INSPIRED INNOVATION

Despatch INDUSTRIES

PROTOCOL *PLUS™* Controller
OWNER'S MANUAL

E-98
PN 143895
VERSION 2
12/2010

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1. About This Manual

1.1. Important User Information

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In no event will Despatch Industries be liable for technical or editorial omissions made herein, nor for direct, indirect, special, incidental, or consequential damages resulting from the use or defect of this manual.

O	***Values displayed on screens are examples only. Though those values may be typical, contact Despatch Industries for the final value.***

O	***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.***

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Danger!

Only fully-trained and qualified personnel should setup and maintain this equipment. Improper setup and operation of this equipment could cause an explosion that may result in equipment damage, personal injury or possible death.

The information in this document is not intended to cover all possible conditions and situations that might occur. The end user must exercise caution and common sense when installing or maintaining Despatch Industries products. If any questions or problems arise, call Despatch Industries at 1-888-DESPATCH or 1-952-469-5424.

1.2. Manufacturer & Service

The Protocol Plus™ controller is a proprietary controller designed by Despatch Industries.

Despatch has specialized in thermal processing for over 100 years. Technical expertise gained over those years helps provide innovative solutions to critical applications in vertical markets and cutting edge technology worldwide. Despatch products are backed by a drive for long-term customer satisfaction and a strong sense of responsibility. The worldwide network of factory-trained Service Professionals is available to support your Despatch equipment. From full service preventive maintenance to routine repair and certified calibration and uniformity, the Despatch service network is positioned to respond to your business needs. Our service programs are customized to meet your specific needs using our Advantage Service Assurance Program (ASAP). For more information on ASAP, visit www.despatch.com.

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1.3. Organization of this Manual

This owner's manual contains the most comprehensive set of information for the Despatch Protocol Plus controller, including installation instructions, theory of operation, operating instructions, among other things.

Danger!

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

1.4. Conventions

O	*This icon signifies important information.*
	This icon signifies information that describes an unsafe condition that may result in death, serious injury, or damage to the equipment.
Danger!	*A condition that may result in death, serious injury, or damage to equipment.*
Warning!	*A condition that may result in serious injury or damage to equipment.*
Caution!	*A condition that may result in damage to equipment or product.*
LOG OUT	*Reversed-out, Bold, 10pt Arial typeface indicates a specific key or button on screen to click.*

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1.5. Specifications

UL, cUL listed:	UL file E136675
CE compliance to:	· EMC Directive 2004/108/EC · Low Voltage Directive 2006/95/EC
Power supply:	· 100 to 240 VAC +10% -15%, 50-60Hz, 30VA Maximum · 12 to 24 VAC/VDC +/-10%, DC to 60Hz, 30VA Maximum
Temperature:	· Storage -20 to 60°C · Operating 0 to 50°C
Humidity:	90% or less, non-condensing
Sensor inputs:	· Type J thermocouple -73°C to 760°C (-100°F to 1400°F) · Input impedance 1M ohm or greater · Common mode noise rejection of 140db@60Hz · Common mode input voltage of +/-12.0 VDC · Sample rate of at least 1 sample per second · Stability of +/- 0.5°C per 5°C change in ambient temperature · Repeatability of +/- 0.5°C, or +/-0.1% of sensed temperature (whichever is greater) · Accuracy (@ 77°F +/-0.2 percent of span (+/-3°F) · Supply Voltage Influence of +/-0.5°C per 10% change in nominal line voltage
Temperature display:	· 1 degree resolution (C or F) · Accuracy after calibration of +/- 1°C, or +/-0.2% of sensed temperature (whichever is greater) @25°C · Four-digit seven-segment LCD, 0.43 inches high (11mm) · Readout Stability (+/-1°F/10°F Change in ambient temperature)
Message display:	· Two-line, 16 alpha-numeric 5x7 dot matrix characters per line · 0.2 inches high (5mm)
Time base:	+/- 4 seconds accuracy in 24 hours
Heat control output:	SSR Drive 24VDC nominal @ 70mA
Relay output: (plug-in module)	Form A dry contact, rated 3 amps @ 24-264VAC
Retransmit output:	1 to 5 VDC into > 100K ohm load
Communications: (plug-in module)	· RS232 Single drop, isolated · RS422 Multi-drop, isolated · RS485 Multi-drop, isolated
Remote inputs: (plug-in module)	Dry-contact closure type with less than 250 ohm ON resistance
Front panel:	NEMA 4X (with gasket)
Dimensions:	3.57H x 7.24W x 2.84D inches (91H x 184W x 72D mm)
Panel opening:	3.63H x 7.30W inches (92H x 185W mm)

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2. Safety

2.1. Safety Information

Do not work on the Protocol Plus controller without reading and understanding this section which contains important information and warnings. Ignoring these warnings can result in death, serious injury or damage to the machine and product.

2.1.1. Lockout

Machine lockout places the Protocol Plus controller into a zero energy state and prevents accidental machine start up. Always follow the Lockout Procedure described in this Section before cleaning, maintaining or repairing the Protocol Plus controller. An accidental start-up, while working on the Protocol Plus controller, can result in serious injury or death.

2.1.1.1. Lockout Requirements

1. Every power source that can energize any element of the Protocol Plus controller must be shut off at the closest possible power source. This includes air, water and electricity, including the Disconnect Switch.
2. After energy sources are locked out, test to ensure circuits are de-energized.

2.1.1.2. Lockout Procedure with Despatch Products

Personnel authorized to lockout equipment must have the necessary locks to perform the lockout.

1. Physically disconnect all electrical power to the machine or lockout the appropriate breaker or disconnects.
2. Close all valves and bleed off any pressure.
3. Test for power by attempting a start with the machine controls.
4. Identify the Lockout Condition with a tag on the electrical disconnect and pneumatic shut off valve.
5. When work is complete, remove all tags and restore the machine to its working state.

Danger!

Electrical panels contain high voltage. Disconnect and lock out the power supply before working inside any electrical panels. Failure to lock out the power supply can result in death or injury.

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2.2. Maintenance

Only qualified and trained personnel should perform maintenance or repair.

2.3. Electrical Power

Only qualified and trained personnel should perform electrical maintenance or electrical repair.

Danger!

Contact with energized electrical sources may result in serious injury or death.

- Before performing maintenance, disconnect all electrical power from the machine. Use a padlock and lockout all disconnects feeding power to the machine.
- Never clean or repair the controller when in operation.
- Unauthorized alterations or modifications to Protocol Plus controller are strictly forbidden. Never modify any electrical circuits. Unauthorized modifications can impair the function and safety of the Protocol Plus controller.

2.4. Fire

Keep the Protocol Plus controller clean and free of scrap materials, oil or solvents to prevent the possibility of fire. In the event of fire, use a fire extinguisher as follows.

1. De-energize the machine immediately by pushing an Emergency Stop push button
2. Turn off the remote main disconnect (customer supplied disconnect).
3. Extinguish the fire.

Danger!

Always disconnect all power before extinguishing a fire. Attempting to extinguish a fire in a machine connected to electrical power can result in serious injury or death!

2.5. Equipment Lockout Requirements

To prevent injury or equipment damage during inspection or repair, the Protocol Plus controller must be locked out.

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3. Theory of Operation

The Protocol Plus is a modular microprocessor based digital temperature controller (Figure 1). The Protocol Plus controller operates as a dual-functioning controller/high limit instrument. The control portion utilizes a time-proportioning voltage signal to control heating devices with minimal temperature fluctuations.

Figure 1. Operator Interface.

The high limit portion protects the product and/or the oven from overheating. If the product being processed has a critical high temperature limit, the high limit setpoint should be set to a temperature somewhat below the temperature at which the product could be damaged. If the product does not have a critical high temperature limit, the high limit setpoint should be set 5 to 15 degrees higher than the maximum programmed setpoint at which the oven will operate.

The Protocol Plus controller provides three primary operating modes:

- **Manual**: Oven operates continuously at a fixed temperature until turned off.
- **Timer**: Oven operates at a fixed temperature for a user-selected time period, then automatically turns off.
- **Profile**: Temperatures increase or decrease as defined by one of eight pre-programmable ramp and soak profiles. Each profile contains up to eight ramp and soak segments. The profiles can be linked to provide additional temperature combinations.

In addition these primary operating modes, the Protocol Plus controller employs a Stopped Mode, Auto Start Mode, Setup Mode and Fast Start Mode:

- **Stopped Mode**: All control and relay outputs are off. Stopped Mode is integrated into each of the modes of operation.
- **Auto Start Mode**: Control may automatically start Manual, Timer, or Profile mode based on a preset time and day. Optional event outputs can be utilized during Manual, Timer, or Profile modes.
- **Setup Mode**: Provides access to control configuration and programming of profiles. Setup Mode contains ten separate electronic "Pages" where configuration and programming parameters (Menu items) are found and can be manipulated.
- **Fast Start Mode**: Provides for automatic startup of an operating mode when power is applied. Use Fast Start Mode if the same mode of operation is used every day. The user can turn on the power and the oven will start the desired process automatically. The Fast Start Mode is controlled by the Power-Up Start parameters on the Control page.

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3.1. System Control—In General

- The Protocol Plus controller provides outputs for the cooling fan, door lock switch/door release pushbutton, and optional beacon light
- As many as eight profiles for oven heating cycles are stored in the Protocol Plus controller. Access profiles using the Protocol Plus keypad.
- The Protocol Plus controls the solenoid valves in an inert atmosphere oven for purge and maintain operation

3.1.1. High-Limit Function

The Protocol Plus controller has an integrated high limit function which disables the heater output when tripped. Find High-Limit temperature readouts on LCD Line #2 in all Modes (Stop, Run, Hold, and Standby) except Setup Mode. High-Limit temperature is displayed for 10 seconds, alternating with current Mode and Status display for 10 seconds. The control will not allow the high limit setpoint to be set below the current setpoint value.

If the high limit trips, the Hi-Limit indicator will light and the relay must be manually reset. Allow the oven to cool several degrees (or increase the high limit setpoint) and then press **Reset**. The indicator will turn off.

3.1.2. Optional Serial Communications Hardware

Optional MODBUS RS422/485 serial communications hardware may be installed on the Protocol Plus controller, with a 9-pin communications port located on rear of oven. This provides the ability to network the oven(s) with a host PC.

3.2. Display Functions

The Protocol Plus controller has two displays. A dedicated LED upper display shows the oven temperature (Figure 2). A two line LCD lower display provides information on control status, high limit temperature and allows changes to be made to the control settings. Figure 3 shows a schematic of the Protocol Plus face plate.

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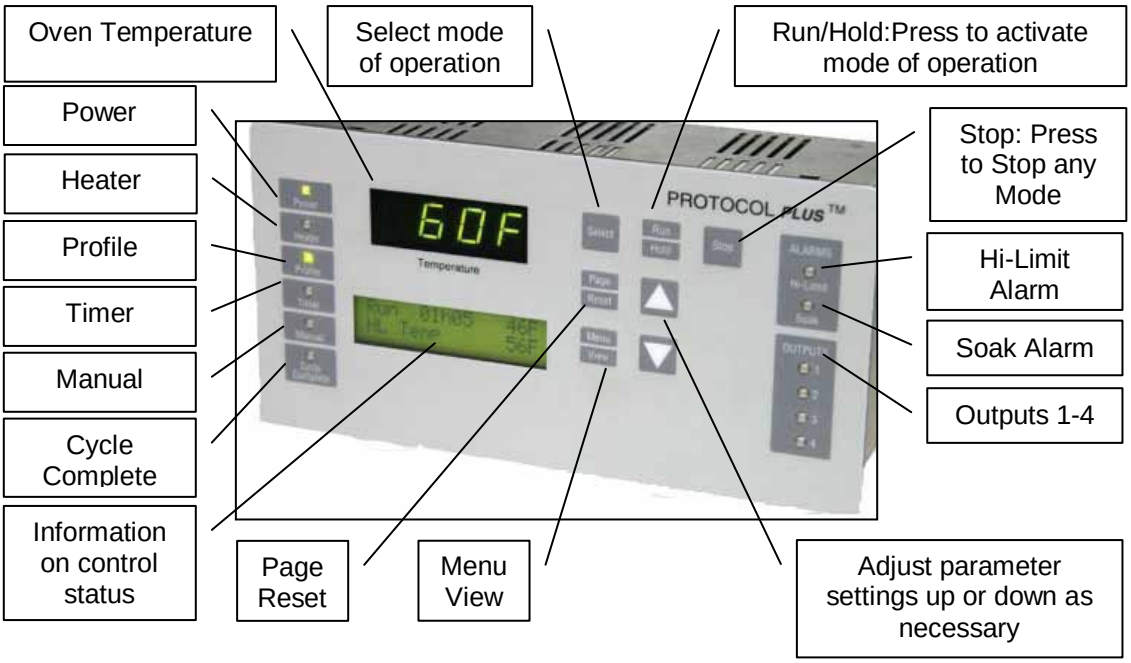

Figure 2. Protocol Plus Displays and Control Buttons.

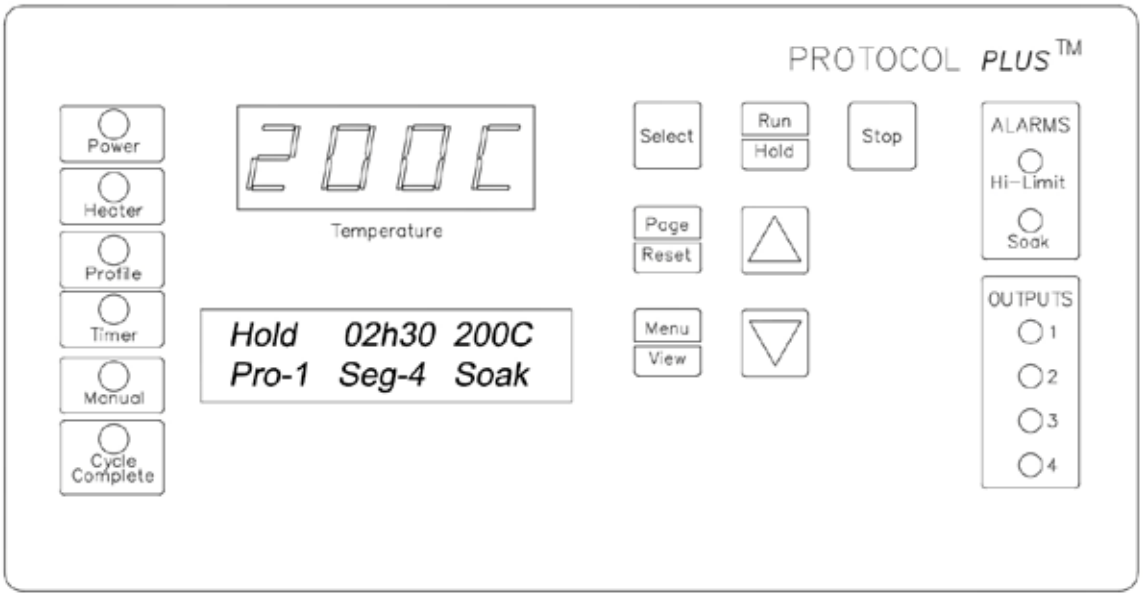

Figure 3. Protocol Plus Controller Faceplate.

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3.3. Modes and Menus

The Protocol Plus controller uses a menu system to display, setup and run the different modes and configurations available for the LCC Oven (Figure 4).

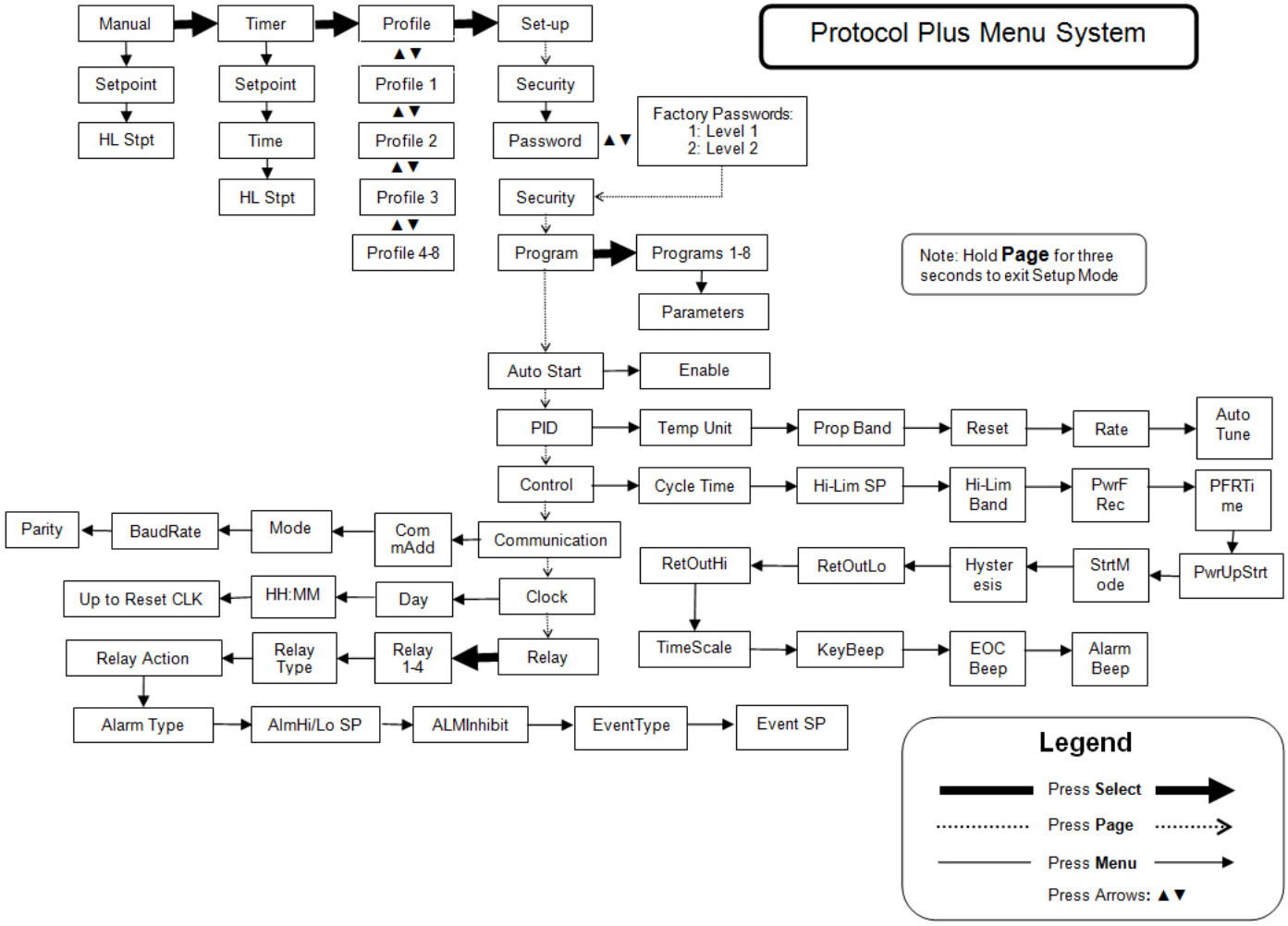

Figure 4. Protocol Plus Menu System—Setup Detail

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3.4. Indicators

Refer to Figure 2:

- Power LED: Indicates power supplied to instrument
- Heater LED: Indicates heater output active
- Profile LED: Indicates Profile Mode is in operation
- Timer LED: Indicates Timer Mode is in operation
- Manual LED: Indicates Manual Mode is in operation
- Cycle Complete LED: Indicates control is in Stopped or Standby modes.
- Hi-Limit Alarm LED: Indicates high limit relay has tripped (de-energized).
- Soak Alarm LED: Indicates the guaranteed soak deviation is in alarm condition.
- Outputs 1 through 4: Indicate that the optional relay outputs are in the ON state. These outputs may be configured as timed event outputs, process temperature trip point outputs, alarm outputs, or as an end of cycle relay output. The ON state can be configured as energized or de-energized.

3.5. Key Functions

Refer to Figure 2:

- **Select**: Press to select mode of operation. In Setup Mode, to select profile number or relay. In Profile/Run Mode, press simultaneously with the UP key to advance a segment.
- **Run/Hold**: Press to activate a mode of operation. If a Profile (or Timer) Mode is running, pressing the Run/Hold key will place the Profile (or Timer) in Hold status. A subsequent press will resume the Profile (Timer).
- **Stop**: Press to stop any mode of operation.
- **Page/Reset**: While in Setup Mode, press to access different Pages of configuration, Press this key to silence an alarm if the instrument alarm sounds during operation. In an operating mode, if an alarm or error condition occurs, press this key to return the instrument to normal operation once the condition is cleared.
- **Menu/View**: While running any operating mode, pressing this key will display the high limit setpoint. While in Setup Mode, pressing this key will provide access to each Menu parameter.
- ▲▼: Press to adjust parameter settings. In Profile/Stopped Mode, press to select profile to run. In Profile/Run Mode, press ▲ simultaneously with **Select** to force the program to advance one segment.

3.6. Outputs

The Protocol Plus controller comes standard with an output signal that can transmit temperature data to a user-supplied recording device. Optional output relays (four) can also signal user-specified events or alarm to external devices (Figure 5).

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- **Heating output:** The control output is a DC voltage open-collector output which is time-proportioned and designed to control a heat control device such as a solid state relay.
- **High limit:** The high limit output is a form C relay which is energized under normal operating conditions. If the control senses a temperature higher than the high limit setpoint, or if there is a sensor error, the high limit relay will de-energize until the condition is cleared and **Reset** is pressed. When the high limit relay is de-energized, the heater is disabled.
- **Retransmission:** The retransmission output is a DC 1 to 5 volt or 4 to 20 ma (DC) signal that is proportional to the process temperature. The signal can be an input to other devices such as a chart recorder.
- **Relay** (**four optional outputs**): The four form A dry contact relay outputs can be configured to function as alarms, events, or end of cycle. These outputs can be utilized in Manual, Timer, or Profile Modes.

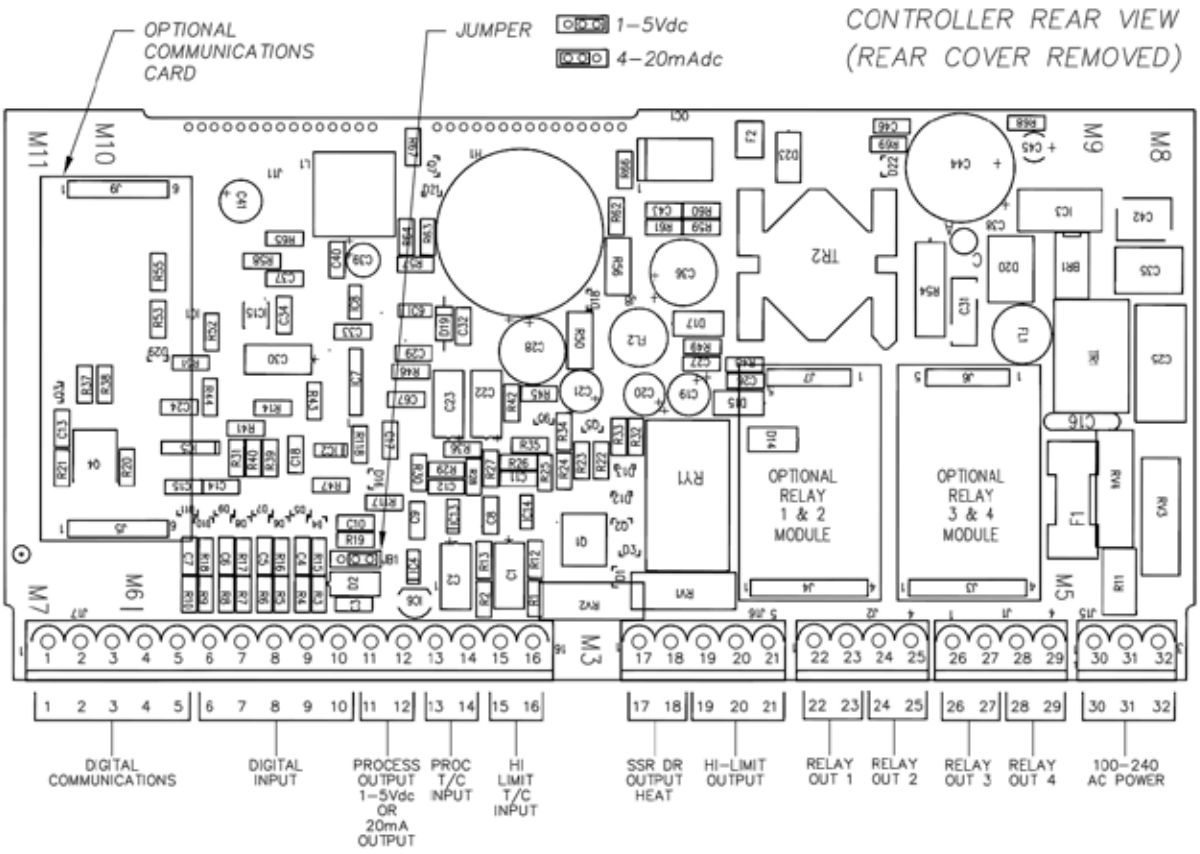

Figure 5. Protocol Plus Controller with Rear Cover Removed, Showing Locations for Optional components.

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4. Assembly & Setup

Danger!

All grounding and safety equipment must be in compliance with applicable codes, ordinances and accepted safe practices.

Warning!

Disconnect the main power switch or power cord before attempting any repair or adjustment.

4.1. Install the Protocol Plus Controller

When replacing a Protocol Plus controller, follow the steps below. Tools required for installation include ¼" socket set with #1 bit, #2 Philips screwdriver.

1. Disconnect the power.
2. Remove the screws from the sides of the control panel and slide it forward.
3. Unplug all terminals on the rear of the control, noting the proper connections (Figure 6).
4. Remove the four retaining clips for the control.
5. Remove the control.
6. Insert the new control into the panel.
7. Fasten the four retaining clips.
8. Re-plug all terminals.
9. Fasten the control panel.

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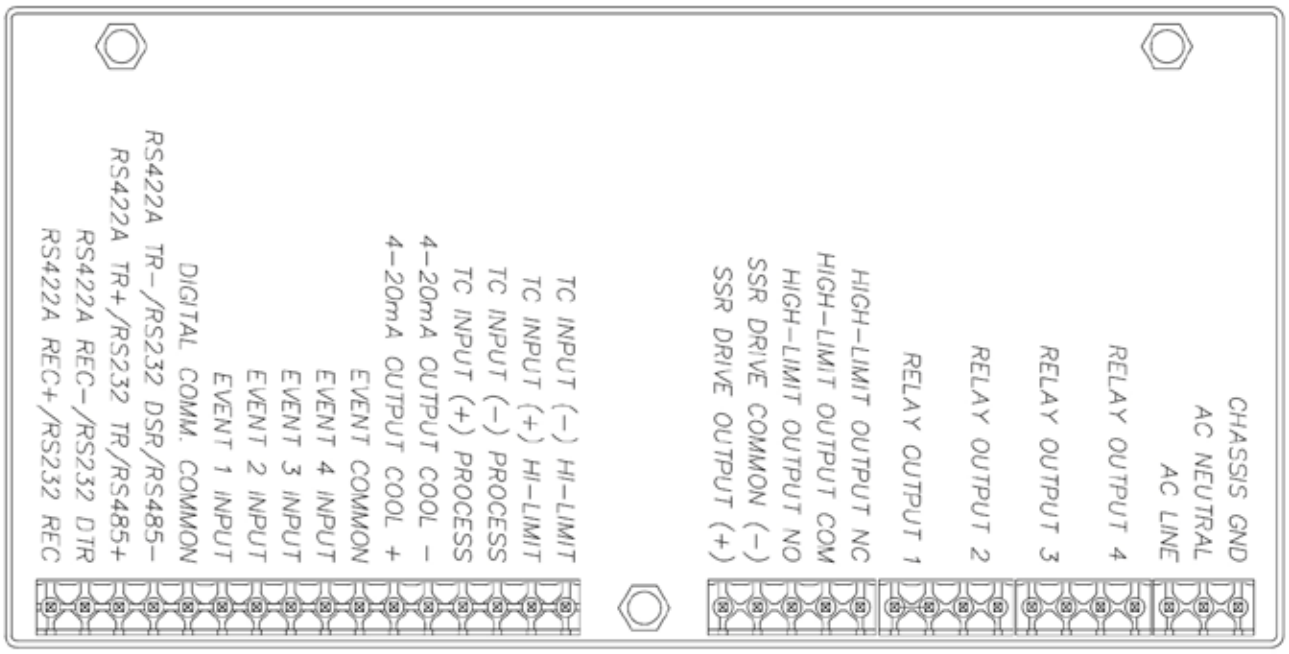

Figure 6. Protocol Plus Wiring Diagram.

4.2. MRC5000 Setup (Optional)

O	***Refer to instructions provided recorder manufacturer for more specific installation notes.***

Temperature is retransmitted to the MRC5000 recorder from the controller. Set up the recorder by:

1. Ensure hardware jumper JU1 is in place for the 5 VDC setting (Refer to MRC5000 Manual included).
2. Move **Mode** to **PROG/TEST/CAL** to display **Prog**.
3. Press ▼ twice to display **Inps**. Move to each Parameter Code using ▼or ▲. Adjust each Parameter Code using the settings in Table 1.
4. After adjusting all settings, move **Mode** to **RUN**. Display on both the Recorder and controller should read the same.

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Table 1. MRC 5000 Settings.

Parameter Code	Degrees C	Degrees F
Inps	18	18
Icor	0	0
diSP	On	On
dPOS	0	0
EUU[1]	400	752
EUL[1]	0	32
ChUP	400	800[2]
ChLO	0	0
DFF	1	1

[1] These values must match the settings RetOutLo and RetOutHi on the Protocol Plus Control page. For example, if RetOutLo is 32, EUL must read 32.
[2] Change 0-400 chart paper to 0-800 chart paper. Depending on the equipment used, 0-600 paper may be used if the maximum temperature is 500 degrees F.

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5. Working with Operating Modes

O	***Users and operators of this controller must comply with operating procedures and training of operating personnel as required by the Occupational Safety and Health Act (OSHA) of 1970, Section 5 and relevant safety standards, and 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.***

5.1. Start-up Basics

O	***Configuration controls may need to be changed depending on the mode used. Refer to the specific operating instructions below, for more information.***

At initial power-up, control is in Manual/Stopped Mode (unless the Autostart or Fast Start Modes are active). To activate any operating mode from Manual/Stopped Mode, press **Select** until the desired mode is displayed and then press **Run**. If the proper Profile number is not displayed when the Profile Mode is accessed, press ▲ or ▼ until the desired Profile number is displayed, then press **Run**. If no profile numbers are displayed (display reads **None**), no profiles are currently programmed. Refer to Section 5.6 for instructions about setting up profiles.

Note that:

- When the lower LCD display reads **HL Temp,** the Hi limit thermocouple actual temperature reading is displayed. Note that the actual temperature reading is not an error message.
- The temperature setpoint can be adjusted while Manual or Timer Mode is running by pressing ▲ or ▼.
- To momentarily hold the Timer or Profile Mode, press **Hold**. To continue the Timer or Profile Mode, press **Run**.
- To return to Stopped Mode at any time, press **Stop** and the Cycle Complete LED will illuminate.

Note that the control can be configured to automatically activate Manual, Timer or Profile Mode when power is applied (power switch turned ON). See Control Page in the Setup Mode to utilize the Fast Start mode (Section 5.6.7).

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O	***Control can be configured to automatically activate Manual, Timer or Profile Mode when power is applied (power switch ON). Refer to Section 5.5.***

5.2. Manual Mode

1. Press **Select** until **Manual** displays.

O	***Press* Run *at any time in the procedure to activate Manual Mode.***

2. Press **Menu** to display the Process Temperature Setpoint (**Setpt**). Change Setpoint (**Setpt**) by pressing ▲ or ▼.

O	***If the* SPChange *on the Enable page in Setup Mode has been set to DISABLED, it must be changed to ENABLED before any changes to the process temperature and high limit setpoints can be made.***

3. Press **Menu** a second time to display current high limit setpoint (**HLSP**). The value can be adjusted pressing ▲ or ▼. If **Band** displays, the High Limit band feature is activated (see Control page, Section 5.6.7) and the high limit cannot be adjusted.
4. **Optional feature**: Press **Menu** a third time to display Event1. Press ▲ to turn the event ON or ▼ to turn the even OFF. Repeat for all events which are enabled (up to four events).
5. To start Manual Mode, press **Run**.

The display changes from **Stop** to **Run**. Return to Stopped Mode by pressing **Stop**. While in operation, the process setpoint can be adjusted by using ▲ or ▼ to change the value while the mode is running. Press **Menu** to display the High Limit Setpoint (HLSP) setting.

O	***Changes to High Limit Setpoint or Event Output Configuration must be accomplished from the Stop Mode.***

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5.3. Timer Mode

1. Press **Select** until **Timer** displays.

O	***Press* Run *at any time in the procedure to activate Timer Mode.***

2. Press **Menu** to display the Process Temperature Setpoint (**Setpt**). Change Setpoint (**Setpt**) by using ▲ or ▼ to change the value.

O	***If the* SPChange *on the Enable page in Setup Mode has been set to DISABLED, it must be changed to ENABLED before any changes to the process temperature and high limit setpoints can be made.***

3. Press Menu a second time to display current high limit setpoint (**Hi-Lim SP**). Change Setpoint (**Hi-Lim SP**) using ▲ or ▼. If **Band** displays, the high limit band feature is activated (see Control page, Section 8.1.5) and the high limit cannot be adjusted.
4. Press **Menu** a third time to display **Time Set**. Change the time setting by using ▲ or ▼.
5. **Optional Feature**: Press **Menu** a fourth time to display **Event1**. Press ▲ to turn the event ON or ▼ to turn the even OFF. Repeat for all events which are enabled (up to four events).
6. Press **Menu** a fifth time to display the current guaranteed soak band (**TmrGuarSoak**) value. If the process temperature deviates from the setpoint by more than this value, the timer is placed in a **Hold** condition. The timer continues when the process temperature falls within range. Reference the Quick Reference and Default Values section (Section 8.1) for available settings.
7. To start Timer Mode, press **Run**. The display changes from **Stop** to **Run** and the time remaining displays. Return to **Stopped** Mode by pressing **Stop**. While in operation, the process setpoint can be adjusted by using ▲ or ▼ to change the value while the mode is running. Press **Menu** to display the High Limit Setpoint.

Pressing **Run/Hold** while in Timer Mode puts control in **Hold** status. The Timer LED will flash to indicate **Hold** status. Press **Run/Hold** key again to continue timing. The Timer LED will return to lit status.

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5.4. Profile Mode

1. Press **Select** until **Profile** is displayed. **None** may display if a profile has not been selected or no profiles have been entered.
2. Press ▲ or ▼ to display the desired profile.
3. Start Profile Mode by pressing **Run**.

The display will change from **Stop** to **Run** and show segment time remaining, Temperature Setpoint, Profile #, and the current segment number. To return to Stopped Mode, press **Stop**.

O	***Press* Run/Hold *while in Profile Mode puts the control into* Hold*. Press* Run/Hold *again to continue in Profile Mode. The Profile LED flashes to indicate Hold status.***

4. To advance to the next segment while running a profile, press **Select** and ▲ at the same time.

If **Link To** is set to **Standby** in the Program Page, at the End of Program/Profile,
1. **Cycle Complete** LED indication goes ON.
2. Controller beeps if **End of Cycle** beep is enabled.
3. Heater/control output keeps controlling oven temperature at last Soak setpoint.
4. All events programmed (if relay cards are installed and programmed as an event) for the last Soak Segment stays active.

O	***Ramping down too fast may cause the high limit relay to trip unexpectedly if the high limit band feature is used. Avoid tripping the high limit relay by using a separate cooling profile (one that does not use the high limit band) and then linking to that profile to perform rapid cooling.***

5.5. Auto Start Mode

Auto Start allows the operator to start Manual, Timer, or Profile modes automatically at a preset time and day. See Setting Up Auto Start (Section 5.6.5) for the time, day, and operating mode settings.

O	***If* AutoStart *is set to No in the* Setup *menu,* AutoStart *will not display on the main Menu. If* AutoStart *is set to Yes in the Setup menu,* AutoStart *will display on the main Menu.***

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To activate Auto Start:
1. On **Auto Start** page, set **Enable** to **Yes**.
2. LCD displays **Active**, current date and time

To deactivate Auto Start, on **Auto Start** page, set **Enable** to **No**.

Once Auto Start is activated, continue to use all operating modes as you normally would. If an operating mode is running at the time of a preset Auto Start function (provided Auto Start is activated), the existing operating mode will override the Auto Start function and the Auto Start will not turn on.

O	***All processes set to run in Auto Start must be at least one minute long for all Run Modes (Manual, Timer, and Profile).***

5.6. Setup Mode

Use Setup to configure a number of control parameters. To access Setup, the controller must read **Stop**.

5.6.1. Enter and Exit Setup Mode

Enter Setup from Stop by:
1. Press **Select** until **Setup** displays.
2. Press **Page**. **Security** displays.
3. Press **Menu**. **Password** displays. Use ▲ or ▼ to enter the proper password and press **Page**.

O	***Passwords Protection*** ***The controller has two levels of password protected security. Level one provides access only to those menu pages enabled on the Enable page. Level two provides access to all menu pages, including the Enable page. The default security password values are* 1 *for level one and* 2 *for level two.*** ***If an improper password has been entered, the control will remain at* Security*. To enter the proper password, press* Menu*.***

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Exit Setup by pressing **Page** and holding for three seconds.

Access each of individual Setup pages by pressing **Page** until the desired heading displays. Press **Menu** to access Menu parameters. Press ▲ or ▼ to change Menu parameter settings. Refer to the Quick Reference and Default Values Appendix (Section 8.1) for default and available settings.

5.6.2. Temperature Scale Conversion

The Protocol Plus controller can be operated for either Centigrade or Fahrenheit. The controller defaults to Centigrade. Chang from Centigrade to Fahrenheit by:

1. Enter Setup Mode.
   a. Press **Select** until **Setup** displays.
   b. Press **Page**. **Security** displays.
   c. Press **Menu**. **Password** displays. Use ▲ or ▼ to enter the proper password and press **Page**.

O	***Passwords Protection*** ***The controller has two levels of password protected security. Level one provides access only to those menu pages enabled on the Enable page. Level two provides access to all menu pages, including the Enable page. The default security password values are* 1 *for level one and* 2 *for level two.*** ***If an improper password has been entered, the control will remain at* Security*. To enter the proper password, press* Menu*.***

2. Press **Page** until **PID** displays.
3. Press **Menu**. **Temp Unit F** or **Temp Unit C** displays.
4. Use ▲ or ▼ to toggle between and choose **F** and **C**.
5. Press and hold **Page** for approximately three seconds to exit Setup mode.

5.6.3. Program Page

Use the Program Page to program the heat profiles. Table 16 shows the menu items available. Eight profiles are available with up to eight ramp and soak segments per profile. See Section 5.6.3.2 for information on working with optional relay outputs.

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5.6.3.1. Using the Program Page

After entering the Program Page, press **Select** to reach the profile you desire to enter/edit. Press **Menu** to select the profile. The first parameter displays: Profile #, Segment 1, Ramp Time. Adjust the value by pressing ▲ or ▼. When the proper value is displayed, press **Menu** to continue to the next parameter. Continue using the **Menu** to view and adjust each parameter.

If the current segment's ramp time value is left at 0:00, the next press of **Menu** advances to the High Limit Setpoint parameter for that profile (**Hi-Lim SP**). Continue entering/verifying all parameters until arriving at the last parameter: Guaranteed Soak Band (**Guar Band**). After properly entering all parameters, press **Page** to return to the top of the Profile Page. Press **Select** to enter/edit another profile, press **Page** to access another page, or press and hold **Page** to exit Setup mode.

O	***While editing any profile, press* Select *to advance the control to the time value for the next segment, until the last segment has been reached. This allows faster editing of the profile rather than pressing* Menu *to advance past each parameter.***

If **Link To Pro** is set to Standby (**Stby**) in the Program Page at the end of running a Profile,

1. Cycle Complete LED indication goes ON.
2. Controller beeps if **End of Cycle** beep is enabled.
3. Heater/control output keeps controlling oven temperature at last Soak setpoint.
4. All events programmed (if relay cards are installed and programmed as an event) for the last Soak Segment stays active.

O	***Run a profile indefinitely by linking the profile to itself.***

5.6.3.2. Programming Optional Relay Outputs

Optional relay outputs must be configured prior to use. If optional relay outputs are installed, configure them as alarms or events on the Relay Outputs Page (Section 8.1.8) before using. If configured as event outputs, these relays can be used as time or temperature events.

Check your schematic for relay use in your oven, but typical uses for optional relays include:

· Relay 1: Cooling event

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- Relay 2: End of cycle relay
- Relay 3: Optional N2 purge event
- Relay 4: Optional N2 maintain event

Table 2. Program Page Menu Items and Explanation.

Menu Item	Display	Description
Ramp Time Seg 1	**Pro-1 Seg-1 Ramp Time**	Ramp time for segment 1 of profile
Event 1 Set Value[3]	**Pro-1 Seg-1 Ramp Event 1**	Event 1 setting for segment 1 ramp of profile
Event 2 Set Value[3]	**Pro-1 Seg-1 Ramp Event 2**	Event 2 setting for segment 1 ramp of profile
Event 3 Set Value[3]	**Pro-1 Seg-1 Ramp Event 3**	Event 3 setting for segment 1 ramp of profile
Event 4 Set Value[3]	**Pro-1 Seg-1 Ramp Event 4**	Event 4 setting for segment 1 ramp of profile
Soak Temp Seg 1	**Pro-1 Seg 1 Soak Temp**	Soak temperature for segment 1 of profile
Soak Time Seg 1	**Pro-1 Seg 1 Soak Time**	Soak time for segment 1 of profile
Event 1 Set Value[3]	**Pro-1 Seg-1 Soak Event 1**	Event 1 setting for segment 1 soak of profile
Event 2 Set Value[3]	**Pro-1 Seg-1 Soak Event 2**	Event 2 setting for segment 1 soak of profile
Event 3 Set Value[3]	**Pro-1 Seg-1 Soak Event 3**	Event 3 setting for segment 1 soak of profile
Event 4 Set Value[3]	**Pro-1 Seg-1 Soak Event 4**	Event 4 setting for segment 1 soak of profile
(Repeat for segments 2-8, until ramp = 00:00)		
High Limit Setpoint	**Profile-1 Hi-Lim SP**	High limit setpoint for profile[4]
Loop From	**Profile-1 Loop From Seg**	To start a loop action in a profile
Loop To	**Profile-1 Loop To Seg**	To end a loop action in a profile
Loop Count	**Profile-1 Loop Number**	Number of times to execute loop
Profile Link	**Profile-1 Link To Pro**	To jump from this profile to another
Guaranteed Soak	**Profile-1 Guar Band**	Guaranteed soak band for profile

[3] Available only if optional relay outputs are installed (repeat all for Profiles 2-8).
[4] Set to **Band** to use the high limit band feature.

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Table 3. Parameter Definitions and/or Ranges.

Parameter	Definition and/or Range
Profile #	Eight profiles are available
Segment #	Program recipe segments one through eight. Give each segment its own set of events, ramp and soak times and soak temperature.
Ramp Time	Time required to move oven temperature from one setpoint to another. Values between 0 and 99:59 are allowed. The Protocol Plus controller stores profile ramp and soak times without units. Times are set as hours and minutes (HH:MM) or minutes and seconds (MM:SS). The setpoint automatically increments from the actual temperature to the soak temperature.
EV1 through 4	Program from one to four events into the ramp time portion of each segment. Events typically involve actuating/disabling relays to close/open valves or perform other relay-controlled functions. NOTE: Events actuate only when the controller has the optional relay cards installed and is programmed for an event.
Soak Temp	Enter the temperature setpoint of a particular segment. The setpoint can range from -18 to 540 °C (0 to 1000 °F).
Soak Time	Enter the duration of soak. Soak Time can range from 0 to 99:59.
EV1 through 4	Program from one to four events into the soak portion of each segment. Events typically involve actuating/disabling relays to close/open valves or perform other relay-controlled functions. NOTE: Events actuate when the controller has the optional relay cards installed and is programmed for an event.
Hi Limit SP	Enter the high limit setpoint. If the temperature exceeds this value, hi-limit will alarm and shut off the heater.
Loop From	Identify segment number to loop from.
Loop To	Identify segment number to loop to.
Loop Number	Enter value from 1-99 to preset the number of times to run the loop established in "Loop From" and "Loop To."
Link to Pro	Enter value to instruct profile in steps to take when the profile ends. Values include: · STANDBY: Holds temperature setpoint while keeping event relay(s) at last status, actuates cycle relay(s) · STOP: Turns heater and all relays to OFF status · HOLD: Holds temperature setpoint and all relays at last status, at end of profile · Value 1 – 8: Jump to specified profile
Guaranteed Soak Band	Enter value that determines if the process temperature has deviated from the setpoint. If the process temperature deviates from the setpoint by more than the "Guaranteed Soak Band" value, the soak timer is placed in a hold condition. The timer continues when the process temperature falls within range.

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5.6.4. Sample Profile

Figure 7 shows a graphic representation of the sample profile, while Figure 8 shows the parameters entered to achieve that profile.

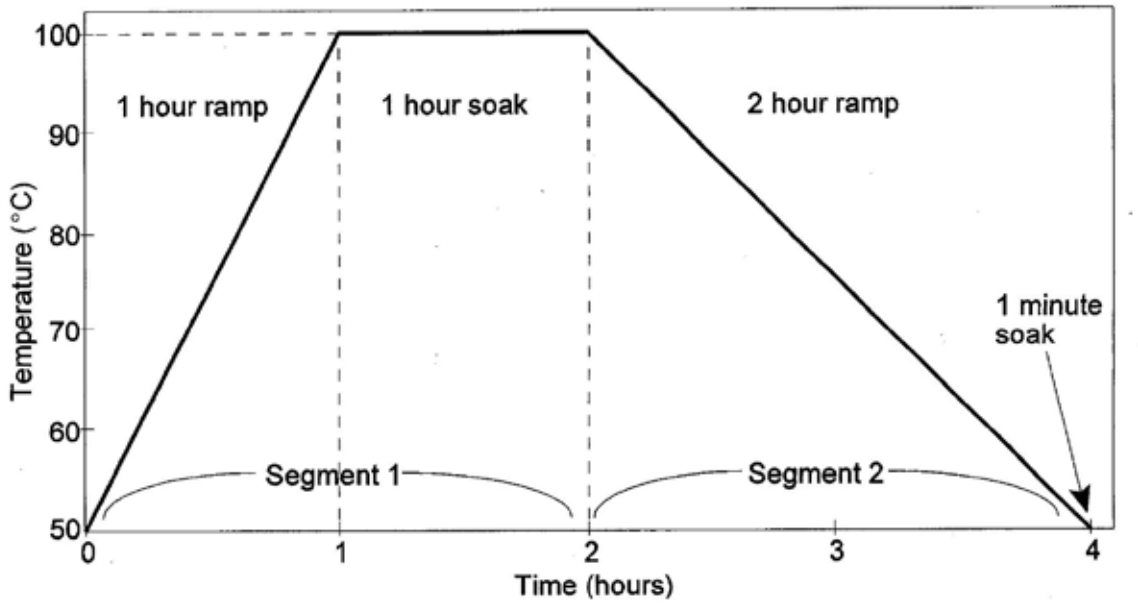

Figure 7. Sample Profile.

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Profile Number____1_____ **Profile Name**_____

Seg-ment	Ramp					Soak					
	Time	Events				Temp-erature	Time	Events			
		1	2	3	4			1	2	3	4
1	01h00					100	01h00				
2	02h00					50	00h01				
3	00h00										
4											
5											
6											
7											
8											

High Limit Setpoint	115
Loop From Seg	No
Loop To Seg	No
Loop Number	0
Link To Pro	No
Guar Soak Band	10

Figure 8. Sample Profile Values.

5.6.5. Setting Up Auto Start

Auto Start allows the operator to start Manual, Timer, or Profile modes automatically at a preset time and day. Table 4 shows the menu items available.

Table 4. Auto Start Menu Parameters and Values.

Menu Item	Display	Description	Range
Enable Autostart	Auto Start Enable	Enable (yes) or disable (no) the Autostart function	No, Yes
Sunday mode	Auto Start Sun Mode	Set mode on Sunday to activate	Off, Manual, Timer, Pro-1 to Pro-8
Sunday time	Auto Start Sun Time	Set time on Sunday for mode to activate	00:00 to 23:59
Monday mode	Auto Start Mon Mode	Set mode on Monday to activate	Off, Manual, Timer, Pro-1 to Pro-8
Monday time	Auto Start Mon Time	Set time on Monday for mode to activate	00:00 to 23:59
Tuesday mode	Auto Start Tue Mode	Set mode on Tuesday to activate	Off, Manual, Timer, Pro-1 to Pro-8

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Menu Item	Display	Description	Range
Tuesday time	Auto Start Tue Time	Set time on Tuesday for mode to activate	00:00 to 23:59
Wednesday mode	Auto Start Wed Mode	Set mode on Wednesday to activate	Off, Manual, Timer, Pro-1 to Pro-8
Wednesday time	Auto Start Wed Time	Set time on Wednesday for mode to activate	00:00 to 23:59
Thursday mode	Auto Start Thu Mode	Set mode on Thursday to activate	Off, Manual, Timer, Pro-1 to Pro-8
Thursday time	Auto Start Thu Time	Set time on Thursday for mode to activate	00:00 to 23:59
Friday mode	Auto Start Fri Mode	Set mode on Friday to activate	Off, Manual, Timer, Pro-1 to Pro-8
Friday time	Auto Start Fri Time	Set time on Friday for mode to activate	00:00 to 23:59
Saturday mode	Auto Start Sat Mode	Set mode on Saturday to activate	Off, Manual, Timer, Pro-1 to Pro-8
Saturday time	Auto Start Sat Time	Set time on Saturday for mode to activate	00:00 to 23:59

5.6.5.1. Configure Auto Start

1. Access Setup Mode.
2. Press **Page** until **Auto Start** displays.
3. Press **Menu**.

O	***If the display does not change, the controller may not have the realtime clock option.***

4. Set **Auto Start Enable** to **Yes**.
5. Using **Menu**, scroll through the options available and press ▲ or ▼ to set the desired mode for each day of the week. Select from Manual, Timer or Profile 1 through 8.
6. After setting mode, press **Menu**.
7. Enter the time of day you wish the mode to activate.
8. Continue through the week by pressing **Menu**, or press **Page** if changes are complete.
    a. One Auto Start mode can be set for each day of the week.
    b. Exit Setup by pressing **Page** and holding for three seconds.
    c. Press **Select** until **Auto Start** displays.
    d. Make sure the correct time and day is displayed. If not correct, set time and day to the Real Time Clock Page in the Setup mode.

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5.6.5.2. Activate Auto Start

1. On **Auto Start** page, set **Enable** to **Yes**.
2. LCD displays **Active**, current date and time

5.6.5.3. Deactivate Auto Start

On **Auto Start** page, set **Enable** to **No**.

Once Auto Start is activated, continue to use all operating modes as you normally would. If an operating mode is running at the time of a preset Auto Start function (provided Auto Start is activated), the existing operating mode will override the Auto Start function and the Auto Start will not turn on.

O	***All processes set to run in Auto Start must be at least one minute long for all Run Modes (Manual, Timer, and Profile).***

5.6.6. Setting Up PID Page

The PID Page contains parameters that control the response to the setpoint and process variable input. Table 5 shows the menu items available.

Table 5. PID Page Parameters and Values.

Menu Item	Display	Description	Range
Display units	PID Temp Unit	Set display units to °C or °F	°C or °F
Proportional band	PID Prop Band	Set proportional band for tuning	1 to 56°C (1 to 100°F)
Integral reset	PID Reset/Rep/Min	Set integral reset for tuning	0.0 to 100 seconds/repeat
Derivative Rate	PID Rate In Sec	Set derivative rate for tuning	0.0 to 500 seconds
AutoTune	PID AutoTune	Enable auto tuning function	Disable, Enable

5.6.6.1. Access the PID Page

1. Enter Setup Mode.
2. Press **Page** until PID displays.
3. Press **Menu**.
4. Change parameters by pressing **Menu** until the desired parameter is displayed. Press ▲ or ▼ to set the desired value.

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5.6.6.2. Setting up Auto Tune

The AutoTune parameter disables or enables the AutoTune function. To use AutoTune:

1. Enter Setup Mode.
2. Press **Page** key until **AutoTune displays**.
3. Enable Autotune by pressing ▲ .
4. Press **Page** for three seconds to exit Setup Mode.
5. Cycle power to the instrument.
6. Set Manual Mode to **Run**. The display will alternate between **AutoTune** and **Manual**.

If the Manual Mode setpoint is less than 50 degrees higher than the actual process temperature, the AutoTune function creates an error condition. Clear the error by cooling the process temperature or increasing the setpoint until more than 50 degrees between them. After AutoTune has completed tuning, the AutoTune parameter will disable by itself.

Cancel AutoTune by pressing **STOP**. Access the PID page in Setup Mode, and set the AutoTune parameter to Disable.

5.6.7. Setting up the Control Page

The Control Page contains parameters that control miscellaneous functions. Table 6 shows the menu items available.

5.6.7.1. Access Control Page

1. Enter Setup Mode.
2. Press **Page** until **Control** displays.
3. Press the **Menu**.
4. Change each parameter by pressing **Menu** until the desired parameter is displayed, and then press ▲ or ▼ to change the value.

Table 6. Control Page Parameters and Values.

Menu Item	Display	Description	Range
Cycle Time	Control Cycle Time Sec	Set cycle time in seconds for control output	1 to 60 seconds
High limit setpoint	Control Hi-Lim SP[5]	Maximum value for all high limit setpoints	MinHiLimSP - MaxHiLimSP[6]
High limit band	Control Hi-Lim Band	If=0, high limit setpoint= Control Hi-Lim SP If>0, high limit setpoint= Control SP[6] + Band	Off, 3°C to 11°C (5°F to 20°F)

[5] High limit setpoint is a read-only item which is calculated on Enable page
[6] Includes ramping setpoints during profiles and controlled ramps

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Menu Item	Display	Description	Range
Power fail recovery	Control PwrFRec	Controls response to loss of power	Stop, Restart, Hold, Resume
Recovery time limit	Control PFRTime	Control aborts to Stopped mode if power is lost for time period longer then set value	00m00s to 99m59s
Powerup start enable	ControlPwrUpStrt	Allows mode to automatically start when power is first applied	Disable, Enable
Powerup Start Mode	Control StrtMode	Operating mode for powerup start	Off, Manual, Timer, Pro-1 to Pro-8
Hysteresis	Control Hysteresis	Hysteresis for all alarms and temperature events	1°C to 56°C (1°F to 100°F)
Process out low	Control RetOutLo	Process value for retransmit output = 1VDC	-73°C to 760°C (-100°F to 1400°F)
Process out high	Control RetOutHi	Process value for retransmit output = 5VDC	-73°C to 760°C (-100°F to 1400°F)
Time scale	Control TimeScale	Time scale setting for program and timer mode[7]	hh:mm or mm:ss
Key press beep	Control KeyBeep	Internal beeper sounds when key is pressed	On or Off
End of cycle beep	Control EOCBeep	Internal beeper sounds at end of cycle	On or Off
Alarm beep	Control AlarmBeep	Internal beeper sounds for alarms	On or Off

5.6.8. Setting up the Communication Page

The Communication Page contains parameters for the communications feature. Table 7 shows the menu items available.

5.6.8.1. Access Communication Page

1. Enter Setup Mode.
2. Press **Page** until **Communication** displays.
3. Press **Menu**.

O	***If the display does not change, the controller does not have the communication board installed.***

4. Change each parameter by pressing **Menu** until the desired parameter is displayed, and then press ▲ or ▼ to change the value.

[7] Power fail recovery time limit is always MM:SS regardless of time scale setting

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Table 7. Communication Page Parameters and Values.

Menu Item	Display	Description	Range
Address	Communication CommAddr	Sets address node for control	1 to 247
Mode	Communication Comm Mode	Turns on/off communications	OFF, Modbus
Baud Rate	Communication Baud Rate	Sets interface speed	2400, 4800, 9600, 19.2K, 38.4K
Parity	Communication Parity	Sets parity for interface	None, Odd, Even

5.6.8.2. Setting up the Real Time Clock Page

The real time clock is a seven day, 24-hour clock with battery backup. The Real Time Clock Page allows an operating mode to begin automatically at a specific time on a specific day of the week. The real time clock feature also for use of the Power Failure Recovery mode Time Limit feature (see Setting up the Control Page Section 5.6.7). Table 8 shows the menu items available.

5.6.8.3. Access Real Time Clock Page

1. Enter Setup Mode.
2. Press **Page** until **Clock** displays.
3. Press **Menu**.
4. Change each parameter by pressing **Menu** until the desired parameter is displayed, and then press ▲ or ▼ to change the value.

Table 8. Real Time Clock Page Parameters and Values.

Menu Item	Display	Description	Range
Day of the week	Clock Day	Setting for current day of the week	Sun, Mon, Tue, Wed, Thu, Fri, Sat
Time of day	Clock Hh:mm	Setting for current time of the day	00:00 to 23:59
Reset clock	Clock UP to Reset[8]	Press the ▲ key to set the clock to entered values	Ready, Done

5.6.9. Setting up the Relay Outputs Page

The Relay Outputs Page configures the four alarm/event outputs. Each output has a dedicated indicator light and can be configured as a temperature alarm, profile event, or end of cycle output. Temperature alarms can be of type process high, process low, deviation high, deviation low, or deviation band. Table 9 shows the menu items available.

[8] If the ▲ key is not pressed, clock values retain original values. The display changes to **Done** if the clock is reset.

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5.6.9.1. Access Relay Outputs Page

1. Enter Setup Mode.
2. Press **Page** until **Relay** displays.
3. Press **Select** until the desired relay output is selected.
4. Press **Menu**.
5. Change each parameter by pressing **Menu** until the desired parameter is displayed, and then press ▲ or ▼ to change the value.
6. To configure a specific relay, press **Select** until the desired relay displays.

O	***If* Relay 0 *appears, no relays are installed. See relay kit assembly p.n. 144562.***

Table 9. Relay Outputs Page Parameters and Values.

Menu Item	Display	Description	Range
Type of relay	Relay 1 RelayType	Set function of relay	Off, Alarm, Cycl, Ev1 to Ev4
Action of relay	Relay 1 RelayAction	Set coil and contact state of relay	· NDE (Normally de-energized) · NE (Normally energized) · NDEL (Normally de-energized Latching), NEL (Normally energized Latching)[9]
Type of alarm[10]	Relay 1 AlarmType	Set alarm type for relay	High, Low, Plus, Minus, Band
Alarm setpoint[10]	Relay 1 AlmHi/Lo SP	Setpoint for alarm	-73°C to 760°C (-100°F to 1400°F)
Alarm deviation[10]	Relay 1 AlmDevBand	Deviation band for alarm	1 to 56°C (1 to 100°F)
Inhibit alarm[10]	Relay 1 ALMInhibit	Inhibits alarm until "safe" condition is reached	En or Dis[11]
Type of event[12]	Relay 1 EventType	Set event type for relay	Time or Temp
Event setpoint[13]	Relay 1 Event SP	Setpoint for temperature event	SPLoLim to SPUpLim
Repeat for relay outputs 2-4, if available			

[9] If the relay output has been configured as latching, the RESET key must be pressed to return the output to the non alarm state once the alarm condition has cleared.
[10] Appears only for alarm types.
[11] Turning on the Alarm Inhibit function disables the alarm output on power up until the process temperature has reached a non alarming condition ("safe").
[12] Appears only for time or temperature event types.
[13] Appears only for temperature event types.

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5.6.10. Setting up the Test Page

The Test Page contains parameters which allow manual control of the heat control and optional relay outputs. Table 10 shows the menu items available.

O	***Use the Test Page only for testing the functionality of the control instrument. Do not operate the oven for processes using the Test Page.***

5.6.10.1. Access Relay Outputs Page

1. Enter Setup Mode.
2. Press **Page** until **Test** displays.
3. Press **Menu.**
4. Change each parameter by pressing **Menu** until the desired parameter is displayed, and then press ▲ or ▼ to change the value.

Table 10. Access Relay Outputs Page Parameters and Values.

Menu Item	Display	Description	Range
Heater output	Test HeatOut	Activate SSR output 100%	OFF or ON
High limit relay	Test HiLimOut	Activate high limit alarm (de-energize relay)	OFF or ON
Relay 1 output	Test Rly1 Out	Energize relay output 1	OFF or ON
Relay 2 output	Test Rly2 Out	Energize relay output 2	OFF or ON
Relay 3 output	Test Rly3 Out	Energize relay output 3	OFF or ON
Relay 4 output	Test Rly4 Out	Energize relay output 4	OFF or ON
HiLim Sensor	Test HL Temp (push and hold up)	Displays sensor reading[14]	OFF or ON

O	***When entering the Test Page, all outputs are automatically set OFF. When exiting the Test Page, all outputs return to their previous condition regardless of Test Page settings.***

5.6.10.2. Setting up the Zone Calibration Page

The Zone Calibration Page allows adjustment of the displayed temperature versus the actual temperature measured by the control thermocouple. This may be desirable in

[14] Press ▲ to refresh display.

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certain conditions where the center of the oven chamber is not the same temperature as the control thermocouple. This temperature differential may occur when the oven is not allowed to soak at a constant temperature for long periods of time, or when the oven is being used at high temperature. Table 11 shows the menu items available.

5.6.10.3. Access Zone Calibration Page

1. Enter Setup Mode.
2. Press **Page** until **Zone Cal** displays.
3. Press **Menu**.
4. Change each parameter by pressing **Menu** until the desired parameter is displayed, and then press ▲ or ▼ to change the value.
5. Press **Page** to exit the Zone Calibration Page.

O	***Use Factory Calibration only when no calibration instrument is available. Push ▲ to restore factory values.***

Table 11. Zone Calibration Page Parameters and Values.

Menu Item	Display	Description	Range
Zone 1 actual	Zone Cal Zone1Act	Point at which Zone 1 is set (center of chamber)	-73°C to 760°C (-100°F to 1400°F)
Zone1 displayed	Zone Cal Zone1Dis	Desired displayed value for Zone 1 setting	-73°C to 760°C (-100°F to 1400°F)
Zone 2 actual	Zone Cal Zone2Act	Point at which Zone 2 is set (center of chamber)	-73°C to 760°C (-100°F to 1400°F)
Zone2 displayed	Zone Cal Zone2Dis	Desired displayed value for Zone 2 setting	-73°C to 760°C (-100°F to 1400°F)
Factory calibration[15]	Zone Cal FactCal	Restores the factory calibration values	Ready or Done (push-key)

5.6.10.4. Access Factory Calibration Recovery

Factory Calibration Recovery restores the original factory calibration values. This may be helpful if the calibration has been lost and a calibration instrument is not readily available. To use the Factory Calibration Recovery feature only, bypass the Zone 1 and Zone 2 calibration parameters by pressing **Menu**.

[15] Use only when no calibration instrument is available, push ▲ to restore factory values.

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5.6.10.5. Adjusting Actual Versus Displayed Parameters

Two points of display calibration (temperature offset) are available. The Zone 1 Actual and Zone 2 Actual parameters are the two temperature points where the offset is to take effect. These values are adjustable. The Zone 1 and Zone 2 Displayed parameters are the values the user wishes to have displayed at the Actual temperatures, and are also adjustable.

For example, the control is displaying 400°F with the setpoint being 400°F, but the center of the oven chamber is actually 395°F. This can occur due to oven wall losses and product loading variations. The operator may change the zone calibration so that the center of the oven is 400°F when the display reads 400°F. In this case operate the oven in manual mode with a setpoint of 400°F. Record the center of the chamber (as measured with an independent sensor). Access the Zone Calibration Page and enter this measured value as the Zone 2 Actual value, with 400° as the Zone 2 Displayed value.

Zone 1 can be adjusted using the same method at a lower temperature. The instrument will then create a linear offset based on the Zone1 and Zone 2 Actual temperature values. Note that the oven does not have to be heated to adjust the zone parameters if the zone values are known based on prior experience.

5.6.10.6. Setting up the Sensor Calibration Page

The Sensor Calibration Page has parameters which can change the internal calibration of the temperature sensor input signal. There is a low and high calibration point for both the control sensor and the high limit sensor. To calibrate the instrument, allow the control to warm up for at least 30 minutes.

5.6.10.7. Access Sensor Calibration Page

1. Enter Setup Mode.
2. Press **Page** until **Sensor Cal** displays.
3. Press **Menu**.
4. Change each parameter by pressing **Menu** until the desired parameter is displayed, and then press ▲ or ▼ to change the value.

The control may have the optional process value retransmission output feature. The output is a 1 to 5VDC signal. To calibrate the retransmit signal, the **RetOutLo** and **RetOutHi** values from the Control Page must be known. Bypass calibrating the control and high limit sensor input and access the retransmit calibration by pressing the **Menu** until **RetCalLo** displays (skip steps 4-17). Table 12 shows the menu items available.

To re-calibrate the instrument:

1. Disconnect the control and high limit sensor thermocouples.

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2. Connect a calibration instrument with a type J thermocouple output to the control sensor input. Allow the control to warm up at least 30 minutes.
3. Access Setup Mode.
4. Press **Page** until **Sensor Cal** displays.
5. Press **Menu** key until **Sensor Cal -100F** displays.
6. With **Ctrl Sens -100F** displayed, adjust the calibration instrument to Type J thermocouple, -100 degrees Fahrenheit output.
7. Wait 30 seconds. Press ▲.
8. With **Ctrl Sens 1400F** displayed, adjust the calibration instrument to 1400 degrees Fahrenheit output (Type J thermocouple).
9. Wait 30 seconds. Press ▲.
10. When **Ctrl Sens Done** displays, disconnect the calibration instrument from the control sensor input and connect it to the high limit sensor input. Reconnect the control sensor thermocouple.
11. Press the **Menu** until **HL Sens -100F** is displayed.
12. With the control displaying **HL Sens -100F**, adjust the calibration instrument to -100 degrees Fahrenheit output (Type J thermocouple).
13. Wait 30 seconds. Press ▲.
14. With the control displays **HL Sens 1400F**, adjust the calibration instrument to 1400 degrees Fahrenheit output (Type J thermocouple).
15. Wait 30 seconds. Press ▲.
16. When the control displays **HL Sens Done**, disconnect the calibration instrument from the high limit sensor input. Re-connect the high limit sensor thermocouple.
17. To skip calibration of the retransmit signal, press **Page** twice to exit the Sensor Calibration Page.
18. To calibrate the retransmit signal, press **Menu** until **RetCalLo** displays.
19. Connect a calibration instrument with a type J thermocouple output to the control sensor input.
20. Connect a voltage measurement device to the retransmit output terminals.
21. Set the calibration instrument output to the temperature value of the **RetOutLo** parameter from the Control Page.
22. Adjust the **RetCalLo**[16] value by pressing ▲ or ▼ to change the value until the voltage measurement device reads 1VDC.
23. Press **Menu**.
24. Set the calibration instrument output to the temperature value of the **RetOutHi** parameter from the Control Page.
25. Adjust the **RetCalHi**[16] by pressing ▲ or ▼ to change the value of the voltage measurement device to reads 5VDC.
26. Press **Menu**.
27. Press **Page** to exit the Sensor Calibration Page.
28. Calibration is now complete. Disconnect the calibration instrument and voltage measurement device (if used).

[16] The "RetCalLo" and "RetCalHi" values are only change indicators. The actual value is not meaningful.

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29. Verify that the control and high limit sensor thermocouples are connected.

Table 12. Sensor Calibration Page Parameters and Values.

Menu Item	Display	Description	Range
Control Sensor Cal	Ctrl Sens -100F Ctrl Sens 1400F Ctrl Sens Done	Calibrate Sensor Low End Calibrate Sensor High End Control Sensor Cal Complete	-100 to 1400°F -100 to 1400°F (read only)
HiLim Sensor Cal	HL Sens -100F HL Sens 1400F HL Sens Done	Calibrate HiLim Sensor Low End Calibrate HiLim Sensor High End HiLim Sensor Cal Complete	-100 to 1400°F -100 to 1400°F (read only)
Retransmit Cal	RetCalLo XXXX[17] RetCalHi XXXX	Calibrate Retransmit Output Low Calibrate Retransmit Output High	0 to 4096 0 to 4096

5.6.11. Setting up the Enable Page

The Enable Page controls access to the other Setup Pages when Level 1 Password is used. The setpoint minimum and maximum values, and the security passwords are also set on the Enable Page. Table 13 shows the menu items available.

5.6.11.1. Access Enable Page

1. Enter Setup Mode using a level 2 access code (See Section 5.6 for more on using access codes).
2. Press **Page** until **Enable** displays.
3. Press **Menu**.
4. Change each parameter by pressing **Menu** until the desired parameter is displayed, and then press ▲ or ▼ to change the value.

O	***Changing Enable to* Yes *for each page will allow access to the page in Level 1 security.***

[17] The "RetCalLo" and "RetCalHi" values are only change indicators. The actual value is not meaningful.

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Table 13. Enable Page Parameters and Values.

Menu Item	Display	Description	Range
Profiles	Enable Profile 1-8	Controls access to Program Page	Yes or No
Autostart	Enable Auto Start	Controls access to AutoStart Page	Yes or No[18]
PID	Enable PID	Controls access to PID Page	Yes or No
Control	Enable Control	Controls access to Control Page	Yes or No
Communication	Enable Communication	Controls access to Communication Page	Yes or No[18]
Real Time Clock	Enable Clock	Controls access to Real Time Clock Page	Yes or No[18]
Relay outputs	Enable Relay 1-4	Controls access to Relay Page	Yes or No[18]
Test	Enable Test	Controls access to Test Page	Yes or No
Zone Calibration	Enable Zone Cal	Controls access to Zone Calibration Page	Yes or No
Sensor Calibration	Enable Sensor Cal	Controls access to Sensor Calibration Page	Yes or No
Setpoint lower limit	Enable SPLowerLim	Sets minimum setpoint allowed	-73°C to 759°C (-100°F to 1399°F)
Setpoint upper limit	Enable SPUpperLim	Sets maximum setpoint allowed	-73°C to 760°C (-100°F to 1400°F)
High limit overhead	Enable HiLimOH	Sets maximum high limit setpoint allowed[19]	3 to 11°C (5 to 20°F)[19]
Password level 1	Enable Password 1	Sets password for access level 1	0 to 999
Password level 2	Enable Password 2	Sets password for access level 2	0 to 999
Setpoint Change	Enable SPChange	Set to DISABLE to lock out setpoint and high limit setpoint changes in Manual and Timer Modes	Yes or No
Analog Output Type	Enable Analog Type	Sets Analog Output type	Ctrl or Proc

5.6.12. Setting up Digital Inputs (Optional)

The Protocol Plus control can be run by external inputs wired to the control from an external source such as a PLC or control panel switches (Figure 9). The external run operation can Run, Hold or Stop profiles 1 through 7 (profile 8 cannot be operated externally). See Table 14 for the inputs required for the desired operation.

[18] If the controller does not have this feature, **No** is the only option.
[19] Maximum high limit setpoint = **SPUpperLim** + **HiLimOH**

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O	***A profile must be created in the program page before trying to run a profile number.***

Table 14. Digital Input Parameters and Values.

Input 1	Input 2	Input 3	Profile Selected
ON	OFF	OFF	1
OFF	ON	OFF	2
ON	ON	OFF	3
OFF	OFF	ON	4
ON	OFF	ON	5
OFF	ON	ON	6
ON	ON	ON	7
OFF	OFF	OFF	none

- To start the selected profile, set Inputs 1, 2 and 3. Then set Input 4 to ON.
- To hold a profile, set Input 4 to OFF.
- To stop a profile, set all inputs to OFF.

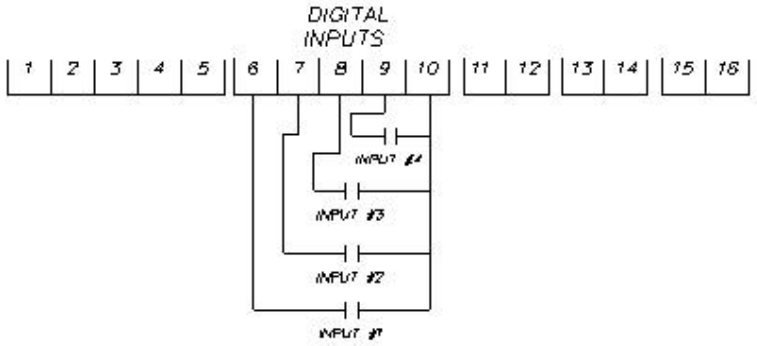

Figure 9. Digital Inputs.

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6. Maintenance

6.1. Replacement Parts

To order or return parts, contact the Service Products Division at Despatch. The Service Products features our Response Center for customer service. When returning parts, a Despatch representative will provide you with an MRA (Material Return Authorization) number. Attach the MRA number to the returned part for identification. When ordering parts, expedite your process by providing model number, serial number and part number.

Global Headquarters	Contact	Service & Technical Support
Despatch Industries 8860 207th Street Lakeville, MN 55044 USA	International/Main: 1-952-469-5424 US toll free: 1-888-337-7282 Fax: 1-952-469-4513 info@despatch.com www.despatch.com	Service: 1-952-469-8230 US toll free: 1-800-473-7373 Service @despatch.com

7. Troubleshooting: Error Messages and Alarm

Table 15 lists the more common error messages, the possible problems and remedies.

Table 15. Error Messages and Next Steps.

Alarm Status	Possible Problem	Next Step
Hi-Limit LED flashing	· Problem with thermocouple · Hi-limit setpoint has been exceeded.	Once the problem has corrected, press **Reset**.
Soak LED flashing	Oven temperature has not entered (or dropped out of) the soak band and the soak timer has stopped	Program a slower ramp rate or if oven is not heating check heater circuit.
Top LED displays **OPEN** and lower LCD displays **CONTROL SENS ERR**	Control thermocouple is disconnected or broken	Repair or replace the thermocouple.
Lower LCD displays **HI LIM SENS ERR**	Hi limit thermocouple is disconnected or broken	Repair or replace the thermocouple.
Lower LCD displays **HIGH LIMIT ALARM**	Hi limit temperature setpoint has been exceeded	Determine if: · the setting is too close to the setpoint · the SSR is defective · calibration is incorrect
Err4	Analog to digital conversion circuit fault. Thermocouple or control hardware failure.	Test thermocouple or consult factory
Err5 (Beep code: five beeps	Program memory fault. Control	Consult factory

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Alarm Status	Possible Problem	Next Step
in rapid succession)	memory failure.	
Batt (Beep code: three beeps in rapid succession)	Weak or dead battery. Battery failure.	Consult factory
RTC (Beep code: two beeps in rapid succession)	Loss of time in real time clock circuit. Control memory loss.	Reset time in real time clock page.

O	***The lower LCD intermittently display* HL Temp*. This is not an error message, but the Hi limit thermocouple temperature reading.***

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8. Appendices

8.1. Quick Reference and Default Values

8.1.1. Program Page Default Values

Table 16. Program Page Default Values.

Menu Item	Display	Default	Range	Setting
Ramp Time Seg[20]	Pro-1 Seg-1 Ramp Time	00:00	00m00s to 99h59s	
Event 1 Set Value	Pro-1 Seg-1 Ramp Event	Off	Off, On	
Event 2 Set Value	Pro-1 Seg-1 Ramp Event	Off	Off, On	
Event 3 Set Value	Pro-1 Seg-1 Ramp Event	Off	Off, On	
Event 4 Set Value	Pro-1 Seg-1 Ramp Event	Off	Off, On	
Soak Temp Seg	Pro-1 Seg 1 Soak Temp	68°F	SPLowerLim to SPUpperLim[21]	
Soak Time Seg	Pro-1 Seg 1 Soak Time	00:00	00m00s to 99h59s	
Event 1 Set Value	Pro-1 Seg-1 Soak Event	Off	Off, On	
Event 2 Set Value	Pro-1 Seg-1 Soak Event	Off	Off, On	
Event 3 Set Value	Pro-1 Seg-1 Soak Event	Off	Off, On	
Event 4 Set Value	Pro-1 Seg-1 Soak Event	Off	Off, On	
(repeat for segments 2-8)				
High Limit Setpoint	Pro-1 Hi-Lim SP	Max HiLimSP	MinHiLimSP to MaxHiLimSP,[21] Band[22]	
Loop From	Pro-1 Loop From XX	No	No, Seg-1 to Seg-8	
Loop To	Pro-1 Loop To XX	No	No, Seg-1 to Seg-8	
Loop Count	Pro-1 Loop Number	0	0 to 99	
Profile Link	Pro-1 Link To XX	Stop	Standby[23], Stop, Hold, Pro-1 to Pro-8	
Guaranteed Soak	Pro-1 Guar Band	Off	Off, 1 to 778°C (1400°F)	
(repeat for profiles 2-8)				

[20] Cycle Complete LED indication goes ON.
[21] See Enable Page (5.6.11)
[22] Band value is set on Control Page (5.6.7)
[23] If Standby: (1) Cycle Complete LED indication goes ON. (2) Controller beeps if **End Of Cycle** beep is enabled. (3) Heater/control output keeps controlling oven temperature at last Soak setpoint. (4) All events programmed (if relay cards installed and programmed as an event) for the last Soak Segment stays active.

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8.1.2. Autostart Page Default Values

Menu Item	Display	Default	Range	Setting
Enable Autostart	**Auto Start Enable**	No	No, Yes	
Sunday mode	**Auto Start Sun Mode**	Off	Off, Manual, Timer, Pro-1 to Pro-8	
Sunday time	**Auto Start Sun Time**	00:00	00:00 to 23:59	
Monday mode	**Auto Start Mon Mode**	Off	Off, Manual, Timer, Pro-1 to Pro-8	
Monday time	**Auto Start Mon Time**	00:00	00:00 to 23:59	
Tuesday mode	**Auto Start Tue Mode**	Off	Off, Manual, Timer, Pro-1 to Pro-8	
Tuesday time	**Auto Start Tue Time**	00:00	00:00 to 23:59	
Wednesday mode	**Auto Start Wed Mode**	Off	Off, Manual, Timer, Pro-1 to Pro-8	
Wednesday time	**Auto Start Wed Time**	00:00	00:00 to 23:59	
Thursday mode	**Auto Start Thu Mode**	Off	Off, Manual, Timer, Pro-1 to Pro-8	
Thursday time	**Auto Start Thu Time**	00:00	00:00 to 23:59	
Friday mode	**Auto Start Fri Mode**	Off	Off, Manual, Timer, Pro-1 to Pro-8	
Friday time	**Auto Start Fri Time**	00:00	00:00 to 23:59	
Saturday mode	**Auto Start Sat Mode**	Off	Off, Manual, Timer, Pro-1 to Pro-8	
Saturday time	**Auto Start Sat Time**	00:00	00:00 to 23:59	

8.1.3. PID Page Default Values

Menu Item	Display	Default	Range	Setting
Display units	**PID Temp Unit**	°C	°C or °F	
Proportional band	**PID Prop Band**	6°C	1 to 56°C (1 to 100°F)	
Integral reset	**PID Reset**	2	0 to 100 seconds/repeat	
Derivative Rate	**PID Rate**	0	0 to 500 seconds	
AutoTune	**PID AutoTune**	Disable	Disable, Enable	

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8.1.4. Programming Table Worksheet

Profile Name: **Profile Number:**											
Seg-ment	Ramp					Soak					
	Time	Events				Temp-erature	Time	Events			
		1	2	3	4			1	2	3	4
1											
2											
3											
4											
5											
6											
7											
8											

High Limit Setpoint	
Loop From Seg	
Loop To Seg	
Loop Number	
Link To Profile	
Guar Soak Band	

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8.1.5. Control Page Default Values

Menu Item	Display	Default	Range	Setting
Cycle Time	**Control Cycle Time**	1	1 to 60 seconds	
High limit setpoint	**Control Hi-Lim SP**	Max HiLimSP	MinHiLimSP – MaxHiLimSP [24]	
High limit band	**Control Hi-Lim Band**	Off	Off, 3°C to 11°C (5°F to 20°F)	
Power fail recovery	**Control PwrFRec**	Stop	Stop, Restart, Hold, Resume	
Recovery time limit	**Control PwrFTime**	00m00s	00m00s to 99m59s	
Powerup start enable	**Control EPwrStrt**	Dis	Dis, En	
Powerup Start Mode	**Control StrtMode**	Off	Off, Manual, Timer, Pro-1 to Pro-8	
Hysteresis	**Control Hyst**	3°C	1°C to 56°C (1°F to 100°F)	
Process out low	**Control RetOutLo**	80°C	-73°C to 760°C (-100°F to 1400°F)	
Process out high	**Control RetOutHi**	400°C	-73°C to 760°C (-100°F to 1400°F)	
Time scale	**Control TimeScale**	hh:mm	hh:mm or mm:ss	
Key press beep	**Control KeyBeep**	On	On or Off	
End of cycle beep	**Control EOCBeep**	Off	On or Off	
Alarm beep	**Control AlarmBeep**	Off	On or Off	

8.1.6. Communication (Optional) Page Default Values

Menu Item	Display	Default	Range	Setting
Address	**Communication CommAddr**	1	1 to 247	
Mode	**Communication CommMode**	OFF	OFF, Modbus	
Baud rate	**Communication Baud Rate**	19.2K	2400, 4800, 9600, 19.2K, 38.4K	
Parity	**Communication Parity**	None	None, Odd, Even	

[24] See Enable Page (5.6.11)

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8.1.7. Real Time Clock Page Default Values

Menu Item	Display	Default	Range	Setting
Day of the week	**Clock Day**	Mon	Sun, Mon, Tue, Wed, Thu, Fri, Sat	
Time of day	**Clock HH:MM**	00:00	00:00 to 23:59	
Reset clock	**Clock UP to Reset CLK**[25]	Ready	Ready, Done	

[25] If ▲ is not pressed, the clock will retain original values, the display will change to **Done** if the clock is reset.

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8.1.8. Relay Outputs (Optional) Page Default Values

Press **Select** to choose relay. If **Relay 0** displays, no relays are installed.

Menu Item	Display	Default	Range
Type of relay	Relay 1 RelayType	Off	Off, Alarm, Cycl, Ev1 to Ev4
Action of relay	Relay 1 RelayAction	NDE	NDE, NE, NDEL, NEL[26]
Type of alarm[27]	Relay 1 AlarmType	High	High, Low, Plus, Minus, Band
Alarm setpoint[27]	Relay 1 AlmHi/Lo SP	538°C	-73°C to 760°C (-100°F to 1400°F)
Alarm deviation[27]	Relay 1 AlmDevBand	3°C	1 to 56°C (1 to 100°F)
Inhibit alarm[27]	Relay 1 ALMInhibit	On	En or Dis
Type of event[28]	Relay 1 EventType	Time	Time or Temp
Event setpoint [29]	Relay 1 Event SP	SPUpLim	SPLoLim to SPUpLim[30]
(repeat for relay outputs 2-4, if available)			

[26] Normally de-energized and non-latching, normally energized and non-latching, normally de-energized and latching, normally energized and latching.
[27] Appears only for alarm types.
[28] Appears only for time or temperature event types.
[29] Appears only for temperature event types.
[30] See enable page.

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8.1.9. Test Page Default Values

Menu Item	Display	Default	Range	Setting
Heater output	Test HeatOut	Off	On	
High limit relay	Test HiLimOut	Off	On	
Relay 1 output	Test Rly1 Out	Off	On	
Relay 2 output	Test Rly2 Out	Off	On	
Relay 3 output	Test Rly3 Out	Off	On	
Relay 4 output	Test Rly4 Out	Off	On	
High Limit Sensor	Test HL Temp	(sensor reading)		

8.1.10. Zone Cal Page Default Values

Menu Item	Display	Default	Range	Setting
Zone 1 actual	Zone Cal Zone1Act	38°C	-73°C to 760°C (-100°F to 1400°F)	
Zone1 displayed	Zone Cal Zone1Dis	38°C	-73°C to 760°C (-100°F to 1400°F)	
Zone 2 actual	Zone Cal Zone2Act	260°C	-73°C to 760°C (-100°F to 1400°F)	
Zone2 displayed	Zone Cal Zone2Dis	260°C	-73°C to 760°C (-100°F to 1400°F)	
Factory calibration[31]	Zone Cal FactCal	Ready	Ready or Done (push- key)	

8.1.11. Sensor Cal Page Default Values

Menu Item	Display	Default	Range	Setting
Control Sensor Cal	Ctrl Sens 0F Ctrl Sens 1000F Ctrl Sens Done	-100°F 1400°F Done	-100 to 1400°F -100 to 1400°F (read only)	
HiLim Sensor Cal	HL Sens 0F HL Sens 1000F HL Sens Done	-100°F 1400°F Done	-100 to 1400°F -100 to 1400°F (read only)	
Retransmit Cal	RetCalLo XXXX[32] RetCalHi XXXX	0 4096	0 to 4096 0 to 4096	

[31] Use only when no calibration instrument is available.
[32] The "RetCalLo" and "RetCalHi" values are only change indicators. The actual value is not meaningful.

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8.1.12. Enable Page Default Values

Menu Item	Display	Default	Range	Setting
Profiles	Enable Profile 1-8	Yes	Yes or No	
Autostart	Enable Auto Start	No	Yes or No[33]	
PID	Enable PID	Yes	Yes or No	
Control	Enable Control	No	Yes or No	
Communication	Enable Communication	No	Yes or No[33]	
Real Time Clock	Enable Clock	No	Yes or No[33]	
Relay outputs	Enable Relay 1-4	No	Yes or No[33]	
Test	Enable Test	No	Yes or No	
Zone Calibration	Enable Zone Cal	No	Yes or No	
Sensor Calibration	Enable Sensor Cal	No	Yes or No	
Setpoint lower limit	Enable SPLowerLim	20°C	-73°C to 759°C (-100°F to 1399°F)	
Setpoint upper limit	Enable SPUpperLim	260°C	-73°C to 760°C (-100°F to 1400°F)	
High limit overhead	Enable HiLimOH	5°C	3 to 11°C (5 to 20°F)[34]	
Password level 1	Enable Password 1	1	0 to 999	
Password level 2	Enable Password 2	2	0 to 999	
Manual/Timer mode setpoint change	Enable SPChange	Yes	Yes or No	
Analog Output Type	Enable Analog Type	Proc	Ctrl or Proc	

[33] If the controller does not have this feature, **No** is the only option.
[34] Maximum high limit setpoint (**MaxHiLimSP**) = **SPUpperLim** + **HiLimOH**. Minimum high limit setpoint (**MinHiLimSP**) = **SPLowerLim** + **HiLimOH.**

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8.2. Standard Products Warranty

Despatch
INDUSTRIES

Standard Products
Product Warranty

Products Covered by this Warranty

This warranty (the "warranty") applies to the following Despatch products: LEB, LBB, LAC, LCC, LCD, LLD, RAD, RFD, LND, RTFO, TAD, TFD, PR, PN, PW, PTC and the following Ransco products: RTH, RTS, 900 Series.

Parts and Materials

Despatch warrants all parts and materials to be free from defects in material and workmanship for a period of:

1. Five (5) years from date of shipment for laboratory oven electric heaters.
2. Three (3) years from the date of shipment for Protocol Plus and DES 2000 temperature controllers; and
3. One (1) year from the date of shipment, or 2,000 hours of operation, whichever occurs first, for all other components of products covered by this Warranty.

During the applicable Warranty period, Despatch will repair or replace, at Despatch's option, parts and materials covered by this Warranty.

Labor

During the first 90 days of the Warranty period, Despatch will pay labor costs incurred to remove defective parts and materials, and to reinstall repaired or replacement parts or materials; provided, however, that Despatch's obligation to pay such labor costs shall be subject to the limitation that the removal and/or reinstallation service must be performed by a Despatch-authorized technician from Despatch's worldwide network of factory-trained professionals at a location within the contiguous United Sates.

Transportation Costs

All transportation costs to transport defective parts or materials to Despatch and to transport repaired or replacement parts or materials to Customer shall be the responsibility of Despatch.

Terms and Conditions

This Warranty shall be deemed valid and binding upon Despatch if and only if the Customer:

1. Installs, loads, operates, and maintains the covered product supplied hereunder in accordance with the instruction manual provided upon delivery and product labeling affixed to the subject equipment;
2. If applicable, follows the Emergency Procedure set forth in this Warranty; and
3. Contacts Despatch's Helpline at 1-800-473-7373 for assistance in diagnosing and troubleshooting the problem immediately upon discovering any damage or malfunction.

Despatch's reasonable determination as to whether a repair, replacement, or service is covered by this Warranty shall be final and binding.

Exclusions

This Warranty DOES NOT cover,

1. Damage or malfunctions, or expenses incurred in the process of diagnosing and/orrepairing damage or malfunctions, resulting from any of the following: operator error, misuse, abuse, inadequate preventative maintenance, normal wear and tear, service or modifications by other than Despatch authorized technicians, use of the covered product that is inconsistent with the operation manual or labeling, acts of nature (including, without limitation, floods, fire, earthquake, or acts of war or civil emergency), internal or external corrosion, or non-conforming utilities (including, without limitation, electrical, fuel supply, environmental and intake/exhaust installations);
2. Repair or replacement of parts or materials designed and intended to be expendable or consumable; refrigerants, filters, lamps;
3. Routine maintenance; or
4. Labor costs incurred for troubleshooting, diagnostics, or testing (except for testing required to verify that a covered defective part or material has been repaired).

Limitations of Liability

Despatch shall not, in any event, be liable for indirect, special, consequential, incidental, or punitive damages or penalties of any kind, including without limitation loss of revenue, profits or business opportunities resulting from interruption of process or production. In no event shall Despatch be liable for damages in excess of the amounts paid by Customer to Despatch with respect to the applicable product(s). This Warranty does not cover, and Despatch shall not be liable for any losses, costs, damages or expenses resulting from delays in diagnosing or repairing the products, supplying or obtaining replacement parts of materials, strikes, labor stoppages or shortages, fires, accidents, government acts or regulations, or any other causes beyond the control of Despatch.

Non-Compliance By Customer

Despatch reserves the right to suspend and withhold service under this Warranty in the event of non-compliance by the Customer to any terms and conditions of this Warranty or the applicable purchase order or invoice. Further, Despatch shall not be liable for any loss of production, expenses, and inconveniences incurred due to such suspension.

Customer Furnished Equipment Warranty Limitation

This Warranty does not cover diagnosis or repairs of defects in or caused by, lack of performance of, or fitness for purpose of customer-supplied parts or equipment unless specifically noted in the Despatch written order acceptance confirmation.

Performance Commitment

Despatch provides no guarantee of process performance or fitness for purpose, unless specifically noted otherwise in Despatch written order acceptance confirmation. Despatch is providing equipment with design parameters specific only to its equipment.

Procedure Upon Discovery of Defects and Emergencies

In the event Customer becomes aware of any defect in the application products, Customer must immediately: (a) shut off fuel or energy supply (gas and electricity); (b) call for emergency assistance, if needed, and (c) notify Despatch Service.

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Service
Worldwide Phone 952-469-8230; Worldwide Fax 952-469-8193; North American Phone 800-473-4373
e-mail service@despatch.com; www.despatch.com

Please see reverse side for other service offerings

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