Pulse 2 Temperature Control System

Designed to support all types of hot runner systems. This distinctive control incorporates the latest in hot runner control technology and is capable of handling up to 180 zones.
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WARNING!
The following equipment is intended for industrial use within the confines of a molding environment.
Locate the equipment in an area where it is not directly exposed to any type of liquid.
Proper grounding must always be followed, consult local electrical codes for details.
Equipment is meant to be serviceable to a certain extent by qualified personnel, refer to the service section in this manual.
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FORWARD

We are proud to offer the Pulse Hot Runner Temperature Control System. This machine is part of a growing family of control solutions for Hot Runner Injection Molding. When used according to the guidelines set forth in this manual, you can expect years of trouble-free, enjoyable operation and proof of Fast Heat’s commitment to customer satisfaction.

We are pleased to provide this manual with the Pulse Hot Runner Control System. It was written to guide you through assembly, review safety considerations, and cover general operating procedures. It represents our effort to produce the best documentation possible.

The specifications, drawings, and photographs illustrated in this manual represent the Pulse 2 as supplied when the manual was prepared. However, owing to Fast Heat’s policy of continuous improvement, changes may be made at any time with no obligation on the part of Fast Heat. For your convenience, we always keep current Fast Heat manuals available on our website at www.fastheat.com. Any updates to your machine will be reflected in these manuals as soon as they are complete. Visit our site often to check for the latest updates to this manual!
We stand behind our machines. If you have any service questions or parts requests, please call, email or write us at the closest location listed above.
GENERAL PRODUCT IDENTIFICATION

This section is dedicated to give a quick overview of the Pulse 2 system and all of the modules. Please note, your new Pulse 2 system is completely modular by design. As a result, we have ensured that each power, cpu and tc modules are interchangeable within the system and with other Pulse 2 systems. To identify the size of your Pulse base cabinet refer to the photos with descriptions.

**Pulse 15-Slot Base Cabinet**
- Overall weight: 65 lbs
- Overall dimensions: 11.5" w x 14" d x 34" h

**Pulse 30-Slot Base Cabinet**
- Overall weight: 160 lbs
- Overall dimensions: 22" w x 31" d x 66.75" h

**Pulse 45/60-Slot Base Cabinet**
- For the 45 slot base cabinet, the bottom left most cabinet is empty
- For the 60 slot base cabinet, all four cabinets are fully wired
- Overall weight: 260 lbs
- Overall dimensions: 42.5" w x 31" d x 66.75" h

**Pulse 75/90-Slot Base Cabinet**
- For the 75 slot base cabinet, the bottom left most cabinet is empty
- For the 90 slot base cabinet, all six cabinets are fully wired
- Overall weight: 360 lbs
- Overall dimensions: 54" w x 31" d x 66.75" h

*Specifications, while deemed accurate, are not guaranteed.* 2/2005
INTRODUCTION

DETAILED SYSTEM LAYOUT

Specifications, while deemed accurate, are not guaranteed. 2/2005
Pulse™ 2 Series Control
Instruction Manual

INTRODUCTION

PULSE MODULES

Pulse 2 CPU Module

The Pulse 2 CPU module controls the operation of the thermocouple module and power modules within the bank that it is plugged into. The CPU module can only be inserted into the first slot of every bank. Note that CPU modules can be swapped, they are NOT specific to any Pulse base cabinet.

There are six status lights on each Pulse 2 CPU module indicating the status of the Pulse System and module itself:

LED 1 (green): +5VDC supply status
ON: +5VDC Supply is OK
OFF: +5VDC Supply is missing

LED 2 (green): Watchdog Status
BLINK: “Watchdog” is OK
OFF: “Reset condition”

LED 3 (red/green): CAN (Controller Area Network) Status
Green: CAN is OK
Red: CAN is offline
OFF: CAN is NOT configured

Specifications, while deemed accurate, are not guaranteed. 2/2005
Pulse 2 TC (Thermocouple) Module

The Pulse 2 TC module controls up to 32 individual thermocouple inputs per module.

The ATP feature ensures robust board and thermocouple protection against improper grounding commonly found on hot runner systems. An advanced protection circuit that opens itself when excessive current is detected through the thermocouple and remains open until proper grounding is added protects each input.

To calibrate the thermocouple module, reference the MAINTENANCE section of this manual.
INTRODUCTION

PULSE MODULES

Pulse Dual Zone, 20 Amp Power Module

The dual zone 20 Amp power module contains 2 zones of control at 20 amps each in one slot. The outputs are fused on both sides of the line with standard ABC 20 Amp fuses. There are 4 indicator lights on the Dual zone 20 amp power module:

- **LED 1 (Zone “A” Power Light)**
  ON = Module is in AUTO, MANUAL, VIEW or SLAVE mode
  OFF = Module is in OFF mode, secondary power relays are disabled.

- **LED 2 (Zone A Load Light)** blinks according to the power applied to zone A.

- **LED 3 (Zone B Power Light)**
  ON = Module is in AUTO, MANUAL, VIEW or SLAVE mode
  OFF = Module is in OFF mode, secondary power relays are disabled.

- **LED 4 (Zone B Load Light)** blinks according to the power applied to zone B.

Fuse Replacement

- Power the BOTH zones in the Pulse 2 system by turning the ZONE MODE to OFF (for more details on how to do this see “Section 6: Operation”.
- Gently pull each module locking mechanism out.
- Using the locking mechanisms, pull out the module directly toward you.
- In the center of the power module there is an access hole for the fuses.
  Using an ohmmeter, check across each fuse for continuity. If it shows open, the fuse is open.

  To replace the fuse:
  - Using a needle nose pliers, grip the center of the fuse gently and pull out.
  - Replace fuses with 20 AMP ABC fuses ONLY.
  - Prior to inserting the new fuse, squeeze the fuse clips slightly together (due to removal of fuses the clips might of opened their grip, a loose fit may cause temperature stability and triac short errors).
  - Insert the new fuses, they should be snug and should not be moving in place.

*Specifications, while deemed accurate, are not guaranteed. 2/2005*
INTRODUCTION

PULSE MODULES

Single Zone, 30 Amp Power Module

The single zone 30 Amp power module contains 30 Amps of control for a single zone in one slot. The output is fused on both sides of the line with standard ABC 30 Amp fuses. There are 2 indicator lights on the Single zone 30 amp power module:

LED 1 (Zone Power Light)
ON = Module is in AUTO, MANUAL, VIEW or SLAVE mode
OFF = Module is in OFF mode, secondary power relays are disabled.

LED 2 (Zone Load Light) blinks according to the power applied to the zone.

Each module is capable of delivering up to 30Amps at 240VAC per zone - note this is based on not exceeding total system power draw that is specified by supplied external power cord and circuit protection.

Fuse Replacement

- Power the BOTH zones in the Pulse 2 system by turning the ZONE MODES to OFF (for more details on how to do this see “Section 6: Operation”.
- Gently pull each module locking mechanism out.
- Using the locking mechanisms, pull out the module directly toward you.
- In the center of the power module there is an access hole for the fuses. Using an ohmmeter, check across each fuse for continuity. If it shows open, the fuse is open.

To replace the fuse:
- Using a needle nose pliers, grip the center of the fuse gently and pull out.
- Replace fuses with 30 AMP ??? fuses ONLY.
- Prior to inserting the new fuse, squeeze the fuse clips slightly together (due to removal of fuses the clips might of opened their grip, a loose fit may cause temperature stability and triac short errors).
- Insert the new fuses, they should be snug and should not be moving in place.

Specifications, while demed accurate, are not guaranteed. 2/2005
INTRODUCTION

PULSE 2 DISPLAY MODULE

The Pulse 2 Display module is the main operator interface to the system. It contains universal symbols that ease in the operation of the system. To familiarize with the display, each button’s and connector’s function is described:

Front View
INTRODUCTION

PULSE 2 DISPLAY MODULE

Rear View

-alarm sounder
-parallel printer port
-optional RS-232 communication port
-display mounting bracket
-display connector

Specifications, while deemed accurate, are not guaranteed. 2/2005
SAFETY

SAFETY INSTRUCTIONS FOR MACHINERY

⚠️ WARNING!
FOR YOUR OWN SAFETY, READ INSTRUCTION MANUAL BEFORE OPERATING THIS MACHINE

ADDITIONAL SAFETY FOR TEMPERATURE CONTROLS

The purpose of safety symbols is to attract your attention to possible hazardous conditions. This manual uses a series of symbols and signal words which are intended to convey the level of importance of the safety messages. The progression of symbols is described below. Remember that safety messages themselves do not eliminate danger and are not a substitute for proper accident prevention measures.

⚠️ DANGER!
Indicates an imminently hazardous situation which, if not avoided, WILL result in death or serious injury.

⚠️ WARNING!
Indicates a potentially hazardous situation which, if not avoided COULD result in death or serious injury.

⚠️ CAUTION!
Indicates a potentially hazardous situation which, if not avoided, MAY result in minor or moderate injury. It may also be used to alert against unsafe practices.

NOTICE!
This symbol is used to alert the user to useful information about proper operation of the machine.

ADDITIONAL SAFETY FOR TEMPERATURE CONTROLS

The Pulse Hot Runner Control System is designed to convey the input voltage to hot runner-heating elements. This requires that the control provide a significant current and voltage, as stated below. We recommend some of the following guidelines in addition to your standards taken by this type of equipment.

• When servicing this unit always disconnect input power from the main cabinet.

• When connecting heater and thermocouple cables between the controller and tool ensure they are connected to their proper location.
CIRCUIT REQUIREMENTS

Only connect your machine to a circuit that meets the requirements below. Always check to see if the wires and circuit breaker in your circuit are capable of handling the amperage draw from your machine, as well as any other machines that could be operating on the same circuit. If you are unsure, consult a qualified electrician. Due to the nature of Hot Runner Systems varying in current draw by design of the specific Hot Runner System, the Pulse Hot Runner Control is designed to meet some maximum requirements as provided.

Each Pulse Slot Configuration is specifically designed to handle a maximum current limit as specified by the total system design on the Pulse which includes internal wiring, circuit breaker (3 phase, delta models only) RCD Switch (5 Wire, Wye systems only), and portable cording (note that each configuration may or may not be supplied with a portable cord - consult factory for details). Where a cord is not provided, it is the customers’ responsibility to supply proper wire size for the current being drawn in the Hot Runner System as a maximum.

⚠️ CAUTION! ⚠️

It is always recommended that the wire size be made to handle the circuit breaker connected to the cabinet.

GROUNDING

In the event of an electrical short, grounding reduces the risk of electric shock. This tool is equipped with a power cord that has a grounding wire, which must be properly connected to the grounding prong on the plug; likewise, the outlet must be properly installed and grounded. All electrical connections must be made in accordance with local codes and ordinances.

⚠️ WARNING! ⚠️

Electrocution or fire could result if this machine is not grounded correctly or if your electrical configuration does not comply with local and state codes. Ensure compliance by checking with a qualified electrician.

For safety and proper operation a ground connection must be present between the tool and the Pulse control system. Ensure that the Heater connector on the tool is properly grounded to the tool.
UNPACK, INVENTORY AND CONNECTIONS

UNPACK AND CONNECTIONS SAFETY

**WARNING!** Wear SAFETY GLASSES during the entire set up process!

**WARNING!** The Pulse System is very heavy. DO NOT over-exert yourself while unpacking or moving – GET ASSISTANCE.

ITEMS NEEDED FOR SET UP

The following items are needed to complete the set up process, but are not included with your machine:

<table>
<thead>
<tr>
<th>Description</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strong People (or Forklift) for Lifting Help.</td>
<td>2</td>
</tr>
<tr>
<td>Wire strippers for portable cord connection</td>
<td>1</td>
</tr>
<tr>
<td>Phillips or Flat Head screw driver for portable cord to plug</td>
<td>1</td>
</tr>
</tbody>
</table>

STEP 1: UNPACKING AND INVENTORY

The Pulse 2 was carefully packed when it left our warehouse. If you discover the machine is damaged after you have signed for delivery, please immediately call Customer Service at the phone numbers listed under “CONTACT INFO” on page 4.

Save the containers and all packing materials for possible inspection by the carrier or its agent. **Otherwise, filing a freight claim can be difficult.** When you are completely satisfied with the condition of your shipment, you should inventory the contents.

Inventory

Using the pictures and descriptions in “Section 1: Introduction: General Product Information” match these items to the enclosed invoice. If there are any concerns or pieces missing, please immediately call Customer Service at the phone numbers located in “Section 1: Introduction” for advice. (Note: There may be some special connector and option packages also included with each Pulse 2, refer to any special instruction sheets included with the Pulse)

System Information Packet:

- Welcome letter
- This instruction manual
- Quick Start guide
- Security access code
UNPACK, INVENTORY AND CONNECTIONS

STEP 2 ASSEMBLY

The Pulse is designed with very little assembly needed. Each Pulse system is fully assembled and load tested prior to shipment. For special assembly or mounting instructions please read the following:

**Pulse 2, 15-Slot Mainframe:**

To assemble the 15 Slot Pulse mainframe, unpack it from its shipping container and place it on a flat dry surface. There are (4) -20 mounting holes located on either side of the cabinet or (4) 8-32 mounting holes located on the bottom of the cabinet that may be used to fasten the control to existing equipment. Caution on proper loading requirements must be taken and these mounting locations are only provided as a guideline.

Take proper precautions - review the entire cabinet and ensure there are no loose connections or screws. If there are problems experienced with this please call the technical support number provided on page X.

If a mobile rack was purchased with your Pulse 15 Slot mainframe, follow the assembly procedure enclosed with the rack.

**Pulse 2, 30 to 90-Slot Mainframes:**

To assemble the 30-90 Slot mainframes, uncrate it from the shipping container and wheel it out onto a flat surface. There is no general assembly required for these cabinets as they come completely assembled at the factory. Note that each Pulse 2 30 to 90 Slot systems already come with a mobile rack assembled.

Take proper precautions - review the entire cabinet and ensure there are no loose connections or screws. If there are problems experienced with this please call the technical support number provided on page X.

**Modules**

If modules were purchased with your Pulse system, if they are not already inserted, take the time now to insert them into the machine. Use “Section 1: Introduction - General Product Information” to guide the location of each module.

Each POWER MODULE slot takes one Dual Zone, 20 Amp power module or one Single Zone, 30 Amp power module.

**Display Module**

If the Pulse system came with the display detached, remove the knurled knobs to the left and right of the display mounting bracket and place the display onto the handle display bracket and replace the knobs. Tighten the knobs once the display is at the desired angle.

**NOTE FOR PROPER OPERATION:**

Ensure the module is fully seated up against the card cage and the latch on either side of the module is in the fully locked position.
STEP 3 CONNECTING TO THE SYSTEM

If the Pulse came with a portable cord, using the recommended tools outlined in the “items needed for setup” attach your company standard electrical plug.

This should be a male plug capable of handling the current outlined in “Section 3: Circuit Requirements” section.

Ensure all connections are tight and that a ground is connected and tested.

If the Pulse came WITHOUT a portable cord, consult an electrician to supply the appropriate power. Ensure proper wire gauge and grounding is maintained throughout this part of the installation.

To install the power cord, from the existing cabinet knock-out hole located directly below the circuit breaker (Chris: Show a photo of the knock out hole). Add a properly sized strain relief, the hole can be made larger, but caution should be taken not to interfere with internal components.

ONLY properly sized wire rated for the application should be used along with proper circuit protection supplied to the Pulse. For more safety details refer to “Section 3: Circuit Requirements”.

STEP 1: NAVIGATING THE SCREENS

The Pulse is a cursor-based system, which is controlled by a set of navigation buttons to the right of the main display.

**Navigation buttons** move the cursor up, down, left and right.

Once the cursor is located over the position that needs to be updated, the **increase value button** or **decrease value button** can be used to change the highlighted values.

STEP 2: UNDERSTANDING SECURITY

Every Pulse ships with a default security level of 5400.

To enter security for the first time, use the cursor keys and increase / decrease buttons until the security code reads “5400”. Then at the bottom of the screen, press the LOGIN button.

What should now be displayed is the MAIN display for Pulse, which contains information for zones 1 to 30.

For more details on passwords and security, reference Security under Section 7: Pulse Operation.

STEP 3: QUICK START-UP

Read this manual completely prior to using the **Quick Start-Up Guide** included with your **Startup Package**. At minimum, each section regarding safety should be read prior to operating the Pulse 2 for the first time.

Locate the **Pulse 2 Quick Startup Guide** included with your **Startup Package** and follow the instructions on getting up and running quickly.
**WARNING!**
**ELECTRICAL SHOCK CAN OCCUR**

Ensure that the unit is properly grounded.

No moisture should be present on or around the Pulse. If any is detected immediately disconnect the mains power to the Pulse and consult your plant maintenance personnel.

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**PULSE CONTROL SYSTEM OPERATION**

This section is laid out in a format that steps the operator in understanding and fully operating the Pulse 2. What is helpful, prior to working through this section it is highly recommended to understand basic NAVIGATION and SECURITY as covered in “Section 5: Quick Startup” of this manual and the “Pulse Quick Startup Guide”.

**STEP 1: DETAILED NAVIGATION**

The Pulse is a cursor-based system, which is controlled by a set of navigation buttons to the right of the main display. Navigation buttons move the cursor up, down, left and right. Once the cursor is located over the position that needs to be updated, the increase value button or decrease value button can be used to change the highlighted values.

The increase and decrease value buttons also toggle between options like ON or OFF and mode settings like Auto, Manual, Slave, View as well as other items that change. Basically, the change value buttons will make the changes for the area that is highlighted.

**Navigating in a Pulse 2 system with more than 30 zones:**

If the Pulse 2 system purchased has more than 30 zones, at the bottom of every display showing a zone there are to function buttons to help navigate to the rest of the zones: PREV (previous) and NEXT.

For example, if a Pulse 90 was purchased, in the MAIN display showing zones 1 to 30, pressing NEXT will now display zones 31 to 60, pressing NEXT again will display zones 61 to 90 and pressing one more time displays 1 to 30 again. Pressing PREV will do the same thing except in opposite order. Pressing PREV from zones 1 to 30 will now display 61 to 90, pressing again, 31 to 60 and so on.
STEP 2: UNDERSTANDING AND MANAGING SECURITY

Each Pulse 2 system can be controlled in a variety of ways that allows for maximum flexibility to the molder. Though this flexibility allows for greater customization, it sometimes requires a deeper understanding of each of these settings and by adjusting these without proper training could cause the Pulse 2 system to not operate as intended. Pulse 2 security assists in controlling access to each adjustment point while still allowing for maximum flexibility where needed.

There are two screens that deal with security in the Pulse 2, the Security Login/Logout screen and the Security Setup Screen.

The Security Login/Logout screen is the first display that appears after the initial LOGO splash screen and can be accessed by pressing the SECURITY function button from the MAIN display. From this screen a security code can be entered to the desired level of operational access. Note that each security code is any combination of four numbers.

There are three command buttons that control security in this screen, LOGIN, LOGOUT and SETUP SECURITY. Note, the MAIN and QVIEW command buttons will take you out of the security screen.

Pressing LOGIN command gives access to the desired security level, provided the desired security code has been setup in the Pulse 2 Security setup display (see SETUP SECURITY in this section for more details).

To LOGIN with a security code, initially the cursor is located in the left most of the four digits. Pressing the change value buttons will scroll through the numbers. To move to the next column press the right or left navigation button then repeat this procedure for the rest of the columns until the desired security code is displayed. Press the LOGIN button to change to the desired level of security.
MANAGING SECURITY CONTINUED

Pressing the LOGOUT command automatically moves access to LEVEL 1 security, which is the lowest level of access. This command is used to simply move to the lowest level with a push of one button.

The SETUP SECURITY command button accesses the setup screen for security rights and can ONLY be accessed if the current security level is 3.

The top section of SETUP SECURITY is dedicated to setting the access rights to all areas. There are four columns of information: NAME, L1, L2 and L3. NAME is the access area that can be secured. Columns L1 to L3 set the rights to each named area, each column signifies a separate level, and with L3 being the only level that gives rights to the security setup screen that is currently being modified. Under each Level Column, each Named area has two states:
- OFF: Named area is unsecure
- ON: Named area is secured

To give access to a named area, move the highlighted cursor to the desired level and named area and by pressing the +/- change the rights from OFF to ON.

The bottom section is dedicated to setting passwords for each respective level. Up to 5 different unique security codes consisting of 4 numbers each can be assigned to Levels 1 and 2. Level 3 also has the ability to be assigned 4 unique numbers but in this case there is only one password assigned to this level.

All new Pulse 2 Controls ship with a standard security code that was included in the shipping documentation for Level 3 access, consult that documentation for that security code.

It is highly recommended if security is used that the factory default security is set to another security code. This code should be placed in a safe location and not given out to anyone without proper authorization.

Recommendations:

Prior to adjusting the rights to each named area, some planning needs to be considered as to who gets access to which screens. Use security where control is needed in preventing problems from occurring, as too much security could hinder use as well. Care should be taken in working with personnel in meeting specific daily needs of operation.
STEP 3: GENERAL SCREEN LAYOUT

What is common to each Pulse screen is the top information bar and the bottom function buttons, the rest of the screen is dedicated to the specific views and functions within the Pulse 2.

The top information bar was designed to guide the operator in the general operation of the Pulse 2 control system. There are three sections to the top information bar. To the farthest left is the SYSTEM STATUS indicator, in the center is the CURRENT SCREEN identifier and to the farthest right is the GENERAL INFORMATION section that indicates the date and time, the mold recipe name and the currently logged in security level.

The SYSTEM STATUS indicator is used to identify the current operating mode of the overall system. There are several operating and transitional modes within the Pulse 2 activated at different times that strictly depends on the features activated. The modes are RUN, STOP, BOOST, IDLE, RAMP, SOFT SOAK, EVEN SOAK and FAST TUNE. Note that color is used to indicate some of the modes. (For more information about these modes reference the “Section 6: Operation”).

The CURRENT SCREEN STATUS indicator is in the center of the screen and always indicates the current screen that is being displayed.

The GENERAL INFORMATION section is to the farthest right of the screen. It indicates from top to bottom the current date and time, the current recipe selected that all information is stored to and the current logged in security level.

The bottom function buttons at the very bottom of the display are located above a row of buttons. These indicators will change with every display to reflect specific functions within the screen currently being shown.
STEP 4: THE MAIN DISPLAY

After logging into the Pulse 2 display, the first screen shown is the MAIN display. The Pulse defaults to this display since it offers the operator the most amount of information and control of each zone in a text view format.

The MAIN display is also the default display to get to all other displays within the Pulse 2. The MAIN Display contains all the important zone operative controls and information needed to adjust, maintain and control each heated zone. It contains the ability to adjust the Zone Naming (NAME), Evensoak Group (GRP), Setpoints (SET), Zone Mode (MODE) and where a zone Slaves (SLV) to another zone. Information is displayed on the operation of each zone with Actual Temperature (ACT), Power applied to a zone (PWR) and Current pulled by a zone (AMPS).

The function button indicators at the bottom of the MAIN display – QVIEW, GRAPHS, SECURITY, ZONES, SYSTEM and RECIPES – access a majority of screens in the Pulse 2. Detailed information about each of these screens appears later in this section.

PREVIOUS (PREV) and NEXT are present on all Pulse 2 systems containing more than 30 zones. NEXT advances the display to the concurrent 30 zones. PREVIOUS (PREV) returns the display to the prior set of 30 zones, depending on the total size of the system.
ZN - This indicates the hard-wired zone locations in the Pulse. This varies per the system purchased and can be a maximum of 180 zones.

NAME - Within the MAIN display, each zone can be assigned a specific name consisting of up to 8 alpha-numeric characters.

GRP - This area assigns the startup group for each zone. There are up to 6 groups of zones that can be started at the same time when the EVENSOAK feature has been activated. For more information on the EVENSOAK feature, refer to SYSTEM SETUP in this section.

ACT - If a thermocouple is present and the zone is either in AUTO or VIEW mode, actual temperature will be displayed here. Note, if the system is set to degrees F, an F symbol will appear after the value in this section. If degrees C is chosen a C symbol will appear in this section after the value displayed.

SET - If the zone is in AUTO mode a temperature setpoint will be displayed here. Note if the system is set to degrees F, an F symbol will appear after in this section. If degrees C is chosen a C symbol will appear in this section after the value displayed. Also note that this is a static value, changing from degrees F to degrees C does NOT convert the value, it must be adjusted by the operator.

PWR - If the zone mode is in AUTO or MANUAL and power is required to maintain a setpoint a % power value will appear here. The range of power in the Pulse 2 is 0% to 100%.

AMPS - IF the zone mode is in AUTO or MANUAL and power is required to maintain a setpoint, an AMP reading will be displayed here. Note that the amps indicated in this screen are true current readings (RMS).

MODE - For every zone there are 5 zone modes available, they are OFF, AUTO, MANUAL, VIEW and SLAVE.

OFF - When the zone is set to OFF mode, power is disconnected to the load via a cut off relay on the power module.

AUTO - When the zone is set to AUTO mode, the zone operates in closed loop control mode. It is expected that a thermocouple is present and working properly to function in this mode. The setpoint (SET) value will display a temperature value that can be adjusted by the operator.
**OPERATION**

- **MANUAL** - When the zone is set to MANUAL mode, the zone operates in open loop control mode. This is valuable when a thermocouple is not present or desired. The setpoint (SET) value on the MAIN display for that zone will show a % power setting adjustable from 0% to 100% power.

  **Caution should be taken when directly applying power to a load, damage can occur to the heating element, system and controller when too high of a power level is set.**

- **VIEW** - When the zone is set to VIEW mode, the zone does not have a control mode that outputs power. The only value displayed for that zone is temperature in the ACT column. VIEW is simply used to view temperature for that zone’s assigned TC location.

- **SLAVE** - When a zone is set to SLAVE mode, the zone does not have a control mode. What SLAVE does is use the information in the next column marked SLV, that represents what zone’s power output will be copied to this zone.

  The slave feature is a feature that allows a zone to run without a thermocouple. The slave feature is valuable in that it allows for an operator to use another zone’s power output to control its heater. The benefit being that there is a thermocouple in the zone that is being slaved to and any temperature adjustments will apply. If properly selected with a known similar zone in setpoint and thermal properties, will allow that zone to run better than setting that zone into manual mode.

- **SLV** - If the zone is set to SLAVE mode, this is where the zone that this zone will slave to will be assigned. The ranges depend on the number of active zones - up to 180.
Step 5: Quickly Changing Values (for multiple zones)

Because there can be a large amount of information to change for multiple zones like setpoints, modes and other settings. There are several to do this simply and quickly with the COPY / PASTE command.

There are three primary ways to copy and paste information depending on the situation. The Copy and Paste Command is used to copy the target zone’s information to other zones.

Example:

In the MAIN display, move the cursor to ZONE 1, SET column. This will be the desired setpoint to be copied.

The COPY/PASTE Command function buttons at the bottom of the screen should now be displayed.

The desired value to be changed should be highlighted in GREEN and the cursor is automatically moved to the next consecutive zone.

At this point, there are three options for PASTING this desired value:

**PASTE, PASTE COLUMN and PASTE GROUP**

**PASTE** - By pressing the PASTE function button, the GREEN highlighted value is copied just to the current cursor location of that zone. This is helpful when only a few select zones need to have their value changed.

**PASTE COLUMN** - By pressing the PASTE COLUMN function button, the GREEN highlighted value is copied (in that column) to ALL zones in that value column - like SET (setpoint). Note that PASTE COLUMN will copy to the maximum zone capability of the purchased Pulse 2 system - all capable zones. This is helpful, when initially setting up a new recipe and all or most of all zone setpoints are the same. Rather than having to enter each setpoint individually or PASTE individually PASTE COLUMN will do this in one button press.

**PASTE GROUP** - By pressing the PASTE GROUP function button, the

To exit the COPY / PASTE Command press the DONE function button.
STEP 6: RECIPE SELECTION AND MANAGEMENT

The Pulse 2 has an active **recipe storage system**, that automatically stores any changes done anywhere in the Pulse 2. At the first startup of the Pulse 2 system, the first recipe is selected as the default recipe. This recipe is shown in the top information bar to the farthest right under the date and time the recipe is indicated as MOLD: XXX.

To access the recipe screen, at the bottom of the MAIN display press the function indicator showing RECIPE. There are two sections in the recipe screen. The selected recipe indicator and the recipe list. At the bottom of the RECIPE screen the the function button indicators show MAIN, MOLD SETUP, DELETE, SELECT and PREV and NEXT.
STEP 7: MORE VIEWS

The Pulse 2 has two more views of temperature, power and current that each allow for a different view of this information and is used primarily for diagnostic purposes. Those views are the QVIEW (Quick View) display and the GRAPH display.

QVIEW allows for a Quick View of the status of many of the functions and alarms in a format that is grouped in a 30-zone block. Secondly, for more than 30 zones, it allows an operator to jump in an out of MAIN text displays for all zones up to 180 from one display (without having to hit previous or next function buttons).

To show the QVIEW display, press the QVIEW function indicator under MAIN. Dependant on the number of zones in the system, QVIEW will display up to 6 STATUS BLOCKS. They are organized in groups of 30 zones a piece and follow the configuration of the Pulse 2 cabinet zones. That is, for a 120 zone system, there would be 4 STATUS BLOCKS displayed. The first STATUS BLOCK located in the upper left contains information on zones 1 to 30, the block directly below this are for zones 31 to 60, top right for zones 61 to 90 and bottom right 91 to 120.

This configuration matches the zone locations of each Pulse cabinet of zones. This becomes helpful when troubleshooting a bad zone module.
STEP 7: MORE VIEWS CONTINUED

QVIEW STATUS BLOCKS:
Each Status Block contains 5 sections of information. From top to bottom, the first block is a zone information header indicating the number of zones the QVIEW status bloc represents. The second status block is for Temperature Status, the third for Power Status, the fourth for Current Status and the fifth for Thermocouple Status.

Color is used to indicate the status of each of these bars with GREEN indicating all parameters are within set conditions (everything is OK), RED indicating that an error has been detected in the assigned slots or zones, YELLOW indicating an error still exists but the alarm has been acknowledged.

Typically, on a RED indication, the Pulse alarm indicators of the strobe light and sounder will be turned on during an alarm condition. After pressing the ALARM button the zone status indicator will turn YELLOW indicating that the alarm has been recognized and the error still exists.

Temperature Status information bar will indicate the following conditions:
- Over Temperature Alarm Limit
- Under Temperature Alarm Limit
- Over Abort Temperature Alarm Limit
- Under Abort Temperature Alarm Limit.

Power Status Information Bar will indicate the following conditions:
- Over % Power Limit Alarm
- Under % Power Limit Alarm errors

Current Status Information Bar will indicate the following conditions:
- Over Current Limit Alarm
- Under Current Limit Alarm
- Open Heater
- Triac Short

Thermocouple Status Information Bar will indicate the following conditions:
- Open thermocouple
- Reverse thermocouple
- Shorted thermocouple

Navigating In QVIEW
To navigate to other text blocks within QVIEW, use the navigation keys to move the highlighted STATUS BLOCK to the desired location and press the MAIN function indicator button.
The GRAPHS display’s main purpose is to view temperature, power and current along with their associated band alarms in a horizontal bar graph format 30 zones at a time. This is useful for watching interaction trends between certain zones. These graphs can also be printed through the print report function (see Printing Reports in this section). To access the GRAPH display, press the GRAPH function button indicator from the MAIN display. Each display can navigate to more than 30 zones by pressing the PREV or NEXT function indicator buttons at the bottom of the display.
Temperature Graph

The first graph that is displayed is the TEMP GRAPH. There are four sections to the TEMP GRAPH display from left to right they are ZN or hard-wired zone number, NAME or the zone name, ACT or actual temperature and the horizontal temperature graph.

In the GRAPH section of this display, at the top, there is a temperature scale representing temperature and ranging from 0° to 1000°. Just below this scale are the actual horizontal bar graphs. Each of these bar graphs represented by a green/yellow bar is the SETPOINT, ALARM BAND and ABORT BAND for that zone. The white vertical bar represents the ACTUAL TEMPERATURE for that zone.

Each bar graph contains a green area in the center surrounded by a yellow area. The center green area is the ALARM BAND currently set in ZONE SETUP. The center of this green section is the temperature SETPOINT. This graph will track along the horizontal axis as the setpoint is changed. For example if the setpoint is 260°F the center of the GREEN band will be located directly below the 260°F mark on the temperature scale.

The green alarm band will change its width as the alarm band is adjusted. For example an alarm band of 50° will show a green band with 50° above the setpoint and 50° below the setpoint - which represents 100° in total.

The yellow portion of this bar graph is ABORT BAND setting as selected in the ZONE SETUP display. The abort band will always sit outside of the ALARM BAND and will also change its width according to the ABORT BAND setting. For example a 100° abort band setting will be represented in this graph as 100° above the setpoint and 100° below the setpoint.
STEP 7: MORE VIEWS CONTINUED

**Power Graph**

To access the POWER GRAPH display, from the TEMP GRAPH display press the POWER GRAPH function indicator at the bottom of the screen. Each display can navigate to more than 30 zones by pressing the PREV or NEXT function indicator buttons at the bottom of the display.

There are four sections to the POWER GRAPH display from left to right they are ZN or hard-wired zone number, NAME or the zone name, ACT or actual temperature and the horizontal power graph.

In the GRAPH section of this display, at the top there is a power scale representing the % Power currently being applied to the load.

Just below this scale are the actual % POWER horizontal bar graph setpoint and alarm band limit. The ACTUAL POWER being applied to the load is represented by a white vertical bar and the POWER BAND limit is represented by a green horizontal bar graph.

The green bar will change its width as the POWER ALARM’s MIN and MAX limits are adjusted from the POWER ALARMS display under ZONE SETUP. For example, if the %POWER MIN is set to 20% and the %POWER MAX is set to 60% the green bar graph will extend from 20% to 60% power and this is the alarm band limit for that zone. The white vertical bar will then move along this axis and represent the current power being applied to the load.
STEP 7: MORE VIEWS CONTINUED

AMP Graph

To access the AMP GRAPH display, either from the TEMP or POWER GRAPH press the AMP GRAPH function indicator at the bottom of the screen.

Each display can navigate to more than 30 zones by pressing the PREV or NEXT function indicator buttons at the bottom of the display.

There are four sections to the AMP GRAPH display from left to right they are ZN or hard-wired zone number, NAME or the zone name, ACT or actual temperature and the horizontal AMP GRAPH.

In the GRAPH section of this display, at the top there is an AMP scale representing the current range output of that zone between 0 Amps and 30 Amps. Just below the scale are the actual AMPS horizontal bar graph setpoint and alarm band limit.

The AMPS being applied to the load is represented by a white vertical bar and the AMP BAND limit is represented by green horizontal bar graph.

The green bar will change its width as the AMP ALARM’s MIN and MAX limits are adjusted from the POWER ALARMS display under ZONE SETUP. For example, if the AMPS MIN are set to 5 AMPS and the AMPS MAX are set to 15 AMPS, the green bar graph will extend from 5AMPS to 15AMPS and this is the alarm band limit for that zone.

The white vertical bar will then move along this axis and represent the current AMPS being applied to the load.
STEP 8: DETAILED ZONE SETUP

Every Pulse 2 system comes ready to run out of the box with minimal setup required. All zone setup values in the ZONE SETUP screens have been set to common settings that may be applicable for most molding applications. In the ZONE SETUP section there are five total ZONE SETUP displays and they are:

- **TEMP ALARMS** - Temperature Alarm bands display
- **SETPT LIMITS** - Setpoint limits display
- **BOOST IDLE** - Boost and Idle setpoints display
- **PID** - Control algorithm adjustment display
- **POWER ALARMS** - % Power and Current alarm bands display

To access ZONE setup displays, from the MAIN display press the function indicator button labeled ZONES at the bottom of the display. The screen then changes to the first zone setup display called “TEMPERATURE ALARMS” screen.

**Temperature Alarms and T/C location Setup Display:**

The TEMPERATURE ALARMS display has two main functions. The first is setting of the ALARM BANDS for each zone’s setpoint. Secondly each zone’s thermocouple location can be assigned to different zones for diagnostic as well as rewiring needs. Each display can navigate to more than 30 zones by pressing the PREV or NEXT function indicator buttons at the bottom of the display.

The TEMPERATURE ALARMS display contains seven columns of information, from left to right they are:

- **ZN** (Hard wired zone location)
- **NAME** (Zone name)
- **SET** (Zone setpoint)
- **ALARM** (ALARM BAND limit) – the temperature limit that surrounds the setpoint. When this limit is exceeded ALARM BAND HIGH or LOW will be shown in the ALARM display. This value can be set anywhere between 0° to 999°. If a value of 0° is set, no alarm band will be used.
- **ABORT**
- **ABORT-TYPE**
- **T/C**

For more information about the above settings see the MAIN display explanation in this section.

**Recommendation**

It is always recommended prior to running the Pulse 2 on a new hot half that all settings be reviewed and modified where necessary for proper operation.

**NOTE: Alarm Bands**

Setting a value that is too low may cause the alarm to be activated often. This is dependant on thermal dynamic influences outside the control loop of the Pulse 2. For example, for a setpoint of 500°, an ALARM band is set for 30° which equates to an ALARM band limit between 470° and 530°. That is, if the actual temperature was to fall below 470° to 469° or exceed the 530° limit to 531° the temperature ALARM OVER or temperature ALARM UNDER alarms will be activated. Note that the total ALARM BAND is 60° - 30° above and 30° below the setpoint. For more information about alarms see theALARMS display in this section.
STEP 8: DETAILED ZONE SETUP CONTINUED

ABORT (Abort Band Limit)
The temperature band limit that surrounds the setpoint and ALARM band (cannot be
smaller than the ALARM band). This is a temperature safety alarm where if zone
were to exceed above or below a certain temperature, more drastic actions can be
taken on the system through the next zone setup known as ABORT TYPE.
This value can be set anywhere between 0° to 999°. If a value of 0° is set, no abort
band will be used.

ABORT TYPE
There are three selections to choose from in ABORT TYPE:

• NONE – there is no action applied when the ABORT BAND limits have
  been exceeded.
• ZONE OFF – if the ABORT TYPE is set to this parameter, when the
temperature exceeds the ABORT BAND limits, this zone will automatically
change its mode to OFF.
• SYS STOP – if the ABORT type is set to this parameter, when the
temperature exceeds the ABORT BAND limits, this zone will automatically
change the SYSTEM MODE to STOP.

T/C (Thermocouple Location)
The T/C or thermocouple location assignment column is located to the furthest right
of the TEMPERATURE ALARMS display. This column represents the currently
assigned thermocouple input from the ZN or hard wired zone location assigned to
that zone. This value can be set from zones 1 to 180, dependant on the total
柜配置。

This parameter is useful when a mis-wired zone is detected between a few zones.
For example if the thermocouple in zone 1 is wired to zone 3 and the thermocouple
for zone 3 is wired to zone 1, those zones can be re-wired by changing their ther-
moscope assignments. Zone 1 would be assigned by adjusting ZONE 1 T/C = 3
(zone 3) and Zone 3 would be assigned by adjusting ZONE 3 T/C = 1 (zone 1).
STEP 8: DETAILED ZONE SETUP CONTINUED

SETPOINT LIMITS Setup Display

The SETPOINT LIMITS display serves two main functions, one is to set high and low limits (not to exceed) to zone TEMPERATURE and % POWER setpoints and the other is to set a MAX (maximum) power output for each zone.

To display this screen from the TEMP GRAPH display press the SETPT LIMITS function button indicator at the bottom of the display.

Each display can navigate to more than 30 zones by pressing the PREV or NEXT function indicator buttons at the bottom of the display. The SETPOINT LIMITS display contains 8 columns of information and they are from left to right:

- **ZN** – Hard wired zone location
- **NAME** – Zone name
- **SET** – Zone setpoint
- **LO-AT** – Low Setting for AUTO mode or Temperature Setpoints
  
  This setting is an absolute temperature setting representing the lowest temperature setpoint setting allowable in the SET column on the MAIN and other displays. For example, if the temperature setpoint is set for 500°, and the LO-AT is set for 400°, when an operator attempts to change the setpoint to 300° a pop-up will appear indicating “UNDER TEMPERATURE LIMIT OF 400, CONTACT YOUR SUPERVISOR, PRESS ANY KEY TO RETURN”. This value can be set anywhere between 0° to 999°. If a value of 0° is set, no lower setpoint limit will be used.

- **HI-AT** – High Setting for AUTO mode or Temperature Setpoints
  
  This setting is an absolute temperature representing the highest temperature setpoint setting allowable in the SET column on the MAIN and other displays. For example, if the temperature setpoint is set for 500°, and the HI-AT is set for 600°, when an operator attempts to change the setpoint to 700° a pop-up will appear indicating “OVER TEMPERATURE LIMIT OF 700°, CONTACT YOUR SUPERVISOR, PRESS ANY KEY TO RETURN”. This value can be set anywhere between 0° to 999°. If a value of 999° is set, no upper setpoint limit will be used.

For more information about the above settings see the MAIN display explanation in this section.
STEP 8: DETAILED ZONE SETUP CONTINUED

**• LO-MN** – Low Setting for MANUAL mode or % Power Setpoints

This setting is an absolute power level setting representing the lowest % power setpoint setting allowable for that zone in the SET column on the MAIN and other displays. For example, if the % power setpoint is set to 15% and the LO-MN is set for 5%, when the operator attempts to change the setpoint to 2% a pop up will appear indicating “UNDER POWER LIMIT OF 5%, CONTACT YOUR SUPERVISOR, PRESS ANY KEY TO RETURN” This value can be set anywhere between 0% to 100%. If a value of 0% is set, no lower setpoint limit will be used.

**• HI-MN** – High Setting for the Manual mode or % Power Setpoints

This setting is an absolute power level setting representing the highest % power setpoint setting allowable for that zone in the SET column on the MAIN and other displays. For example, if the % power setpoint is set to 15% and the HI-MN is set for 20%, when the operator attempts to change the setpoint to 25% a pop up will appear indicating “OVER POWER LIMIT OF 20%, CONTACT YOUR SUPERVISOR, PRESS ANY KEY TO RETURN” This value can be set anywhere between 0% to 100%. If a value of 100% is set, no upper setpoint limit will be used.

**• MAX** – Maximum power applied to a zone’s output

MAX power’s main function is to limit the output power applied to a zone at any time during its operation. The default level is always set to 100% power applied to the load (full power). This full power output is determined by the Pulse’s PID settings automatically. If a setting of 50% is set in the MAX column for a zone, this will limit the full power output to 50%. The zone will continue to operate and vary its power (below the 50% max level) to maintain its desired temperature. This value can be set anywhere between 0% to 100%. Default value is 100%. The MAX power setting is useful for certain zones where full power applied might cause a situation of excessive heat and degradation of material due to design of the hot half.

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**CAUTION!**

Care must be taken setting the MAX Power setting. Using any setting lower than the operating power of that zone will cause the zone to not achieve setpoint. Some experimentation might be necessary to find setting that minimizes heat flux while still being able to control the zones setpoint.
STEP 8: DETAILED ZONE SETUP CONTINUED

Boost Idle Setpoint Setup Display

The BOOST and IDLE setup display’s main function is to set the BOOST and IDLE setpoint values for each zone. These setpoints work in conjunction with the BOOST and IDLE system functions. For more information on those functions see BOOST and IDLE under “CONTROLLING THE PULSE 2”.

To access the BOOST IDLE Setpoint Setup Display, from any ZONE SETUP display press the function button indicator showing BOOST IDLE at the bottom of the display. Each display can navigate to more than 30 zones by pressing the PREV or NEXT function indicator buttons at the bottom of the display.

The BOOST IDLE Setpoint Setup Display contains seven columns of information and they are from left to right:

- **ZN** – Hard wired zone location
- **NAME** – Zone name
- **SET** – Zone setpoint
- **ID-AT** – Idle setpoint for AUTO mode or temperature setpoint

This setting is an absolute temperature setpoint representing the lower temperature setpoint value that zone will control at when the SYSTEM STATUS or mode is set to IDLE. For example, if the zone temperature setpoint is set to 500°, the ID-AT setpoint is set to 300° and the SYSTEM STATUS is changed to IDLE by pressing the IDLE button the zone will control its output to the heater at the new temperature of 300° for the time limit set in the Global IDLE timer in SYSTEM SETUP (for more information on this feature see Boost Idle under “Detailed System Setup” in this section). This value can be set anywhere between 0° and 999°. If a value of 999° is set, no idle setpoint will be recognized on this zone.

**NOTE: Idle Setpoint**

This setpoint should always be set lower than the operating setpoint SET on the MAIN and other displays. If ID-AT is set HIGHER than the zone's operating temperature setpoint, the ID-AT setpoint will be ignored and that zone will continue to operate at its normal temperature setpoint.
STEP 8: DETAILED ZONE SETUP CONTINUED

**NOTE: BS-AT Setpoint**
This setpoint should always be set higher than the operating setpoint SET on the MAIN and other displays. If BS-AT is set lower than the zone's operating temperature setpoint, the BS-AT setpoint will be ignored and that zone will continue to operate at its normal temperature setpoint.

**NOTE: ID-MN Setpoint**
This setpoint should always be set lower than the operating setpoint SET on the MAIN and other displays. If ID-MN is set higher than the zone's operating % power setpoint, the ID-MN setpoint will be ignored and that zone will continue to operate at its normal % power setpoint.

**NOTE: BS-MN Setpoint**
This setpoint should always be set higher than the operating setpoint SET on the MAIN and other displays. If BS-MN is set lower than the zone's operating % power setpoint, the BS-MN setpoint will be ignored and that zone will continue to operate at its normal % power setpoint.

**BS-AT** – Boost setpoint for AUTO mode or temperature setpoint
This setting is an absolute temperature setpoint value that zone will control at when the SYSTEM STATUS or mode is set to BOOST. For example, if the zone temperature setpoint is set to 500°, the BS-AT setpoint is set to 600° and the SYSTEM STATUS is changed to BOOST by pressing the BOOST button, the zone will control its output to the heater at the new temperature of 600° for the time limit set in the Global BOOST timer in SYSTEM SETUP (for more information on this feature see Boost Idle under “Detailed System Setup” in this section). This value can be set anywhere between 0° and 999°. If a value of 0° is set, no boost setpoint will be recognized on this zone.

**ID-MN** – Idle setpoint for MANUAL mode or % Power setpoint
This setting is an absolute % power setpoint value that zone will control at when the SYSTEM STATUS or mode is set to IDLE. For example, if the zone % power setpoint is set to 15%, the ID-MN setpoint is set to 5% and the SYSTEM STATUS is changed to IDLE by pressing the IDLE button, the zone will control its output to the heater at the new % power setting of 5% for the time limit set in the Global IDLE timer in SYSTEM SETUP (for more information on this feature see Boost Idle under “Detailed System Setup” in this section). This value can be set anywhere between 0% and 100%. If a value of 100% is set, no idle setpoint will be recognized on this zone.

**BS-MN** – Boost setpoint for MANUAL mode or % Power setpoint
This setting is an absolute % power setpoint value that zone will control at when the SYSTEM STATUS or mode is set to BOOST. For example, if the zone % power setpoint is set to 15%, the BS-MN setpoint is set to 30%, and the SYSTEM STATUS is changed to BOOST by pressing the BOOST button, the zone will control its output to the heater at the new % power setting of 30% for the time limit set in the Global BOOST timer in SYSTEM SETUP (for more information on this feature see Boost Idle under “Detailed System Setup” in this section). This value can be set anywhere between 0% and 999%. If a value of 0% is set, no boost setpoint will be recognized on this zone.
STEP 8: DETAILED ZONE SETUP CONTINUED

PID Setup Display

The PID setup display has two main functions. The first is to view the selected operating table determined by the FastTune function. The second is to give the ability to specifically adjust each PID output when a problem occurs in the control of a zone.

Note: To access the PID Setup Display, from any ZONE SETUP display press the function button indicator showing PID at the bottom of the display. Each display can navigate to more than 30 zones by pressing the PREV or NEXT function indicator buttons at the bottom of the display.

The PID Setup Display contains nine columns of information. From left to right:

- **ZN** – Hard wired zone location
- **NAME** – Zone name
- **ACT** – Actual setpoint
- **SET** – Zone setpoint
- **PWR** – Power output applied
- **T** – Selected PID Table
- **P** (Proportional Band) – this value adjusts for the proportional band limit of the PID. Values are adjustable from 0 to 9999.
- **I** (Integral Term) – this value adjusts for the integral or anti-reset wind up term for the PID. Values are adjustable from 0 to 9999.
- **D** (Derivative Term) – this value adjusts for the derivative term of the PID. Values are adjustable from 0 to 9999.

There are a total of 7 tables in the PID setup screen. Each table represents a load configuration as determined by the Pulse 2 algorithm. They are:

- Table 1: Very large mass
- Table 2: Large mass
- Table 3: Universal mass
- Table 4: Small mass
- Table 5: Very small mass
- Table 6: Micro mass
- Table 7: User defined PID settings

For more information about the above settings see the MAIN display explanation in this section.

NOTE: Tables

All tables with the exception of Table 7 are predefined load profiles - typically automatically chosen for a zone by running FastTune technology. They can also be changed by directly navigating to each table value. None of the PID settings are adjustable.

Most hot runner system loads will operate WITHOUT FastTune activated at table 3. Table 7 “User defined PID settings” allow the cursor to move to each individual PID columns allowing for adjustments.
STEP 8: DETAILED ZONE SETUP CONTINUED

POWER ALARMS Setup Display

The POWER ALARMS display allows for the setup of two types of band alarms - % Power and Amps. Each zone can have a band alarm set around a desired power level and a band alarm around a desired current level. To access the POWER ALARM setup display, from any ZONE SETUP display press the function button indicator showing POWER ALARM at the bottom of the display. Each display can navigate to more than 30 zones by pressing the PREV or NEXT function indicator buttons at the bottom of the display.

![POWER ALARM setup display](image)

POWER ALARM setup display contains six columns of information from left to right:

- **ZN** – Hard wired zone location
- **NAME** – Zone name

*For more information about the above settings see the MAIN display explanation in this section*

- **% POWER MIN** – Power minimum

  This setting is an absolute % power output value representing the lower limit of the % POWER band. If a zone’s % power output falls below this value an UNDER % POWER alarm is activated. This value can be anywhere between 0% and 100%. A value of 0% will not show a % POWER MIN alarm. For example, if the % POWER MIN is set to 5% and the zone’s output is 3%, the UNDER % POWER alarm is activated.
STEP 8: DETAILED ZONE SETUP CONTINUED

• **% POWER MAX** – Power maximum
  This setting is an absolute % power output value representing the upper limit of the % POWER band. If a zone’s % power output rises above this value an OVER % POWER alarm is activated. This value can be anywhere between 0% and 100%. A value of 100% will not show a % POWER MAX alarm. For example, if the % POWER MIN is set to 10% and the zone’s output is 15%, the OVER % POWER alarm is activated.

• **AMPS MIN** – AMPS Minimum
  This setting is an absolute AMP output value representing the lower limit of the AMP band. If a zone’s AMPS output falls below this value an UNDER AMPS alarm is activated. This value can be set anywhere between 0 AMPS and 30 AMPS. A value of 0 AMPS will not show an UNDER AMPS alarm. For example, if the AMPS MIN is set to 2AMPS and the zone’s output is 1AMP, the UNDER AMP alarm is activated.

• **AMPS MAX** (maximum) This setting is an absolute AMP output value representing the upper limit of the AMP band. If a zone’s AMPS output rises above this value an OVER AMPS alarm is activated. This value can be set anywhere between 0 AMPS and 30 AMPS. A value of 30 AMPS will not show an OVER AMPS alarm. For example, if the AMPS MAX is set to 5AMPS and the zone’s output is 7AMPS, the OVER AMP alarm is activated.
STEP 9: DETAILED SYSTEM SETUP

Every Pulse 2 system comes ready to run out of the box with minimal setup required. All SYSTEM SETUP values have been set to common settings that may be applicable for most molding applications.

The SYSTEM SETUP display contains global settings that effect all zones, system functions and system parameters as a whole. In detailed SYSTEM SETUP section, there are three SYSTEM SETUP displays and they are:

• SYSTEM (Main System Setup)
• AUX IN/OUT (Auxillary Input and Output Assignments)
• VERSION (Module version number reporting)

To access SYSTEM setup displays, from the MAIN display press the function indicator button labeled SYSTEM at the bottom of the display.

SYSTEM – Main System Setup

The first screen to appear when pressing the SYSTEM function indicator button from the MAIN display is the SYSTEM (Main System Setup) display. The SYSTEM setup display has several system functions:

- BAKEOUT
- FASTTUNE
- EVENSOAK
- SOFTSOAK
- TC AUTO COMP
- TC TYPE
- TEMP UNITS
- MANUAL ZONE TEMPS
- BOOST TIMER
- IDLE TIMER
- DATE
- TIME
BAKEOUT

BAKEOUT function's purpose is to "bake out" any moisture or leakage current present on a new tool startup. Doing this prevents premature failure of the heating element, sensor and control module. If selected, BAKEOUT is the first function in the TOOL STARTUP ROUTINE (for more information on the TOOL STARTUP ROUTINE see "CONTROLLING THE PULSE 2" in this section. BAKEOUT performs this by creating a smooth ramp up in power starting from 1% to the set BAKEOUT power level over a period of time set in the BAKEOUT TIMER. There are three adjustable settings in Bakeout:

- BAKEOUT (ON or OFF) – turns the BAKEOUT feature on or off. Setting this to OFF skips this feature and moves to the next activated TOOL STARTUP ROUTINE feature.
- BAKEOUT TIMER – a countdown timer that is used to time the total BAKEOUT cycle and can be set anywhere between 0 – 99 hours, 59 minutes – 59 seconds.
- BAKEOUT POWER – the % power level that Bakeout will reach when the BAKEOUT TIMER times-out, and can be set anywhere between 0% – 100% power.

FAST TUNE

FAST TUNE technology's purpose is to find an optimum tuning point that will allow the load to reach a stable temperature at the desired setpoint. FAST TUNE can either be set to ON or OFF.

- When FAST TUNE is set to ON it will run as part of the TOOL STARTUP ROUTINE and when it has finished tuning, it will automatically turn its mode to OFF.
- Once FAST TUNE has finished it will assign the appropriate PID values to each zone (for more information on the value selection see PID SETUP under the "ZONE SETUP" section in this manual).

Note: FAST TUNE

Pulse 2 automatically tunes on startup - it is not necessary to run this feature on a new tool startup. FAST TUNE is for special load situations.
STEP 9: DETAILED SYSTEM SETUP CONTINUED

EVEN SOAK

EVEN SOAK technology’s purpose serves two main functions:

- The first is to ensure the proper startup of a hot half according to Fast Heat published standards for starting up Hot Runner Systems (for more information on the Fast Heat Hot Runner System startup routine refer to the hot runner manual supplied with your hot half). In general, EVENSOAK will use the GRP (Group) setting found on the MAIN display (see the section under MAIN display in this manual). There are up to 6 groups that can be assigned to each zone.

- EVEN SOAK allows for a staggered startup on groups of zones that helps prevent excessive initial “power up current draw” that pulls a demand on the power system supplying the Pulse 2 (for more information on EVEN SOAK “staggered startup” feature see the SPECIAL FEATURES section of this manual).

EVEN SOAK can either be set to ON or OFF. When set to ON, EVEN SOAK will run as part of the “TOOL STARTUP ROUTINE” (for more information on operation see the TOOL STARTUP ROUTINE in “Controlling the Pulse 2” section in this manual. Setting EVEN SOAK to OFF will skip this feature.

SOFT SOAK

SOFT SOAK technology’s main purpose is to prevent the operation of the injection-molding machine until the tool has fully soaked in temperature. This is especially important in very large tools that require their heat to travel to all parts of the tool. SOFT SOAK helps to prevent excessive short shots to the possibility of breaking a screw because though the zones may be up to temperature the entire system may not be.

- This feature works in conjunction with the AT TEMP output feature found in optional “AUX IN/OUT” (Auxiliary input and output) package.

- SOFT SOAK can either be set to ON or OFF.

- When SOFT SOAK is set to ON, it will run as part of the “TOOL STARTUP ROUTINE” (for more information on operation see the TOOL STARTUP ROUTINE in “Controlling the Pulse 2” section in this manual.

- Setting SOFT SOAK to OFF will skip this feature.
STEP 9: DETAILED SYSTEM SETUP CONTINUED

TC AUTO COMP
TC AUTO COMP allows the Pulse 2 to take control in case a thermocouple breaks. TC AUTO COMP will work after FAST TUNE has been run on the system. TC AUTO COMP automatically provides two levels of thermocouple sensor loss backup: TC MANUAL mode and SLAVING of zones.

• TC AUTO COMP - MANUAL mode, will take the average zone’s operating % power and apply this on a continuous basis.

• TC AUTO COMP - SLAVE mode uses the stored thermal dynamic parameters determined by FAST TUNE, along with a zone’s setpoint to determine the best zone to SLAVE TO.

• TC AUTO COMP can either be set to ON or OFF. When TC AUTO COMP is set to ON and FAST TUNE is ON, it will be activated after a zone’s setpoint is reached. Setting TC AUTO COMP to OFF will skip this feature.

• TC TYPE will select the Pulse 2 system’s thermocouple type. There are two types to choose from either TYPE J or TYPE K.

Note: TC TYPE
This value can only be set when the system is in STOP mode. Most Hot Runner Systems use TYPE J and the Pulse 2’s default sensor input is set to TYPE J.

TEMP UNITS
TEMP UNITS can either be set for degrees Farenheit or degrees Celsius operation.

THIS VALUE CAN ONLY BE SET WHEN THE SYSTEM IS IN STOP MODE.

MANUAL ZONE TEMPS
MANUAL ZONE TEMPS allows the Pulse 2 system to ignore any OPEN THERMOCOUPLE alarms when it is turned ON. MANUAL ZONE TEMPS is useful for systems that do not require a thermocouple to operate as part of production.

• MANUAL ZONE TEMPS can either be set to ON or OFF.

• When MANUAL ZONE TEMPS is set to ON it will prevent the activation of OPEN THERMOCOUPLE alarms for a zone that is in manual mode.

• Setting MANUAL ZONE TEMPS to OFF will allow OPEN THERMOCOUPLES to be alarmed for any zone in MANUAL MODE.

CAUTION!
All temperature setpoint values in the Pulse 2 are absolute values. Changing the units from Farenheit to Celsius will not convert those values. New values must be entered. For example, if a zone’s setpoint is set to 500° F and the TEMP UNITS are changed to degrees Celsius, the setpoint temperature will then be 500°C, which is significantly hotter than 500° F.
STEP 9: DETAILED SYSTEM SETUP CONTINUED

BOOST TIMER

BOOST TIMER is the main countdown timer used when the Pulse 2 is placed in BOOST system mode. BOOST Timer contains a standard clock configuration consisting of HH:MM:SS (hours:minutes:seconds). Any value between 00:00:00 and 99:59:59 can be entered.

- There is one mode of operation for BOOST, once the BOOST system button is pressed the entered countdown sequence will start. Once it ends the system will be returned to RUN mode.
  
  Note: The system mode (STOP, RUN or IDLE) can be changed at any time during the BOOST countdown sequence.

For more information on BOOST reference the section “Controlling the Pulse 2” in this manual.

IDLE TIMER

IDLE TIMER is the main countdown timer used when the Pulse 2 is placed in IDLE system mode. IDLE Timer contains a standard clock configuration consisting of HH:MM:SS (hours:minutes:seconds). Any value between 00:00:00 and 99:59:59 can be entered. There are two modes of operation available for IDLE, countdown to next system mode and indefinite operation in IDLE.

- To set a standard countdown of the IDLE function set the clock anywhere between 00:00:01 and 99:59:58. At the end of the time limit, the system will return to RUN mode.

- To set the system mode to an indefinite IDLE mode (always in IDLE mode), set the timer for 99:59:59. This timer value will not countdown and will stay in idle until another system mode button is pressed (STOP, RUN, or BOOST).
  
  Note: The system mode (STOP, RUN or BOOST) can be changed at any time during the IDLE countdown sequence.

For more information on IDLE, reference the section “Controlling the Pulse 2” in this manual.

DATE / TIME

- DATE is displayed as MONTH/DAY/YEAR.
- TIME is displayed as a 12 hour clock in a format of HH:MM:SS with AM/PM indicator.

Note: TIME/DATE

The date and time can be changed at any time in this screen, and will be updated at the next minute change.
STEP 9: DETAILED SYSTEM SETUP CONTINUED

AUX IN/OUT OPTION – Auxiliary Input and Output

To access AUX IN/OUT setup displays, from the SYSTEM SETUP display press the function indicator button labeled AUX IN/OUT at the bottom of the display.

The AUX IN/OUT setup display is an option available on every Pulse 2 system. This option allows the Pulse 2 to directly communicate to discrete connections with other equipment, typically the injection-molding machine discrete contacts. It is useful when an interaction is needed between the Pulse 2 and other equipment to operate more as part of a whole system.

For example, if there is a desire to prevent the machine from shooting on a cold startup the Pulse 2 can be setup to prevent this with the SOFT SOAK (timer) and the AT TEMP output.

The AUX IN/OUT optional feature does exactly what it says - there are outputs from the Pulse 2 to equipment and there are inputs to the Pulse 2 from equipment.

Each INPUT and OUTPUT can be factory configured for a variety of types of inputs and outputs. The standard configurations available are N/O or normally open contacts for both.

Consult the factory for other types of outputs like DC voltage driven (+5, +24), N/C contacts, etc…
The AUX IN/OUT display is configured into two sections. The top section is assigned to ALARM STATUS where there are up to 4 selectable outputs.

To the right of the ALARM STATUS there are the output assignments labeled OUT1, OUT2, OUT3 and OUT4. Each of these outputs corresponds to an internally mounted, customer selected, relay wired to the I/O connector on the rear of the Pulse 2 system. (for more information on pin-outs reference the included diagrams with the option).

- Each of the outputs can have one or more ALARM STATUS items assigned to activate it. It is also possible to set all ALARM STATUS functions to OFF where none of the items will activate that output.

- Each of the outputs can be assigned an OFF or ON condition:
  - If the output is set to ON, that outputs relay will be turned on when the selected ALARM status has been activated.
  - If the output is set to OFF, that ALARM status will not activate the specific OUTPUT.

<table>
<thead>
<tr>
<th>ALARM STATUS</th>
<th>OUT1</th>
<th>OUT2</th>
<th>OUT3</th>
<th>OUT4</th>
</tr>
</thead>
<tbody>
<tr>
<td>TC OPEN</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td>TC REVERSED</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td>TC SHORTED</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td>HEATER OPEN</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td>TRIAC SHORT</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td>OVER TEMP</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td>UNDER TEMP</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td>OVER TEMP ABORT</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td>UNDER TEMP ABORT</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td>OVER % POWER LIMIT</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td>UNDER % POWER LIMIT</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
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<tr>
<td>OVER AMPS LIMIT</td>
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<td>OFF</td>
</tr>
<tr>
<td>UNDER AMPS LIMIT</td>
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<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td>AT TEMPERATURE</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
</tr>
</tbody>
</table>
STEP 9: DETAILED SYSTEM SETUP CONTINUED

There are fourteen ALARM STATUS outputs:

- **TC OPEN** – if selected to an output and TC OPEN occurs, that output will be activated through the closing of the contacts for the N/O standard module.

- **TC REVERSED** – if selected to an output and TC REVERSED occurs, that output will be activated through the closing of the contacts for the N/O standard module.

- **TC SHORTED** – if selected to an output and TC SHORTED occurs, that output will be activated through the closing of the contacts for the N/O standard module.

- **HEATER OPEN** – if selected to an output and HEATER OPEN occurs, that output will be activated through the closing of the contacts for the N/O standard module.

- **OVER TEMP** – if selected to an output and OVER TEMP occurs, that output will be activated through the closing of the contacts for the N/O standard module.

- **UNDER TEMP** – if selected to an output and UNDER TEMP occurs, that output will be activated through the closing of the contacts for the N/O standard module.

- **OVER TEMP ABORT** – if selected to an output and OVER TEMP ABORT occurs, that output will be activated through the closing of the contacts for the N/O standard module.

- **UNDER TEMP ABORT** – if selected to an output and UNDER TEMP ABORT occurs, that output will be activated through the closing of the contacts for the N/O standard module.

- **OVER % POWER LIMIT** – if selected to an output and OVER % POWER LIMIT occurs, that output will be activated through the closing of the contacts for the N/O standard module.

- **UNDER % POWER LIMIT** – if selected to an output and UNDER % POWER LIMIT occurs, that output will be activated through the closing of the contacts for the N/O standard module.

- **OVER AMPS LIMIT** – if selected to an output and OVER AMP LIMIT occurs, that output will be activated through the closing of the contacts for the N/O standard module.

- **UNDER AMPS LIMIT** – if selected to an output and UNDER AMP LIMIT occurs, that output will be activated through the closing of the contacts for the N/O standard module.

- **AT TEMP** – a unique feature that is tied to the SYSTEM modes SOFT SOAK and RUN (reference the “TOOL STARTUP ROUTINE” under “CONTROLLING THE PULSE 2” section in this manual for more details). When AT TEMP is assigned to an output that output will be activated (typically N/O to a closed contact condition) when the SYSTEM MODE changes to RUN.
The bottom section of the AUX IN/OUT display is assigned to REMOTE FUNCTIONS. To the right of the REMOTE FUNCTIONS there are four selectable input assignments labeled IN1, IN2, IN3 and IN4. Each of these inputs corresponds to an internally mounted, customer selected, relay wired to the I/O connector on the rear of the Pulse 2 system (for more information on pin-outs reference the included diagrams with the option). Each input can have one or more REMOTE FUNCTION items assigned to activate it. It is also possible to set all REMOTE FUNCTIONS to OFF, where none of the items will activate that input.

- Each of the inputs can be assigned an OFF or ON condition:
  - If the input is set to ON, that input's relay will be turned on when the selected REMOTE FUNCTION receives a signal.
  - If the input is set to OFF, that REMOTE FUNCTION will not recognize any input signals that activate it.

There are four REMOTE FUNCTIONS:

- **RUN** (System mode: RUN) – the equivalent of pressing the RUN system button
- **STOP** (System mode: STOP) – the equivalent of pressing the STOP system button
- **BOOST** (System mode: BOOST) – the equivalent of pressing the BOOST system button
- **IDLE** (System mode: IDLE) – the equivalent of pressing the IDLE system button
STEP 9: DETAILED SYSTEM SETUP CONTINUED

VERSION – Module version number reporting

To access the VERSION display, from the SYSTEM setup display press the function indicator button labeled VERSION at the bottom of the display.

The VERSION display simply displays the current versions of the Pulse 2 display module and each bank’s CPU module. This becomes helpful if a version upgrade is done, each Pulse 2 system can be easily audited by view this display.
STEP 10: ALARMS

The Pulse 2 contains several monitoring points that ensure the proper operation of the hot runner system and the Pulse 2 control. These monitoring points are measured and reported in one display known as the ALARM view display. For some of the monitoring points they are adjustable others are built into the system and have been thoroughly tested for optimum operation.

The alarm display works in conjunction with the ALARM strobe light and sounder (to locate these, reference the INTRODUCTION section of this manual). When a measured value triggers an ALARM the ALARM light and bell will be turned on.

- PRESSING THE ALARM BUTTON WILL SILENCE THE ALARM LIGHT AND BELL.

- PRESSING THE ALARM BUTTON WILL SHOW THE ALARM DISPLAY FROM ANY SCREEN.

For any of the alarm displays, a detailed explanation can be found in the TROUBLESHOOTING section of this manual.
STEP 10: ALARMS CONTINUED

The ALARM display contains six columns of information – from left to right:

- **ZN** – Hard wired zone location
- **NAME** – Zone name

For more information about the above settings see the MAIN display explanation in this section.

- **T/C** – Thermocouple Alarm Status will display an alarm as it relates to the status of the thermocouple sensor status on that zone when it fails. There are one of three possible alarms that can be detected:
  - TC OPEN (Thermocouple OPEN detected)
  - TC REVERSE (Thermocouple Reverse detected)
  - TC OPEN (Thermocouple OPEN detected)

- **POWER STAT** (Power Alarm Status) displays measured alarms as it relates to POWER output to the heater on that zone, to system heater wiring or fuse failure and to power module relay status. There are one of four possible power alarms that are detected:
  - OVER % POWER alarm (Over % Power MAX limit alarm)
  - UNDER % POWER alarm (Under % Power MIN limit alarm)
  - HEATER OPEN alarm (Open heater, wire or fuse detected in heater power circuit)
  - TRIAC SHORT alarm (Pulse 2 Power Module Triac/Relay has been shorted closed)

- **TEMP STAT** (Temperature Alarm Status) displays measured alarms as it relates to the temperature deviation of that zone. There are one of four possible alarms that are detected:
  - OVER ALARM alarm (Temperature OVER the ALARM BAND limit)
  - UNDER ALARM alarm (Temperature UNDER the ALARM BAND limit)
  - OVER ABORT alarm (Temperature OVER the ABORT BAND limit)
  - UNDER ABORT alarm (Temperature UNDER the ABORT BAND limit).

- **AMP STAT** (Amperage Alarm Status) displays measured alarms as it relates to the AMPS pulled per zone. There are one of two possible alarms that are detected:
  - OVER AMPS alarm (AMPS measured is OVER the AMP MAX limit)
  - UNDER AMPS alarm (AMPS measured is UNDER the AMP MIN limit).

- Each display can navigate to more than 30 zones by pressing the PREV or NEXT function indicator buttons at the bottom of the display.
STEP 11: CONTROLLING THE PULSE 2

SYSTEM OPERATING MODES

Prior to running the Pulse it is important to note the main system operating modes available in the Pulse 2 system. Each mode will direct the power modules on the Pulse 2 to apply power to the load according to their setup. There are a total of four operating modes they are STOP, RUN, BOOST and IDLE. All of these modes can be started manually by pressing their corresponding system buttons or by the REMOTE FUNCTION option (see AUX IN/OUT in the SYSTEM SETUP section of this manual). Each of these modes initiates the user selectable “TOOL STARTUP SEQUENCE” that eventually brings the attached heating elements up to temperature.

The current system mode of operation is always displayed in the upper left of all displays and is labeled “SYSTEM STATUS”.

NOTE: All SYSTEM MODES can be activated from ANY display.

STOP mode is the default mode on power up of the Pulse 2 and its main function is to ensure all activity on controlling ALL zones is STOPPED. STOP mode is indicated in the SYSTEM STATUS with a red color.

RUN mode is the default-operating mode of the Pulse 2 system and will allow each zone RUN (apply power) their loads to temperature. RUN mode initiates the “TOOL STARTUP ROUTINE” first, then uses the zone’s operating setpoint (SET on MAIN display) for control of the heater. RUN mode is indicated in the SYSTEM STATUS with a green color background.

BOOST mode is a temporary operating mode that uses a preset BOOST setpoint value that is always set higher than the operating setpoint SET in MAIN display (reference ZONE SETUP in this manual for BOOST SETPOINT details). BOOST is temporary in that it uses a global timer called “BOOST TIMER” which can be set in the SYSTEM setup display. BOOST can be activated at any time either from STOP mode, which will initiate the TOOL STARTUP ROUTINE or IDLE or RUN mode. Once BOOST is activated the BOOST count down timer is started and once the timer has finished, BOOST will then automatically change to RUN mode (using the zones operating setpoints to control the load). BOOST is indicated in the SYSTEM STATUS display with a light red colored background. BOOST’s main purpose is to increase all or selected zones’ temperatures for temporary time frame to either cause the tool to free unmelt during operation of a system that is already in RUN mode or shock balance a system on startup.

CAUTION!

Though the system is in STOP mode and power is not being applied to the load there is the potential of live voltage at the heater terminals. ALWAYS turn off the main circuit breaker, disconnect power to the Pulse 2 and remove the heater cables before servicing the hot half.

CAUTION!

Setting BOOST for too long of a time interval at too high of a temperature can cause damage to the tool, heaters, sensors and Pulse 2 control.
**STEP 11: CONTROLLING THE PULSE 2 CONTINUED**

**IDLE** mode can be set as a temporary operating mode or a permanent operating mode that uses a preset IDLE setpoint value that is always set lower than the operating setpoint SET in MAIN display (reference ZONE SETUP in this manual for IDLE SETPOINT details).

IDLE is temporary in that it uses a global timer called “IDLE TIMER” which can be set in the SYSTEM setup display. IDLE can be activated at any time either from STOP mode, which will initiate the TOOL STARTUP ROUTINE or BOOST or RUN mode. Once IDLE is activated the IDLE count down timer is started and once the timer has finished, IDLE will then automatically change to RUN mode (using the zones operating setpoints to control the load).

IDLE’s main purpose as a temporary setting can be for delayed startups of a tool. It might be desired to press IDLE that has a count down timer from a STOP mode to step heat a tool, that is, to first warm up the tool to a low temperature for a period of time, then after the timer is done the system mode changes to RUN.

IDLE is a permanent operating mode by setting the global timer to a specified value (reference IDLE global timer in SYSTEM setup for more details) where IDLE will always be running using the preset IDLE setpoints.

IDLE’s main purpose here as a permanent operating mode is for safety and maintenance. A typical scenario is if a tool has been running in RUN mode for a period and a few of the cavities need to be serviced but the tool is hard to start from a cold temperature, pressing the IDLE button will allow the tool to IDLE at a warm temperature while the cavities are serviced. Then by pressing the RUN mode button the system is immediately returned to normal operating setpoints.

IDLE is indicated in the SYSTEM STATUS display with a light blue colored background.
**STEP 11: CONTROLLING THE PULSE 2 CONTINUED**

**Tool Startup Routine**

Depending on the desired results, the Tool Startup Routine allows for special hot runner system-related functions to occur that result in a better, more reliable running hot runner system.

Pulse 2 has special startup routines that are operator selectable from the SYSTEM SETUP display. These routines are “sub-operating modes”.

**NOTE:** the only sub-operating mode not selectable is RAMP.

There are a total of four sub-operating routines that when initiated from STOP system mode by activating RUN, BOOST or IDLE and are selected as “ON” in the SYSTEM SETUP display to participate in the TOOL STARTUP ROUTINE.

1. BAKEOUT
2. EVENSOAK
3. SOFT SOAK
4. RAMP

• **BAKEOUT** is the first sub-operating mode in the tool startup routine that ensures any moisture present on a cold startup is removed at a specified rate that will protect the heater, sensor and Pulse 2 modules from failing due to leakage current. When BAKEOUT is active, the SYSTEM STATUS indicator will display BAKEOUT. Bakeout will for the present time period raise the zone’s temperatures based on the % power. For example if BAKEOUT is set to a BAKEOUT timer value of 12 minutes and a BAKEOUT power level of 12%, BAKEOUT will start by applying 1% power then after one minute it will increase the power to 2% and every minute after that it will increase the power 1% until 12% is reached or if the zone’s setpoint has been reached BAKEOUT will stop. This is because if it continued it would overshoot that zone’s operating setpoint.

**NOTES ON FAST TUNE:**

FAST TUNE is NOT considered a sub-operating mode in the tool startup routine. It is temporary in that it shuts itself off after running the first time thorough. FAST TUNE will force tune each zone in the Pulse 2 system and it is NOT recommended this function be run as part of the tool startup routine for hot runner systems. If Fast Tune were selected to ON, it would operate between BAKEOUT and EVENSOAK sub-operating routines.

The Pulse 2 automatically tunes the system every time, all of the time. FAST TUNE’s purpose is for loads that are difficult to control and typically not hot runner related. Running FAST TUNE on some load conditions may cause the zone to fluctuate in temperature. Reference SYSTEM SETUP in this manual for more information on FAST TUNE.
STEP 11: CONTROLLING THE PULSE 2 CONTINUED

- **EVENSOAK** is the second sub-operating mode that has one primary purpose related to proper hot half startup that ensures proper seating of the drops to the manifolds and could assist in preventing leakage of material and increase reliability of the hot runner system by reducing galling. This is accomplished through an automatic turn on of specific zones and once those zones reach setpoint the next set is turned on.

A second purpose is explained later in this section on using EVENSOAK for Energy Management and preventing low current main supply breakers from tripping. When EVENSOAK is active, the SYSTEM STATUS indicator will display EVENSOAK followed by a number 1. The numbers in the SYSTEM STATUS indicator signify the current group being raised to operating setpoint.

EVENSOAK works in conjunction with the GRP (Group setting in MAIN display). The GROUP settings give the order to which the heaters in the tool are started. There are up to six groups that can be assigned to each zone numbered 1 to 6.

A typical scenario is with a 32-drop hot half, containing 32 drops on zones 1 to 32, two secondary manifolds on zones 33 and 34 and a primary manifold on zone 35. The GRP setup would be configured as follows: Zone 35 is set to GRP 1 or the first set of zones to run to setpoint. Zone 33 and 34 are set to GRP 2 or the second set of zones after the primary to run to setpoint. Then zones 1 to 32 are set to GRP 3 the last set of zones to run to setpoint.

During this scenario, the SYSTEM STATUS display will show which group is currently being run, that is when group 1 is being run to setpoint the SYSTEM STATUS display will show EVENSOAK 1, group 2: EVENSOAK 2, etc…

- **SOFTSOAK** is the third sub-operating mode with a main purpose of allowing a tool to SOAK at the operating mode setpoint (SET in MAIN display) for a preset period of time as setup in the SYSTEM SETUP display and when used with the AT TEMP\ output and wired to the injection molding machines inhibit input will prevent the machine from shooting until the desired soaking period has timed out. This is an excellent tool that prevents the shooting of a tool that even though its up to setpoint is NOT ready to run.

- **RAMP** is a sub-operating mode that is displayed when no other mode is selected in between the actual temperature being lower than the operating setpoint and is simply an indicator. For example, if BAKEOUT is only selected and RUN SYSTEM MODE is pressed, after BAKEOUT times-out, some zone may still not be up to setpoint and they may still need to RAMP up to temperature. The same is true if NO sub-operating modes are selected, the SYSTEM status display will show RAMP until setpoint is reached then RUN, BOOST or IDLE will be displayed in the SYSTEM STATUS display depending on the original selected SYSTEM MODE.

**NOTE: SOFTSOAK**

SOFTSOAK will not serve any purpose other than display in the SYSTEM STATUS indicator. SOFTSOAK during the timer period if not used in conjunction with the AT TEMP output optional feature.
STEP 11: CONTROLLING THE PULSE 2 CONTINUED

Energy Management

The Pulse 2 is specifically designed to save on energy consumption. The three features that directly address this are **WATERFALL Technology** combined with **MAX power** and **EVENSOAK**.

**WATERFALL technology** (patent pending) was developed with plant operations in mind. It was developed to address a growing concern of most molders who are adding new equipment to existing facilities or planning new facilities.

When planning for power, most molders take several factors into consideration - the molding machine and key auxiliaries. Most auxiliary equipment can easily be planned for due to their low current requirements or fixed current requirements, in other words most auxiliaries can be easily planned for when specifying power. But the one auxiliary that requires special attention is the hot runner system. Dependant on its design with number of hot runner zones and size, the power required to operate the hot runner system can sometimes match that of the injection molding machine. Due to the variety of hot runner designs, it is sometimes difficult to plan the power for this system.

Fast Heat has recognized this common issue and with the combination of technologies in our Pulse Hot Runner Temperature Control System we have created a more balanced approach to properly loading power.

**MAX POWER** – each zone can be set for a maximum power that can be applied to the load at ANY time. When properly set, this allows for a very efficient first line of defense on power usage. For example, if a hot runner tool requires on average 20% power or less, the MAX POWER setting can be set above this limit, say at 33% power. If this is the case, the power on any one zone will not exceed 33% power, which places less demand on the power subsystem in the plant.

**EVENSOAK** – where up to 6 groups of zones can be turned on in sequence. Following industry standard on startup of a hot runner system, which is, Manifolds first, drops or cavities second, Fast Heat has implemented EVENSOAK to address this. What was discovered is that when customers are given the option to turn on high current groups of zones one at a time and allow each group to get to operating power (which is less than initial power) the overall demand of startup power required is further minimized.
WATERFALL Technology – where each phase is now controlled with respect to its power output. Being the weakest link in the power management system, controlling ALL zones’ outputs has become the goal of the Pulse control system. Each zone continues to be individually controlled, and with our advanced FASTTUNE technology that allows for each load to be constantly tuned allows us to take advantage of now controlling and staggering outputs on each power module. This gives the customer the ultimate control in power management by now controlling each phase and its output. WATERFALL actively regulates each load module through our control algorithm and maintains and even balance on the load output. On average, WATERFALL will provide a 20% reduction on peak contribution. Doing this results in an even power distribution across all phases, all of the time. To the customer this means that each phase will be evenly balanced all of the time removing costly peak demands.

Where this becomes important is in the cost savings in peak power usage. We recognize that each hot half may pull a significant amount of power and this can place demands on the power system that could cause multiple issues. One of them being an imbalanced load, the other being using peak power to control the hot half throughout the day. During normal plant operation, peak power usage comes at a premium, in some cases costing the customer up to 2 to 3 times the normal rate of dollar per kilowatt-hour, which directly affects the bottom line. Hot runner controllers today, because of their inefficient method of controlling the load, will pull power as it’s needed. With the Pulse WATERFALL technology, we ensure maximum efficiency because the Pulse controls this aspect of output power. It is this control over when power is applied on a system level that ensures constant efficiency.

Over time, this efficiency can be many dollars of savings annually per hot half dependent on number of amps/zone, average plant peak pull and service charges by the local electrical facility. There are further intangible savings in having Pulse with WATERFALL technology insure that the hot runner load will NOT be a contributor to line imbalance - saving countless dollars in having to upgrade the power system when these problems arise.
HELP is available for all displays in Pulse 2 and is meant to be a quick reminder and guide that supplement this manual. The Pulse 2 system is designed with a display sensitive HELP system. This means that by pressing the HELP button from a certain display, that display’s HELP information will be shown.

There are three navigation buttons for HELP at the bottom of the display:

- BACK - pressing BACK takes you back to the display you wanted help on.
- PREV and NEXT allow you to browse all of the other help screens available for every other display.
STEP 13: PRINTING REPORTS

Each Pulse 2 system comes standard with a standard 25 Pin type printer port attached to the rear of the Pulse 2 display – allowing for printing to the most popular dot matrix, inkjet and laser printers on the market today without any special configuration required. Pulse 2 Print Reports display can be shown by pressing the PRINT button. The Pulse 2 system can print up to five different types of reports and also be selected to print errors as they occur. There two columns of information on the PRINT REPORTS display the type of report and the selection of printed reports.

The available reports are:

- **SETUP SHEET** - this is a text based, basic zone setup sheet giving a quick snapshot of the MAIN display settings.

- **SETPOINT VS. ACTUAL** - this is text based, zone by zone snapshot of the SETPOINT and ACTUAL TEMPERATURE.

- **TEMPERATURE GRAPH** - this is a graphic printout of the TEMP GRAPH display showing SETPOINT, ALARM BAND, ABORT BAND and ACTUAL TEMPERATURE.

- **POWER GRAPH** - this is a graphic printout of the POWER GRAPH display showing the power graph band alarm and actual power being applied.

- **AMP GRAPH** - this is a graphic printout of the AMP GRAPH display showing the amp graph band alarm and actual amps being applied.

Printing Reports:

For each desired report, change its selection to ON. At the bottom of the display there is a function button indicator called PRINT. Once the reports have been selected, ensure the printer is ONLINE and press the PRINT function indicator button.

**NOTE: PRINT ERRORS**

PRINT ERRORS is a special printing function that will print the ALARM STATUS errors as they occur. This is useful when an operator is not there to observe when and if an error has occurred. To activate the PRINT ERRORS function, change its selection to ON.
The following information will always be visible on ALL displays:

- **System Status Indicator** - shows the current operating mode of the entire system. The modes available are STOP, FASTTUNE, BAKEOUT, SOFTSOAK, EVENSOAK, RAMP, RUN, BOOST and IDLE.

- **Date/Time** - current date and time of the system.

- **Recipe Selected** - indicates the current recipe in the Pulse 2 file system where all information is being stored.

- **Current Display** - indicates what screen is currently shown.

- **Security Level** - indicates the current security level of the system.

- **Function Button Identifiers** - indicate the current function of the buttons directly below the name. Dependent on the current screen being displayed, the function of these buttons will vary.

For more information on setting up and working with any of these features, reference Section 7: Pulse 2 Operation.
QVIEW

MAIN->QVIEW

(press QVIEW under the MAIN display)

Graph Temperature Display

MAIN->GRAPH

(press GRAPH under the MAIN display)

Power Graph

MAIN->GRAPH->POWER GRAP

(In the GRAPH display, press POWER GRAPH).

AMP Graph

MAIN->GRAPH->AMP GRAPH

(In the GRAPH display, press AMP GRAPH).
DETAILED DISPLAY REFERENCE

BOOST and IDLE Setup

MAIN>zones>BOOST IDLE
(In the ZONE alarm bands setup display, press BOOST IDLE)

PID Setup

MAIN>zones>PID
(In the ZONE alarm bands setup display, press PID)

Power Alarms Setup

MAIN>ZONE>POWER ALARMS
(In the ZONE alarm bands setup display, press POWER ALARMS)

System Setup

MAIN>SYSTEM
(From the MAIN display, press SYSTEM)
Aux In/Out Setup
MAIN>SYSTEM>AUX IN/OUT
(In the SYSTEM setup display, press AUX IN/OUT)

Recipes Selection
MAIN>RECIPES
(From the MAIN display, press RECIPES)

Version
MAIN>SYSTEM>VERSION
(In the SYSTEM setup display, press VERSION)

Mold Setup Sheet
MAIN>RECIPES>MOLD SETUP
(In the RECIPES selection display, press MOLD SETUP)
**Alarm**

ALARM status display can be accessed from any screen by pressing the ALARM STATUS DISPLAY button.

**Help**

The HELP display can be accessed from any screen by pressing the HELP button.

**Print**

PRINT display can be accessed from any screen by pressing the PRINT button.
MAINTENANCE

CLEANING / REPLACING FAN FILTERS

To ensure proper operation and maximum life of the Pulse 2 system, ensure that the fan filters on the Pulse 2 are cleaned on a regular basis. To clean the filter material, remove the filter cover. To do this use a flat blade screw driver on any one of the four sides of the cover and gently pry the filter covers off.

- Remove the filter material and clean with a mild detergent and water.
- Pat the filter material dry with a towel and replace them and filter covers.

The filter cover is fully seated when a snap is heard on all four sides.

CLEANING CABINET AND DISPLAY

The Pulse system is painted with a durable powder coat finish that should offer many years of service. To clean the surface, no scouring pads or heavy solvents should be used. Instead use a mild soap or glass cleaner.

CALIBRATION OF THE THERMOCOUPLE MODULE

Every Pulse 2 system has been calibrated and is tracable to NIST with respect to temperature. It is recommended that a minimum of a yearly calibration check be done on every Pulse 2 control system. The following section details the calibration procedure of the Pulse 2 TC module. Tools needed:

- Qty (1) 3/32” mini - screwdriver for calibration of potentiometer
- Qty (1) 2 pin shunt (jumper)
- Qty (1) Phillips screwdriver (for removing module cover)
- Qty (1) DC milivolt meter with hook clips

3 sections to the calibration of the Pulse T/C module:

1. Voltage reference setting
   (1) With the Pulse powered on, set all zones to OFF (wait at least 10 seconds prior to power off so new settings are stored).
   (2) Power off the Pulse and remove the TC module.
   (3) Remove the cover from the TC module.
   (4) Install a temporary 2-pin shunt (jumper) on J3 (near the gold finger contacts).
   (5) Ensure the 2-pin shunt on J2 is installed on pins 1 and 2.
   (6) Ensure there is NO TC mold cable connected.
   (7) Place the board into the TC module slot (it does NOT matter which TC slot is used).
   (8) Place the Black lead of the DC mili-volt meter onto TP1 and the Red lead onto TP2.
   (9) Ensure the DC meter is in the Volts position.
   (10) Power on the Pulse control and adjust POT R57 to read 0.500VDC +/-0.0005VDC.

Before proceeding with any cleaning procedure, it is always recommended that the power to the Pulse 2 is shut off and the power cord disconnected.
2. Temperature Calibration Procedure:
   (1) Move the jumper on J2 to pins 2 and 3.
   (2) Ensure the DC meter is in the milli-volts position.
   (3) Power on the Pulse control and adjust POT R58 until the meter reads approximately 0.000V +/- 0.0005mV.

3. The calibration is complete; now proceed to reassemble the module for normal use:
   (1) Power off the Pulse control, remove the meter clips from the module and remove the module from the PULSE.
   (2) Move jumper on J2 to pins 1 and 2.
   (3) Remove jumper from J3.
   (4) Replace cover and reinstall the module into the Pulse.
This section is dedicated to cover the most common errors and solutions to the Pulse 2 system.

**Replacing System Fuses**
For safety reasons, each Pulse is equipped with fuse protection internally to the base cabinet known as system fuses and on each power module. To access system fuses in the rear of the cabinet and for more details on power module fuse replacement see “Section 1: Introduction - General Product Information” under “power modules”.

**Fluctuating temperatures and intermittent temperature and triac short alarms**
- Check the seating of the fuses into the fuse clips, from replacement of fuses, the clips could be loose and cause partial connections.
- Check for proper grounding from the Pulse system to the tool. Using an ohm meter check the continuity between the tool steel and the Pulse 2 power input ground.

**Alarm Errors**

**TC OPEN: Thermocouple OPEN**
The alarm has light and sounder have been activated indicating this alarm and TC OPEN is displayed in the ALARM display under the T/C status column. The thermocouple connection between the Pulse and the hot half are missing. There are several causes to this problem that involve the connections and wires from the Pulse cabinet thermocouple connector, to the cable, to the mold box/connector.

If the TC AUTOCOMP feature has been activated in System Setup AND FastTune has been run on the Pulse, either Autocomp level 1 or AutoComp level 2 will take control of the zone. See TC AUTOCOMP under System Setup in this manual.

- Ensure the cable is properly connected and latched on the control connector and on the tool connector.
- Ensure the wiring of the thermocouple from the cavity is in place and tight on the mold box/connector.
- Check all crimped wire connections in the mold box/connector if they exist for any loose wires.
- The Pulse has opened one of its re-settable thermocouple fuses. This fuse is part of the ATP circuitry and will stay open until a good ground is placed between the controller and the tool. This is usually remedied by ensuring that the heater mold connector on the tool has its ground wire is secured with a screw to the hot half steel.
Alarm Errors continued

**TC REVERSE**
The alarm has light and sounder have been activated indicating this alarm and TC REVERSE is displayed in the ALARM display under the T/C status column. The thermocouple connection between the Pulse and the hot half are reversed. Every thermocouple has a polarity indicated by the color of the wire, for type J the white wire is POSITIVE and the red wire is NEGATIVE. The zone will automatically be deactivated from operation until the thermocouple has been rewired. Though it is possible to set this zone into Manual Mode.

- To fix this problem, trace the wiring back to the tool and ensure wire colors and polarity match on the MOLD BOX or MOLD CONNECTOR.
- Check all crimped wire connections in the mold box/connector if they exist for reversed wiring.

**TC SHORT**
The alarm has light and sounder have been activated indicating this alarm and TC SHORT is displayed in the ALARM display under the T/C status column. There are three types of thermocouple shorts that can occur, they are:

1. Positive shorted to ground.
2. Negative shorted to ground.
3. Both connections shorted together.

Two of the three types of shorts are easily found by the Pulse 2 ALARM system they are the Positive short to ground and both connections (positive and negative) shorted together. The third is difficult to detect because the effect could be small - that is, shorting the negative to ground could shift the temperature slightly making it hard to discern between a temperature fluctuation or this type of short.

If the TC AUTOMCOMP feature has been activated in System Setup AND FastTune has been run on the Pulse, either Autocomp level 1 or AutoComp level 2 will take control of the zone. See TC AUTOCOMP under System Setup in this manual.

**NOTE:** A thermocouple short can only be detected during RUN mode. If a sensor fails prior to running the system it may not be detectable as a TC SHORT.

- To fix this problem, ensure that there are no exposed bare wires touching to ground or together from the control cable to the sensor on the heater.
- A common error is usually in the mold box wiring, check to ensure that the thermocouple connections are not touching ground or each other. Check for exposed or bare wiring.
- Check all crimped wire connections in the mold box/connector if they exist for any bare wiring or shorts to each other or tool steel/mold box/mold connector.
Alarm Errors continued

OVER % POWER
The alarm has light and sounder have been activated indicating this alarm and OVER % POWER is displayed in the ALARM display under the POWER status column. The % power output of the zone has exceeded the % POWER MAX limit setting found in ZONE SETUP, POWER ALARMS display.

Action taken depends on the reason for setting up the OVER % POWER condition, % Power BAND is useful in detecting large swings in power usage that could indicate several symptoms to potential problems with the hot runner system.

% Power is an indicator of how much power a zone requires to maintain its temperature. So, if more demand for power is required to maintain that temperature due to the mold cycle increasing or mold water decreasing in temperature the power will change to accommodate.

Some possible conditions that could be applied is monitoring when sprue temperatures are set too low and cavities now require more power to maintain their set-points. In some cases power might be used to point to a potentially leaking system.

UNDER % POWER
The alarm has light and sounder have been activated indicating this alarm and UNDER % POWER is displayed in the ALARM display under the POWER status column. The % power output of the zone has fallen below the % POWER MIN limit setting found in ZONE SETUP, POWER ALARMS display.

Action taken depends on the reason for setting up the UNDER % POWER condition. % Power BAND is useful in detecting large swings in power usage that could indicate several symptoms to potential problems with the hot runner system.

% Power is an indicator of how much power a zone requires to maintain its temperature. So, if more demand for power is required to maintain that temperature due to the mold cycle increasing or mold water decreasing in temperature the power will change to accommodate.

Some possible conditions that could be applied is monitoring when sprue temperatures are set too low and cavities now require more power to maintain their set-points. In some cases power might be used to point to a potentially leaking system.
Alarm Errors continued

**OVER AMPS alarm (AMPS measured is OVER the AMP MAX limit)**

The alarm has light and sounder have been activated indicating this alarm and OVER AMPS is displayed in the ALARM display under the AMPS status column. The AMPS of the zone has exceeded the AMP MAX limit setting found in ZONE SETUP, POWER ALARMS display.

Action taken depends on the reason for setting up the OVER and UNDER AMPS condition. AMPS BAND is useful in detecting large swings in current usage that could indicate several symptoms to potential problems with the hot runner system.

AMPS is an indicator of how much current a heater requires at the specified voltage of the cabinet. Some possible conditions that could be applied is monitoring when power fluctuates excessively. This can cause short shots or stringing that may go undetected for a period of time. AMPS would detect the major swings in power indirectly. AMPS can also indicate the premature failure of a heater or the loss of a multi element heater as in a manifold zone.

**UNDER AMPS alarm (AMPS measured is UNDER the AMPS MIN limit)**

The alarm has light and sounder have been activated indicating this alarm and UNDER AMPS is displayed in the ALARM display under the AMPS status column. The AMPS of the zone has exceeded the AMP MIN limit setting found in ZONE SETUP, POWER ALARMS display.

Action taken depends on the reason for setting up the OVER and UNDER AMPS condition. AMPS BAND is useful in detecting large swings in current usage that could indicate several symptoms to potential problems with the hot runner system.

AMPS is an indicator of how much current a heater requires at the specified voltage of the cabinet.

Some possible conditions that could be applied is monitoring when power fluctuates excessively. This can cause short shots or stringing that may go undetected for a period of time. AMPS would detect the major swings in power indirectly. AMPS can also indicate the premature failure of a heater or the loss of a multi element heater as in a manifold zone.
Alarm Errors continued

HEATER OPEN
(Open heater, wire or fuse detected in heater power circuit)
The alarm has light and sounder have been activated indicating this alarm. Under the ALARM display, HEATER OPEN is shown under the POWER status column. The output of each Pulse 2 power module is a series circuit that contains the TRIAC (electronic switch), input and output fuse, connectors on the cabinet, the heater cable, the mold connector and the heater itself. Any one of these components are prone to failing OPEN or breaking their connection with the most common being an OPEN HEATER.

If this were to occur, the Pulse 2 constantly monitors for the loss of this type of connection and once detected reports this on the ALARM display.

For all of the components listed, there is a rule of thumb in checking connections.

- First check all connections to the controller and the hot half mold connector / mold box. Ensure the latches on the mold box and connector are fully latched closed.

- Second, check the fuses on the Pulse 2 power modules. Locate the appropriate power module for the zone indicating HEATER OPEN and remove it from the cabinet. Flip the module exposing the circuit side up. Using an ohmmeter check each FUSE pad on the module. If a fuse is found open, replace the fuse.

- Third, disconnect the cable connector to the Pulse 2 connector and using the tool wiring diagram and an ohmmeter check ohms to each heating element.

  If a problem still persists call your local service center for further help.

TRIAC SHORT
(Pulse 2 Power Module Triac/Relay has been shorted closed).
The alarm has light and sounder have been activated indicating this alarm. Under the ALARM display, TRIAC SHORT is shown under the POWER status column. The secondary safety cutoff relays on the zone’s power module has been kicked off preventing the heater from receiving uncontrolled power.

- Call your local service center to have this module repaired.

NOTE: In new tool startup situations, it is sometimes common that heater wires are cross wired between zones. Doing this can cause TRIAC SHORT to occur. Prior to calling the service center double check the wiring on the hot half mold connector / mold box.
Alarm Errors continued

Temperature Alarms
There are four possible conditions that can occur when a temperature has exceeded a certain alarm limit ranging from a minor temperature swing covered by the TEMP ALARM BAND to a major temperature swing covered by the ABORT TEMP ALARM BAND.

TEMP ALARM BAND consists of two settings found in ZONE SETUP:
• OVER ALARM alarm (Temperature OVER the ALARM BAND limit)
• UNDER ALARM alarm (Temperature UNDER the ALARM BAND limit)

The alarm light and sounder have been activated indicating this alarm. Under the ALARM display, OVER or UNDER TEMP is shown under the TEMP status column. There is no other action that occurs with TEMP ALARM BAND, it is an indicator showing that the temperature has exceeded this band limit.

TEMP BAND is an only an indicator of temperature and there are many causes to fluctuating temperatures that range from failing thermocouples to improperly setup injection molding parameters.

ABORT TEMP ALARM BAND consists of two settings found in ZONE SETUP:
• OVER ABORT alarm (Temperature OVER the ABORT BAND limit)
• UNDER ABORT alarm (Temperature UNDER the ABORT BAND limit).

The alarm light and sounder have been activated indicating this alarm. Under the ALARM display, OVER or UNDER ABORT TEMP is shown under the TEMP status column. Each ABORT band can activate one of three actions, by selecting:
• NONE, no action will be performed for that zone.
• ZONE, that zone’s mode will automatically be shut OFF.
  This is useful if an undesired OVER / UNDER temperature is detected and further expansion of temperature will cause extreme damage unless that zone is shut off.
• SYSTEM, the SYSTEM MODE is automatically shut OFF.
  This is useful if an undesired OVER / UNDER ABORT temperature is detected and further expansion of temperature will cause extreme damage unless that zone is shut off.

ABORT TEMP BAND is an only an indicator of temperature and there are many causes to fluctuating temperatures that range from failing thermocouples to improperly setup injection molding parameters.
WARRANTY

The Pulse 2 temperature controller is warranted for two (2) years against manufacturing defects from the date of invoice for service, parts, and labor.

NOTE: The warranty does not cover electrical contact points, fuses, power supplies, or triac circuitry.
FREQUENTLY ASKED QUESTIONS

How do I shut off the alarm light and sounder?
Pressing the ALARM button will silence the alarm light and sounder.

Do I have to save when I change a value on Pulse?
No, the Pulse uses the latest technology that automatically saves any changes every time a value is changed. This information is always stored with the selected recipe in the system.

What if I lose my Level 3 security code?
Call your local Fast Heat service representative for information on accessing your password.