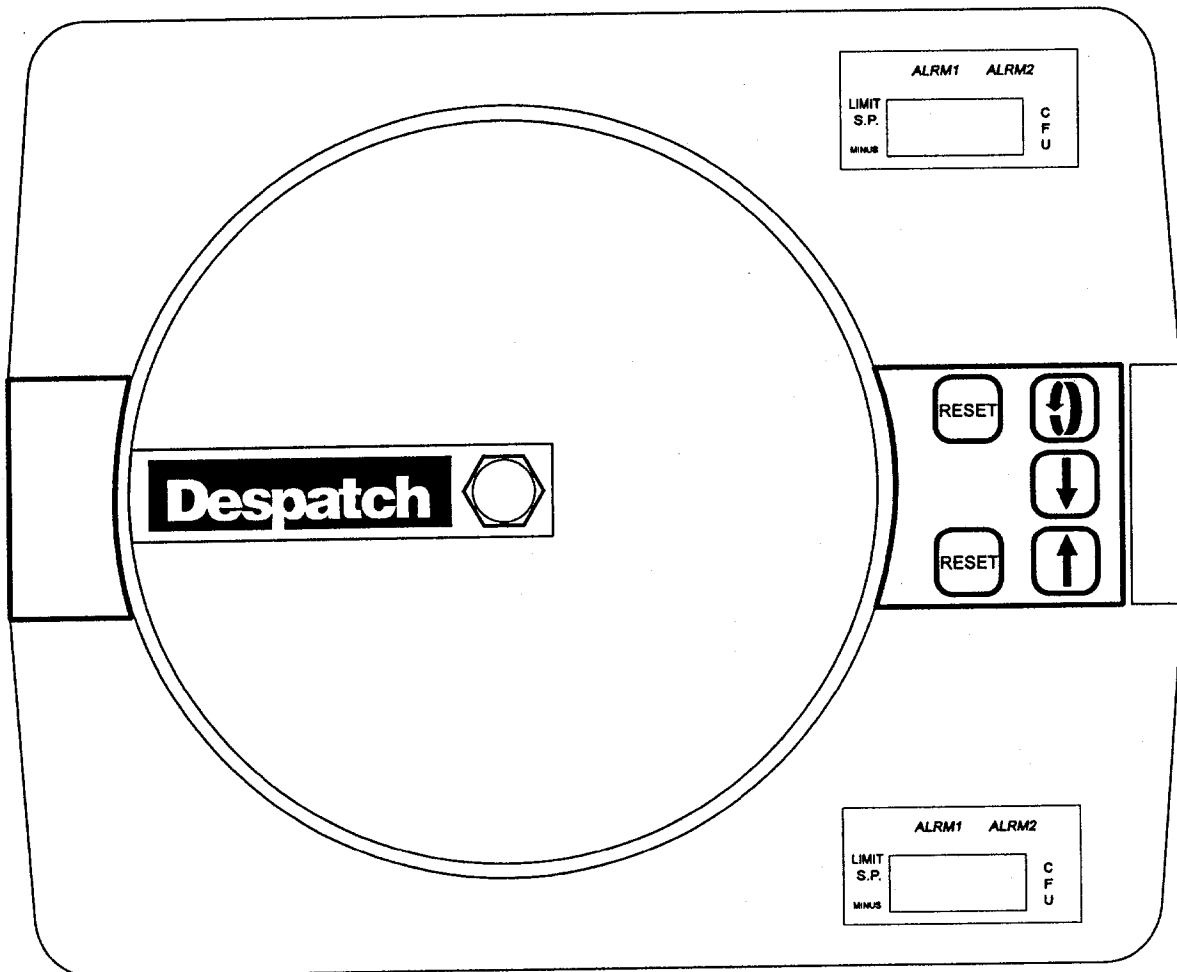# Instruction Manual for the Despatch/Partlow MRC7400 Hi-Limit Controller and MRC7100 Recorder

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 MRC7400 hi-limit controller and the MRC7100 recorder. 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 MRC7400 hi-limit controller and the MRC7100 recorder. 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 hi-limit controller has been factory configured to limit the control temperature and/or humidity conditions in your Despatch chamber. Under normal conditions, you should not have to re-program this controller. We have, however, included re-programming instructions in this manual to help guide you through that process if it should become necessary.

NOTE:
Your Hi-limit has already been configured at Despatch. Use this manual as a guide to typical settings.

CAUTION:
Before making changes to your hi-limit consult with Despatch Industries Product Service at 1-800-473-7373.

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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.

- **Oper** or **oFF** for a few seconds

- Current oven temperature for 7 to 10 seconds

To exit the off mode and enter the operate mode

1. Press the ⓞ key until **Oper** appears in the display.

2. Press the ↓ key. The display will momentarily blank, then the current oven temperature will display.

The controller is now in the operate mode and will monitor the oven temperature to the alarm setting.

To view the setpoint at any time the controller must be in the operate mode

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

Operating (Cont.)

To change the setpoint in the operate mode

On single pen units

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

On 2-pen units

1. Select a pen.

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

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

4. 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 reset the alarm

Press the **Reset** key, once the limit condition has been cleared. For example, if temperare exceeds alarm setting, the ALM1 Alarm LED will light and the heater will shut off. Wait for the temperature to drop below the alarm setting and reset.

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.

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 ⓪ 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 ⓪ 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.

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

Table 1 Enable Mode

Display Code	Setting	Description
Etst ECAL	Off Off	Test mode Calibration mode
EPro EASt	Off Off	Program mode Alarm Set mode
ESPC	On	Setpoint Change mode

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Program Mode

The Program Mode is used to re-configure the hi-limit 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 when re-configuring the controller. The following questions will help you determine which settings apply to your application.

Is the hi-limit controller installed on a humidity chamber? If so you should use the humidity settings listed in the Table 2.

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

Table 2 Program Mode Software Reference

Codes	Pen 1 Temperature	Pen 2 Humidity	Codes	Unit
inPS	1	30	rLyA	1
iCor	0	0	tLyb	
AL1	2	0	rLyC	-
AL2	0	0	rLyd	-
diSP	1	1	rLyE	-
dPoS	0	0	rLyF	-
Euu	0	100	rLyg	-
EuL	0	0	rLyh	-
HyAo	0	0	CurA	-
SPul	***	100	Curb	-
SPLL	***	0	CurC	-
Prnd	0	0	Curd	-
dFF	1	1	CoAr	-
PFF	1	1	Cobr	-
Pout	0	0	CoCr	-
Pou	-	-	Codr	-
PoL	-	-	Crt	24*
Cru	**	100	Coo	1
CrL	**	0	CCon	-
PAEC	1	0	CbS	-
			CAd1	-
			CAd2	-

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

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Program Mode (Cont.)

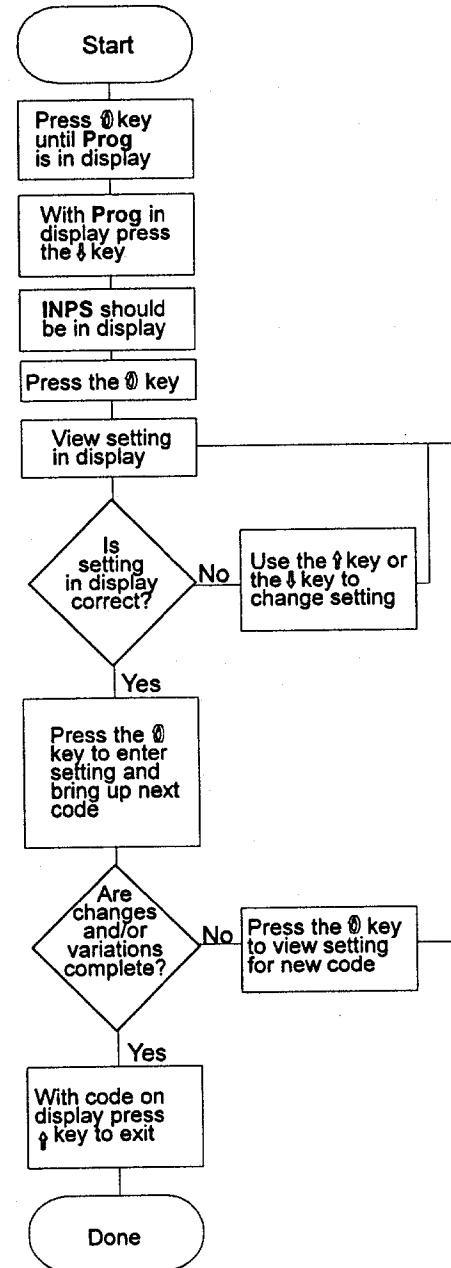Record your settings for future reference. Use the worksheet on page 15 of this manual for this purpose.

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 <u>does not</u> 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.

```
        ┌─────────┐
        │  Start  │
        └────┬────┘
             │
   ┌─────────▼─────────┐
   │ Press ⓪ key       │
   │ until Prog        │
   │ is in display     │
   └─────────┬─────────┘
             │
   ┌─────────▼─────────┐
   │ With Prog in      │
   │ display press     │
   │ the ↓ key         │
   └─────────┬─────────┘
             │
   ┌─────────▼─────────┐
   │ INPS should       │
   │ be in display     │
   └─────────┬─────────┘
             │
   ┌─────────▼─────────┐
   │ Press the ⓪ key   │
   └─────────┬─────────┘
             │
   ┌─────────▼─────────┐
   │ View setting      │◄──────────┐
   │ in display        │           │
   └─────────┬─────────┘           │
             │                     │
        ┌────▼────┐    ┌───────────────────┐
        │   Is    │ No │ Use the ↑ key or  │
        │ setting ├───►│ the ↓ key to      │
        │in display│    │ change setting    │
        │correct? │    └───────────────────┘
        └────┬────┘
           Yes
   ┌─────────▼─────────┐
   │ Press the ⓪       │
   │ key to enter      │
   │ setting and       │
   │ bring up next     │
   │ code              │
   └─────────┬─────────┘
             │
        ┌────▼────┐
        │  Are    │
        │ changes │ No ┌───────────────────┐
        │ and/or  ├───►│ Press the ⓪ key   │
        │variations│   │ to view setting   │
        │complete?│    │ for new code      │
        └────┬────┘    └───────────────────┘
           Yes
   ┌─────────▼─────────┐
   │ With code on      │
   │ display press     │
   │ ↑ key to exit     │
   └─────────┬─────────┘
             │
        ┌────▼────┐
        │  Done   │
        └─────────┘
```
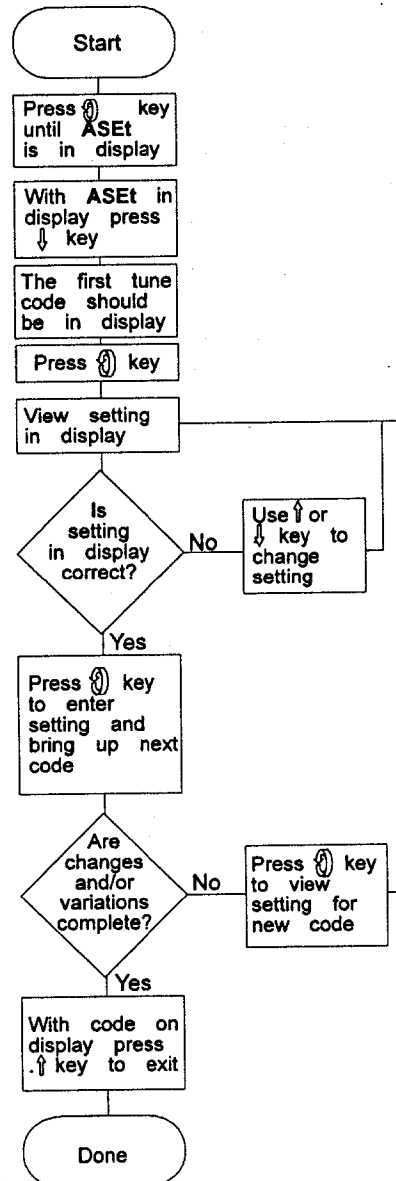
Alarm Set Mode for the MRC7100 Recorder

This will only be used if the recorder has the alarm relays. The Alarm Setting can be used to protect the product in the chamber instead of the equipment. Record your settings for future reference.

These instructions should be adequate for adjusting alarm parameters. If you want more details on the display codes and settings, refer to <u>Alarm Set Mode Configuration Procedure</u> in the Partlow manual.

1. Press 🕲 key until **ASEt** appears in display. If **ASEt** is not displayed, refer to the Enable mode section of this manual.

2. Press ↓ key. You are now in the alarm set mode. **PAL 1** should be in the upper display. If the display changes to **OFF**, this is an indication that no alarms are set in the program mode.

3. Press the 🕲 key to view the setting for the display code **PAL 1**, for hi-limit temperature. This should never be set above the maximum chamber temperature.

    *   If the setting <u>does not</u> have to be changed, move on to step 6.

    *   If the setting needs to be changed, continue on to step 4.

4. Press the ↓ key or ↑ key to change the setting.

5. When the correct setting is displayed press the 🕲 key to enter the new setting into memory and bring up the next code.

6. Press the 🕲 key to view the next setting, **PAL 2** (humidity alarm if so equipped.)

7. Repeat steps 3 through 6.

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

Start

Press 🕲 key until **ASEt** is in display

With **ASEt** in display press ↓ key

The first tune code should be in display

Press 🕲 key

View setting in display

Is setting in display correct? — No → Use ↑ or ↓ key to change setting

Yes ↓

Press 🕲 key to enter setting and bring up next code

Are changes and/or variations complete? — No → Press 🕲 key to view setting for new code

Yes ↓

With code on display press ↑ key to exit

Done

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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.

* Pens recording does not agree with displays - 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 ⓪ key. Display will say **oFF**. Press the ↑ key (display will change to **on**).

5. Press the ⓪ key. Display will say EPro. Press the ↑ key (display will return to **oFF** or **Oper** modes).

6. Repeat pressing the ⓪ 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 ⓪ key. The display will blank momentarily. Release the keys. **CAL 1** is complete.

8. Re-install the program and alarm set software parameters. Refer to the program mode and the alarm set 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!!!!**

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Reconfigure Hardware

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

1. Turn the controller power on while pressing the ⊕ key and the ↓ key simultaneously until the display blinks. Release the ⊕ key first, then release the ↓ key.

2. The first four digits of the hardware configuration will display (example 7400). Press the ↑ key and change hardware configuration back to basic controller (example 7410).

3. Next press the ⊕ key and the second set of four digits of the hardware configuration will display (example 0000-).

4. Press the ↑ key and change hardware configuration back to basic controller (example 0000-).

5. Press the ⊕ key. The third set of four digits of the hardware configuration will be displayed (example 0000).

6. Press the ↑ key and change hardware configuration back to basic controller (example 0001-).

7. Press the ⊕ key. Controller will self test.

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

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Master Clear

These instructions are for the controller hardware and software matrix.

1. Turn the controller power on 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!!!!

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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 10 of this manual.

3. Press the ⓪ key several times until CAL 9 is displayed.

   For single pen instruments

   a. Push and hold the ↓ key while simultaneously pressing the ⓪ 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 ⓪ 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 ⓪ 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 ⓪ 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.

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WORK SHEETS

We have provided programming worksheet for your convenience.

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 3 Program Mode Worksheet

Codes	Pen 1 Temperature	Pen 2 Humidity	Codes	Unit
inPS iCor			rLyA tLyb	
AL1 AL2			rLyC rLyd	
diSP dPoS			rLyE rLyF	
Euu EuL			rLyg rLyh	
HyAo SPul			CurA Curb	
SPLL Prnd			CurC Curd	
dFF PFF			CoAr Cobr	
Pout Pou			CoCr Codr	
PoL Cru			Crt Coo	
CrL PAEC			CCon CbS	
			CAd1 CAd2	