



# Solid State Timers and Controllers



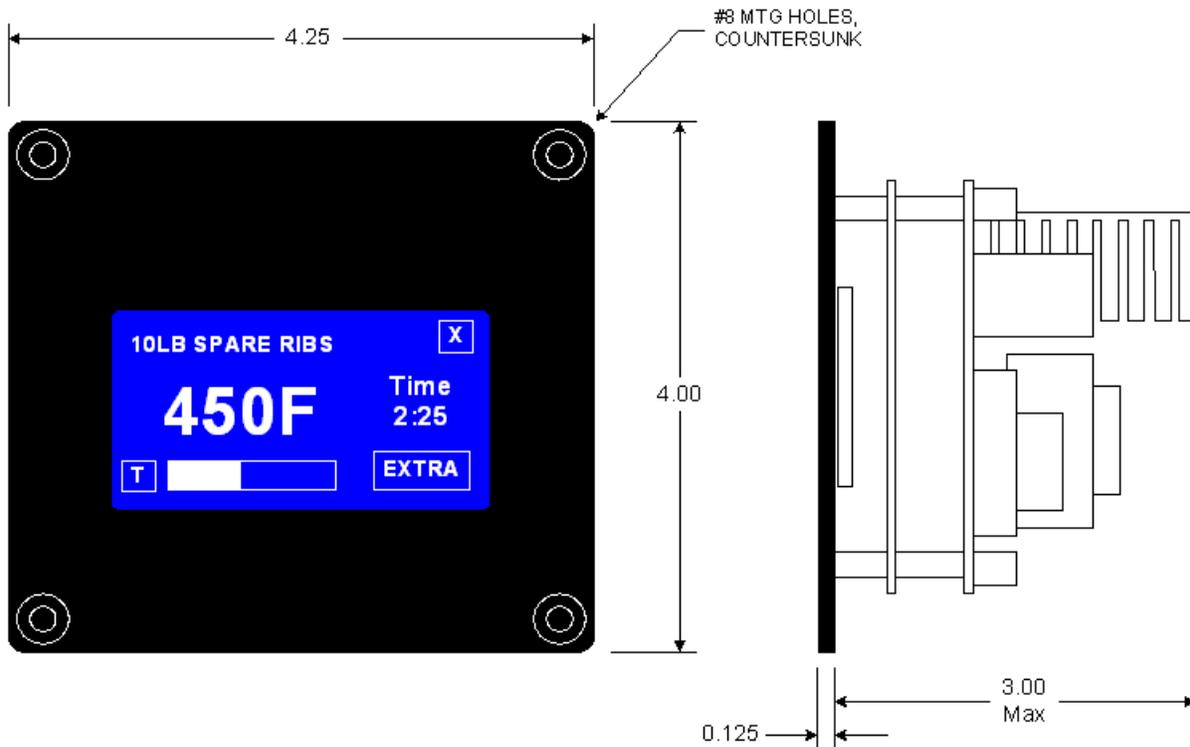
## 5300

### Cooking Controller

The Model 5300 cooking controller provides flexibility for industrial cooking and baking systems. It incorporates a high-contrast blue and white LCD display with an analog touchscreen for all user inputs, relay and solid state heater control outputs, circulating fan relay output, and two 100 Ohm RTD temperature sensor inputs; one for the cooking control probe and the other for an optional product temperature probe. An integral high-output beeper is used to confirm user touchpad presses and is configurable for short or long beep patterns indicating the end of the cook cycle, thereby easing the differentiation between installations with multiple controllers. An additional solid state output can be used to drive an external 12V DC lamp to indicate the conclusion of the cooking cycle for pass-thru ovens.

The controller incorporates 15 cooking recipes which can be configured with; a text name for enhanced user readability, preheat temperature, cooking temperature, cooking time, holding temperature, and cook to temperature. The cooking recipes and basic configuration are protected with a configurable four digit passcode with an additional factory level passcode. The factory passcode is used to access a service screen used for confirmation of functionality upon installation in the factory or the field. An eight position DIP switch is used to determine the heating output used, control hysteresis, availability of the product probe and cook to temperature functions, and the extra cook time available for real-time extension of the cooking time.

### Mechanical



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## DIP Switch .....

The DIP switch configuration must be done with no power applied to the controller

**Heating Output:** Switch 1 controls which heating output will activate when heat is required. Putting the switch up selects the NO relay output, down selects the 12V DC output for SSR's. The heating output and control hysteresis must agree per the chart below or the controller will display DIP ERROR and the current DIP switch settings to aid in identifying the errant configuration.

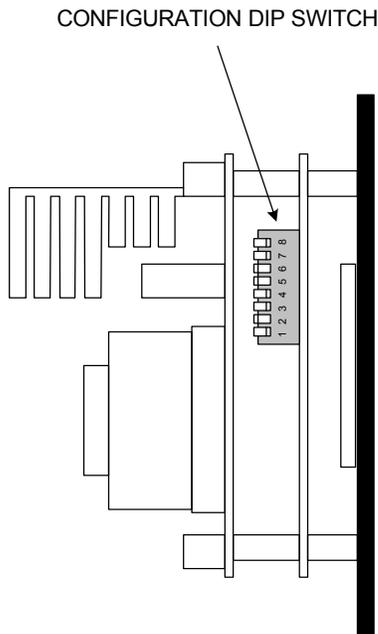
**Control Hysteresis:** The controller operates a standard ON-OFF control pattern with high and low hysteresis. The value is selectable for 1°F, 2°F, 5°F or 10°F. The lower values require the solid-state output as they can cause the relay contacts to wear out from the excessive number of activations.

**Product Probe:** This selection determines whether the product probe temperature is available for display during the operation of a cooking cycle. At any time during a cycle the user can see the current oven cavity temperature, enabling this feature also allows viewing the temperature of the optional product probe.

**Cook To Probe:** This selection allows running a cooking cycle until the specified product probe temperature is reached. The cook cycle will also stop once the programmed time is elapsed. The cook to probe feature must be enabled with the product probe switch for this to be available or the DIP ERROR message will display.

**Door Open Alarm:** Once the Preheat cycle is complete and the system is ready to cook, if the controller detects a loss of cabinet temperature in excess of 25°F the beeper sounds and the display flashes to indicate that the door is open..

**Extra Time:** This selects the amount of minutes which can be added to a cook cycle during the cook or hold periods. The EXTRA button is displayed during this time, pressing that button brings up another screen which allows additional cook time to be added in either 1 or 5 minutes increments per this switch setting.



| SWITCH | IDENTIFICATION             | UP        | DOWN        |
|--------|----------------------------|-----------|-------------|
| 1      | Heating Output             | Relay     | Solid State |
| 2      | Control Hysteresis         | See Below |             |
| 3      | Control Hysteresis         | See Below |             |
| 4      | Product Probe              | Enabled   | Disabled    |
| 5      | Cook To Probe <sup>1</sup> | Enabled   | Disabled    |
| 6      | Door Open Alarm            | Enabled   | Disabled    |
| 7      | Extra Time                 | 1 Minute  | 5 Minute    |
| 8      | Unused <sup>2</sup>        |           |             |

| SWITCH |      | Control Hysteresis |
|--------|------|--------------------|
| 2      | 3    |                    |
| DOWN   | DOWN | 1°F <sup>3</sup>   |
| UP     | DOWN | 2°F <sup>3</sup>   |
| DOWN   | UP   | 5°F                |
| UP     | UP   | 10°F               |

1. Product Probe (Switch 4) must be enabled for Cook To Probe to be enabled.
2. Leave unused switches in Down position.
3. Hysteresis values 1°F & 2°F require Solid State outputs selected with Switch 1

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# Solid State Timers and Controllers

## Configuration .....

A user or factory passcode is required to access the controller configurations below:

### Basic Configuration:

The controller can be configured to display temperatures in Fahrenheit or Centigrade, to use short or long beeps at the end of the cook cycle, to operate in English or Spanish, and the four digit passcode can be modified.

### Recipes:

Each of the 15 recipes have the following configurations:

- Name: Up to 16 characters, A-Z, a-z, 0-9, and ' '.
- Preheat Temp: 150°F - 400°F, or OFF.
- Cook Temp: 150°F - 400°F.
- Cook Time: Up to 9 hours and 59 minutes
- Hold Temp: 150°F - 400°F, or OFF.
- Cook To Temp: 150°F - 400°F, or OFF (if avail).



The Cook To Temp is only available if enabled by DIP switches 4 & 5. A standard temperature editing screen is shown above illustrating the ease of adjustment. The recipe name being edited is highlighted, the left and right arrows are used to select the underlined digit to be changed, the up and down arrows change the digit as desired. Pressing the SAVE area saves the changed parameter, pressing X aborts any changes

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# Solid State Timers and Controllers

## Cook Cycle

The cooking cycle is comprised of four basic steps: Preheating, Ready To Cook, Cooking, and finally the Hold Mode.

Upon application of power the controller enters a power off mode, the user then presses anywhere on the touch pad and the unit displays the list of available recipes. The up and down buttons move the highlight box from one recipe to the next. Once the desired recipe is indicated the user presses the GO button to start the cook cycle.

The GO button displays the Preheat / Cook selection screen to the right, the user then selects where to start the cooking cycle. This enables faster cooking cycles by going directly to Ready To Cook mode when the equipment is already at the proper temperature. The user simply presses either Preheat or Cook to select. If the preheat temperature is set to OFF this feature is not available and the controller goes directly to the Ready To Cook mode.

In all modes where the system is heating the cooking cavity, the T button can be used to display the current oven temperature. Pressing the T button displays the temperature, then automatically returns to the previous screen in 2 seconds. Alternately, holding the T button down for 2 seconds displays the product probe (if available) instead of the cooking cavity temperature.

The Preheat cycle heats the cooking cavity up to the pre-defined preheat temperature. Once this temperature is reached the unit automatically switches to the Ready To Cook mode.

Once in the Ready To Cook mode, the user places the product to be cooked into the cooking cavity and presses the COOK button to start the cooking process.

During the cook cycle the controller displays the cooking temperature, the time remaining in the cook cycle, and the elapsed time shown with the progress bar at the bottom of the screen. The EXTRA button can be used to add more cook time to the cycle. The cook cycle ends when either the cook time elapses, or if the cook to temperature requirement has been satisfied if available and programmed.

Once the cook cycle is complete, the controller enters the hold mode. This displays the hold temperature (or nothing if set to OFF), and the elapsed time in the hold mode. The EXTRA button is available here so the product can be cooked for more time if required.



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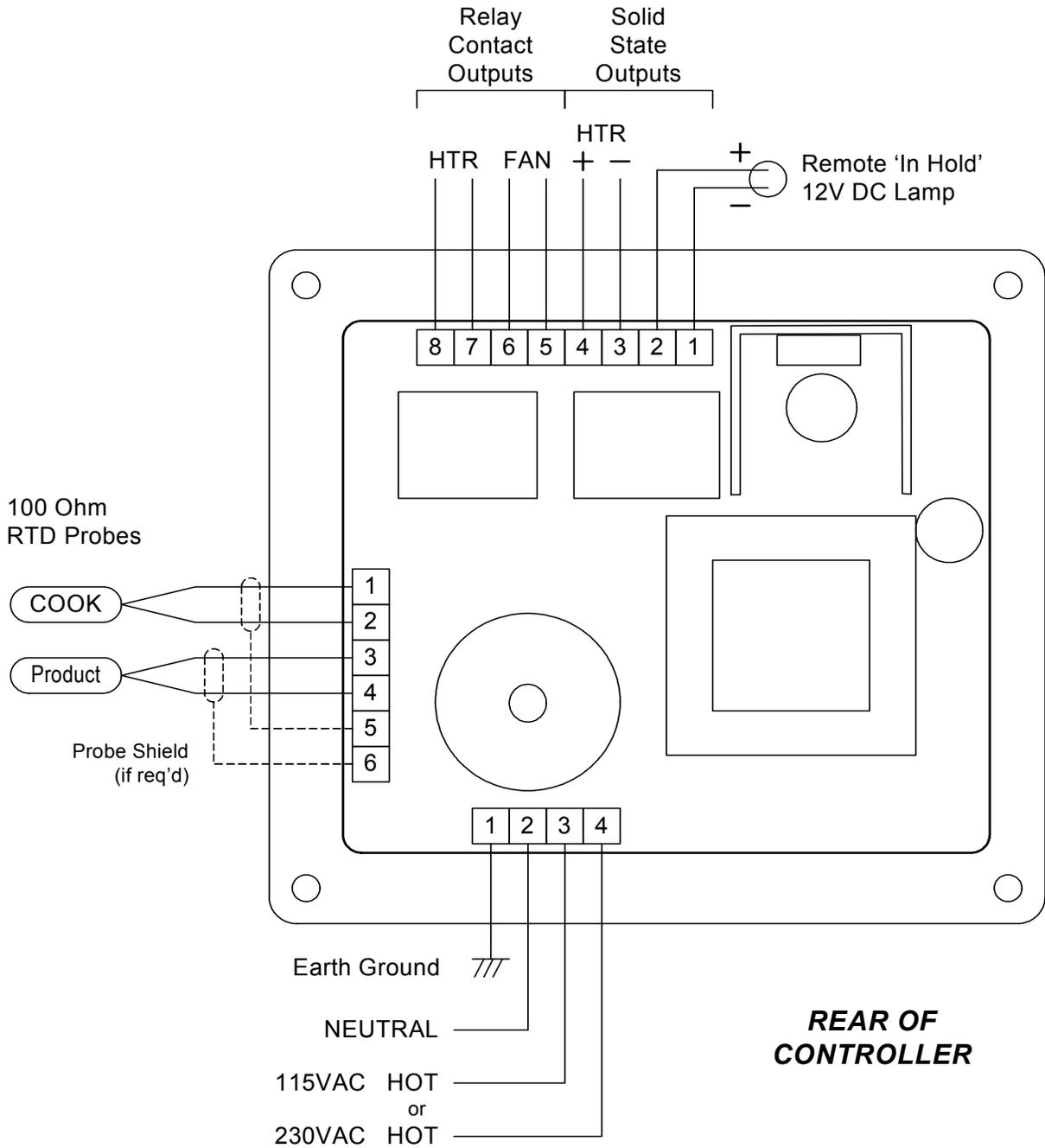
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# Solid State Timers and Controllers

## Wiring Diagram



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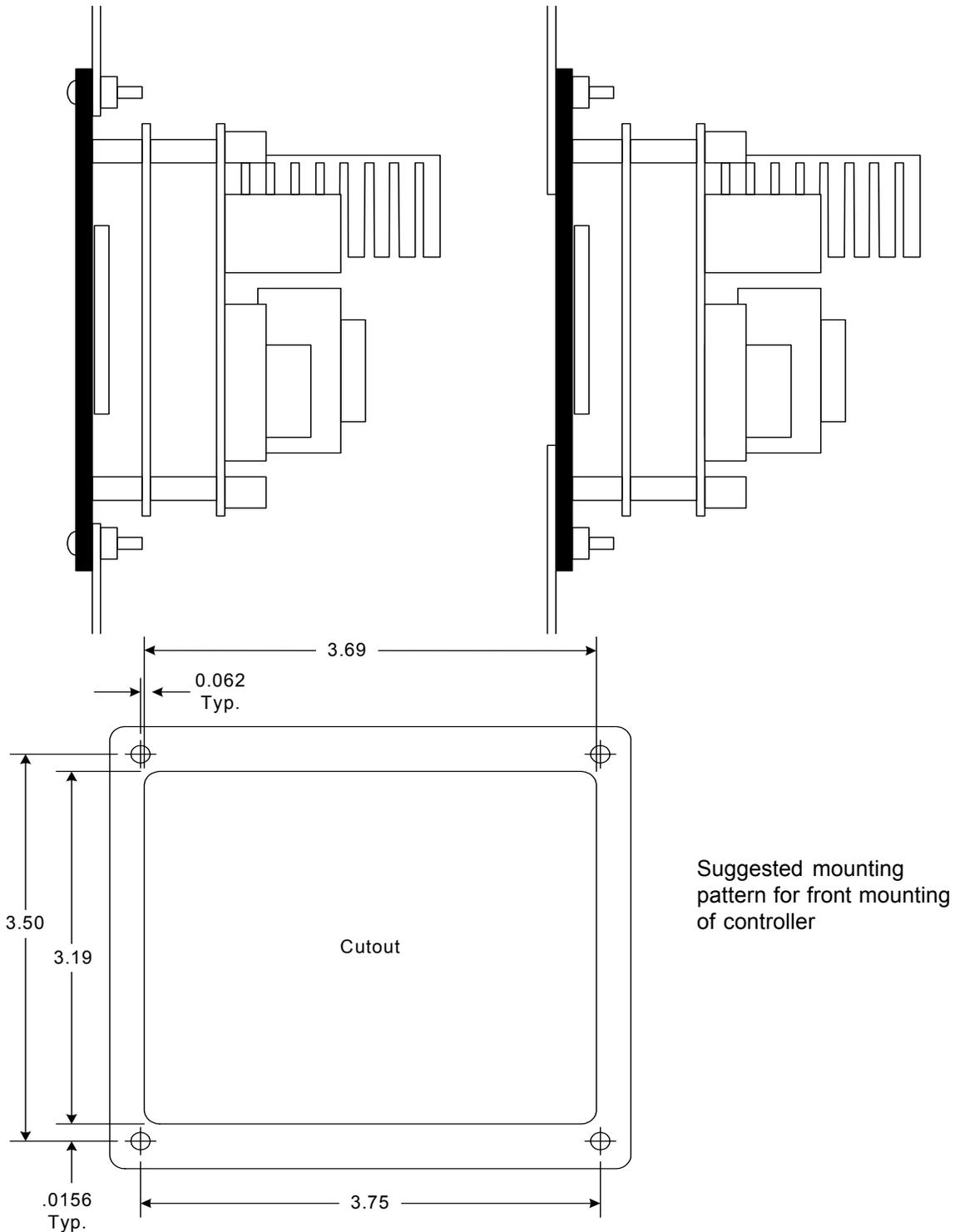
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# Solid State Timers and Controllers

## Mounting Diagram .....

The controller may be vertically mounted either in front of or behind the front panel of the end equipment



Suggested mounting pattern for front mounting of controller

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## General Specifications .....

- Operating Voltage:** Two ranges, 100V-120V or 200V-240V AC, 50/60 Hz. Earth ground connection required, refer to wiring diagram for details
- Temperature Inputs:** Two inputs, one for cooking control, one for optional product temperature measurement. 100 Ohm RTD, Din 385 curve. Probe shield connections provided.
- Measurement Accuracy:** ±5°F from 150°F to 400°F. Unit self-calibrates upon power up and each time the controller goes from OFF mode to recipe list. Accuracy is for input circuitry only, add probe error for total measurement accuracy.
- Temperature Control:** ON/OFF control with selectable hysteresis values from 1°F to 10°F. Selected output energized until control probe reaches setpoint plus hysteresis value, off until temperature drops to setpoint minus hysteresis value.
- Temperature Control Outputs:** Selectable between relay output and solid state drive for SSR. Fan output relay energizes whenever temperature control is active, remains on for 30 seconds after temperature control is stopped.
- Relay Contact Ratings:** 5A@250VAC, 1/2Hp@125/250 VAC.
- Solid State Outputs:** 12-15V DC output voltage, 25mA per output maximum. One output for primary temperature control, one for remote 'In Hold' lamp.
- Recipe Configuration Memory:** Non-volatile EEPROM storage device with 100,000 write cycle endurance. No batteries supplied or required.
- Construction:** 0.125" black polycarbonate front panel with polycarbonate overlay. Two printed circuit boards mounted behind front panel.
- Operating Temperature:** 0°C to +70°C.
- Agency Recognition:** Conforms to Standards UL 60730-1A, UL 60730-2-9, CAN/CSA E60730-1-02, CAN/CSA E60730-2-9. Conforms to CE Electromagnetic Compatability directive dated 1/96 and Low Voltage directive dated 1/97.
- Data Sheet Revision Date:** April 11, 2012

**IMPORTANT NOTICE:** This controller should only be used in a system incorporating an independantly operating high temperature limiting device which will safely disable the heaters, thereby preventing damage in the event of failure, malfunction, or normal wear-out of this device.

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# Solid State Timers and Controllers

## Declarations .....

|                                |  |
|--------------------------------|--|
| <b>Purpose of Control</b>      | Thermostat, electrically operated control  |
| <b>Construction of Control</b> | Integrated   |
| <b>Type of Load</b>            | 250v/5A, pilot head (heating contacts)<br>250v/5A, motor load (fan motor)<br>12Vdc/25mA resistive (SSR)<br>12Vdc/25mA specific (remote lamp) |
| <b>Degree of Protection</b>    | IP00   |
| <b>Pollution Degree</b>        | Pollution degree 2   |
| <b>Automatic Action</b>        | Type 1.C.K   |
| <b>Connections</b>             | Wago connectors on PCB:<br>Supply: 231-134/001-000<br>Output: 231-138/001-000<br>Sensors: 231-136/001-000                                    |
| <b>Insulating Materials</b>    | Connectors: Material Group I, PTI 600<br>PWB: Material Group IIa, PTI 400  |
| <b>Temperature Limits</b>      | Switch Head: 70°C<br>Mounting Surface: 70°C  |
| <b>Operating Time Limits</b>   | Cook cycle limited to 10 hours   |
| <b>Rated Impulse Voltage</b>   | Category II  |
| <b>Ball Pressure Test Temp</b> | Front Panel: 75°C<br>Relay Output Connector: 125°C   |

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