



Hot Runner Temperature Controls

The Pulse™ Series temperature control system is 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 24 zones, all packaged in a small control cabinet for maximum space utilization.

fast heat®



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UNPACKING THE PULSE

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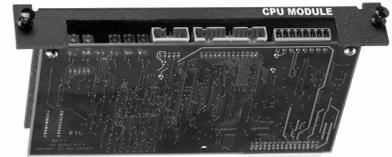
What's Included

A standard Pulse control system consists of a Pulse cabinet with display unit, a CPU module, one or two thermocouple modules and a quantity of dual zone 20 Amp and/or single zone 30 Amp power modules, depending on the number of zones that were purchased.

PULSE CABINET & DISPLAY UNIT



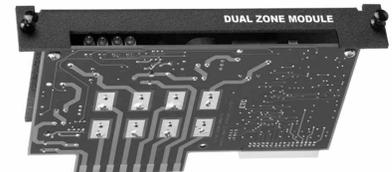
CPU MODULE



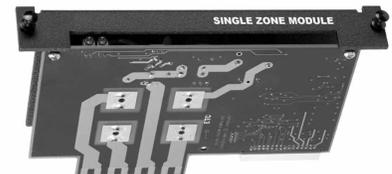
T/C MODULE



DUAL ZONE POWER MODULE



SINGLE ZONE POWER MODULE





PULSE CABINET & DISPLAY UNIT

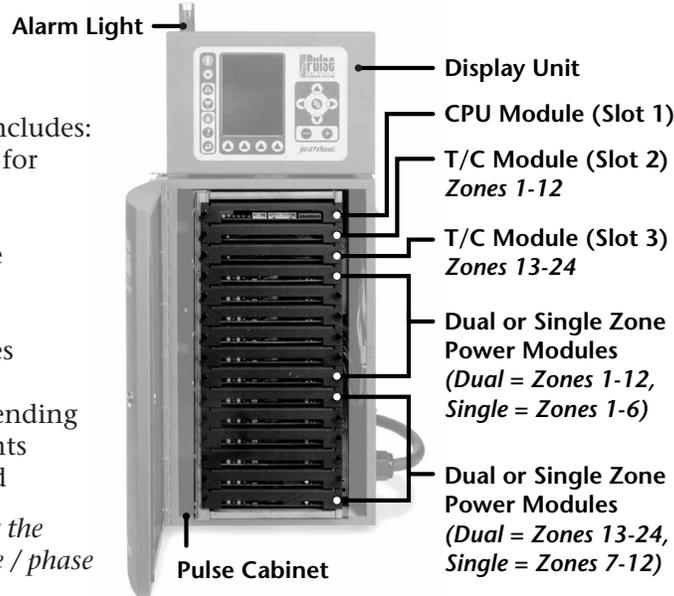
The Pulse cabinet and Display unit consist of the following components.

PULSE CABINET

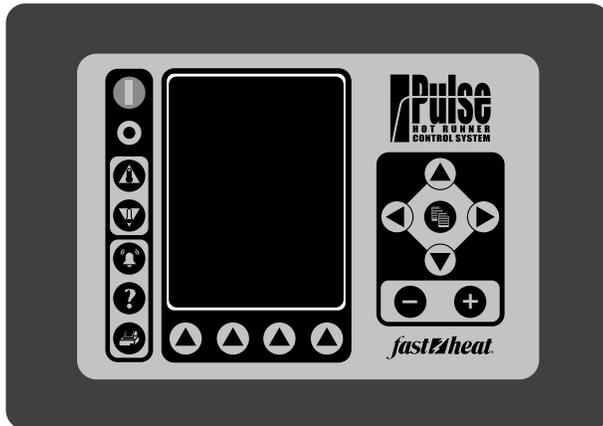
Standard configuration includes:

- (1) Pulse Cabinet wired for either 6 or 12 slots
- (1) CPU module
- (1) 12 zone T/C module (6-Slot Cabinet)
 - or-
 - (2) 12 zone T/C modules (12-Slot Cabinet)
- (#) Power modules depending on zone requirements
- (1) 10 ft. AC power cord

All cabinets are prewired at the factory to meet your voltage / phase specifications.



PULSE DISPLAY UNIT



SYSTEM RUN



SYSTEM STOP



BOOST SETPOINTS



IDLE SETPOINTS



ALARM



HELP

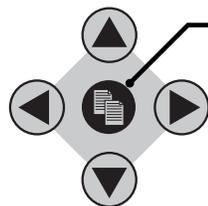


PRINT

F1 F2 F3 F4



FUNCTION
BUTTONS



COPY BUTTON

NAVIGATION BUTTONS
(Up, Down, Left, Right)



CHANGE VALUE BUTTONS
(Decrease, Increase)

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PULSE MODULES

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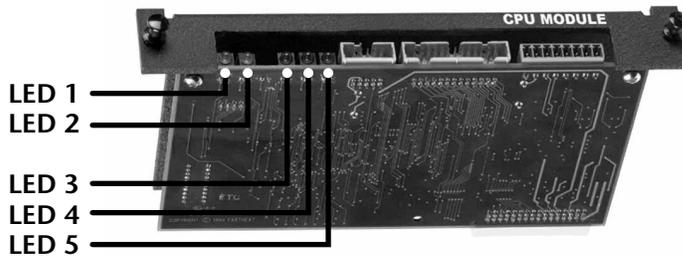
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CPU Module

The CPU module controls all of the Pulse's and Display Unit's main functions. It is modular and easily removable in case of a problem. The CPU module can only be inserted in slot 1 of the Pulse cabinet (refer to the cabinet layout drawing on page 4).

There are 5 status lights on the CPU module which indicate the status of the Pulse system and module itself:

- CPU WATCHDOG**
- LED 1 (green):** ON = indicates the CPU watchdog is operating properly
Blinking = indicates the CPU watchdog is being reset
- MICRO FUNCTION**
- LED 2 (green):** ON (Fast Blinking) = indicates the module is functioning properly
ON (Does Not Blink) = indicates microprocessor has failed
OFF or Slow Blinking = indicates failure in CPU module
- + 12V POWER SUPPLY UNIT**
- LED 3 (red):** ON = power supply is missing
OFF = power supply is present
- + 24V POWER SUPPLY UNIT**
- LED 4 (red):** ON = power supply is missing
OFF = power supply is present
- 12V POWER SUPPLY UNIT**
- LED 5 (red):** ON = power supply is missing
OFF = power supply is present

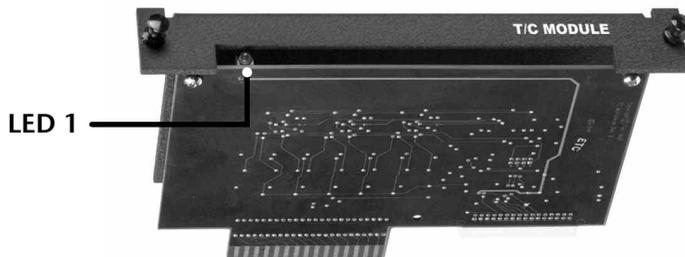


T/C Module

The T/C module controls 12 individual thermocouple inputs on one board. Robust thermocouple and board protection circuitry ensures maximum protection against improper grounding commonly found hot runner systems. Each input is fused on both sides with a 0.125A axial fuse which is easily replaced on the board via it's socket. The T/C module can only be inserted in slots 2 or 3 in the Pulse cabinet (refer to the cabinet layout drawing on page 4).

There is 1 status light on the T/C module:

- LED 1 (T/C Status Light)** ON = T/C module functioning correctly
OFF = T/C module has a failure





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.

Reference cabinet layout drawing on page 4 for module placement.

There are 4 indicator lights on the Dual zone 20 amp power module:

LED 1 (Zone “A” Power Light)

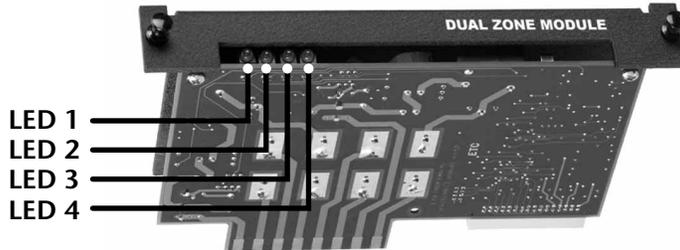
- ON = Module is in AUTO, MANUAL, VIEW or SLAVE mode
- OFF = Module is in OFF mode, secondary power relays are disabled.

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.



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.

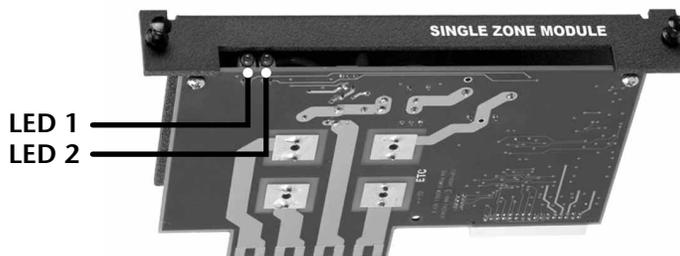
Reference cabinet layout drawing on page 4 for module placement.

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.



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HEATER AND T/C MOLD CABLE(S)

Connecting the Mold Cable(s)

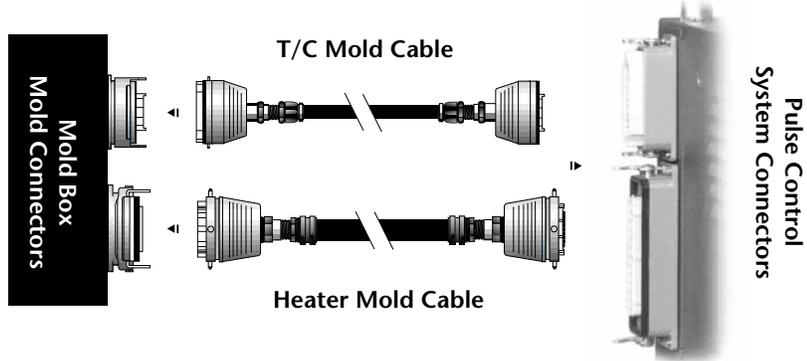
Locate the new Pulse heater and thermocouple cables and attach the appropriate side to the Pulse control system (reference the connector diagram to the right).

- T/C Connector (Zones 1-12)
- Heater Connector (Zones 1-12)
- T/C Connector (Zones 13-24)
- Heater Connector (Zones 13-24)



PLEASE NOTE:

Each cable end has a set of male and female connectors. Your system may contain a single cable that is specifically used for heaters, a single cable that is specifically used for thermocouples, and/or a cable that is a combination heater and thermocouple. Ensure that the correct cable is connected to the appropriate connector on the Pulse cabinet (reference the connector diagram below).

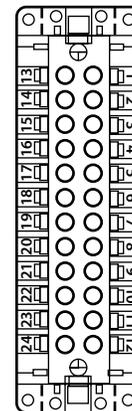


Mold / Junction Box Connector Pin-outs

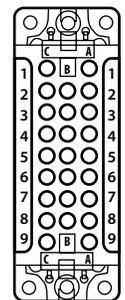
HEATER CONNECTORS

ZONE	FAST HEAT	INDUSTRY STD.	DESIGNATION
1	1	A1	HOT
1	13	A2	RETURN
2	2	A3	HOT
2	14	A4	RETURN
3	3	A5	HOT
3	15	A6	RETURN
4	4	A7	HOT
4	16	A8	RETURN
5	5	B2	HOT
5	17	B3	RETURN
6	6	B4	HOT
6	18	B5	RETURN
7	7	B6	HOT
7	19	B7	RETURN
8	8	C1	HOT
8	20	C2	RETURN
9	9	C3	HOT
9	21	C4	RETURN
10	10	C5	HOT
10	22	C6	RETURN
11	11	C7	HOT
11	23	C8	RETURN
12	12	A9	HOT
12	24	C9	RETURN

REARVIEW HEATER CONNECTOR



FAST HEAT (MALE)



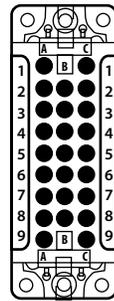
INDUSTRY STANDARD (MALE)



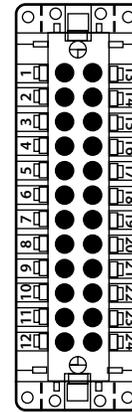
THERMOCOUPLE CONNECTORS

ZONE	FAST HEAT	INDUSTRY STD.	POLARITY
1	A1	1	(+)
1	C1	13	(-)
2	A2	2	(+)
2	C2	14	(-)
3	A3	3	(+)
3	C3	15	(-)
4	A4	4	(+)
4	C4	16	(-)
5	A5	5	(+)
5	C5	17	(-)
6	A6	6	(+)
6	C6	18	(-)
7	A7	7	(+)
7	C7	19	(-)
8	A8	8	(+)
8	C8	20	(-)
9	A9	9	(+)
9	C9	21	(-)
10	B2	10	(+)
10	B3	22	(-)
11	B4	11	(+)
11	B5	23	(-)
12	B6	12	(+)
12	B7	24	(-)

REARVIEW
T/C CONNECTOR



FAST HEAT
(FEMALE)



INDUSTRY
STANDARD
(FEMALE)

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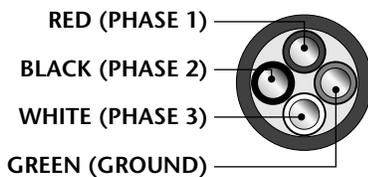
CONNECTING AC POWER

The power input cord and main circuit breaker are located on the lower right side of the Pulse cabinet. Before connecting power, be sure that the circuit breaker is in the OFF or "O" position. Reference the wiring diagrams below to connect the Pulse Control system to AC power.

⚠ CAUTION

Always connect the "Ground" wire first to avoid electrical shock or short.

3-PHASE, DELTA

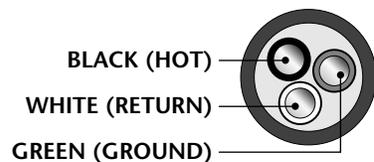


3-PHASE, 5 WIRE, WYE



*European 5 Core, 3-Phase Cable

SINGLE PHASE





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SYSTEM OPERATION

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This section describes the main system functions which, when initiated, affect the operation of the entire Pulse System. The main system functions consist of RUN, STOP, BOOST and IDLE.



RUN (System Run)

RUN starts the control operation on ALL selected zones. The RUN function performs a selectable startup function prior to “running” or controlling the hot runner system, RUN can be initiated from any screen.

There are 3 sequential steps in the Startup function that are automatically run prior to bringing the hot runner system to setpoint.

- 1. Fast tune (FT2):** The tuning function of the Pulse control system. Tunes all zones according to the load attached and stores the information in the file setup.
- 2. Bake-out:** The safety feature that, when properly set, can “bake out” the moisture in a heater prior to applying full power.
- 3. Even soak:** The safety feature that, when setup properly, will assist in reducing leakage in the hot runner system.

Please Note: More information about these functions is provided in the SYSTEM SETUP section, page 31 of this manual.



STOP (System Stop)

The STOP function is a system wide function that, when pressed, will stop control to all zones. The stop function can be pressed at any time from any screen. This function can never be locked out through security.

Please Note: Pressing the STOP button DOES NOT shut off power to the Pulse control system. Prior to performing any maintenance, ensure that no power is being applied by shutting off the main circuit breaker located on the lower right side of the Pulse cabinet and disconnecting the power cord from it's AC supply.



BOOST (Boost Setpoints)

The Boost function is primarily used to free “unmelt” from within the hot runner system. When setup properly, the Boost function “Boosts” or raises the selected zone’s temperature to a user-specified value for a user-specified time period. Once the period has timed out, the system is returned to the normal “run” mode.



Boost can be initiated at any time during the RUN sequence, or can even be initiated from STOP or from IDLE mode. Please note that if BOOST is being initiated from STOP, the Startup Functions will be automatically initiated prior to increasing temperature to the BOOST setpoints (reference the RUN section for the explanation of the Startup Functions).

Please Note: For more information on the BOOST function, please reference the Zone Boost/Idle SETUP section, page 25 of this manual.



IDLE (Idle Setpoints)

The Idle function is primarily used as a maintenance feature. When setup properly, the Idle function “Idles” or lowers the selected zone’s temperature to a user-specified value for a user-specified time period or can be set to be in IDLE for an indefinite amount of time. Once the user-specified period has timed out, the system is returned to the normal “run” mode. When maintenance needs to be performed on a mold in the press, the press is stopped and/or if for any reason plastic is sitting idle in the hot runner system for a long period of time, it is advisable to set the Pulse into Idle mode as to reduce material degradation in the hot runner system.

Idle can be initiated at any time during the RUN sequence, or can be initiated from STOP or from BOOST mode. Please note that if IDLE is being initiated from STOP the Startup Functions will be automatically initiated prior to decreasing temperature to the IDLE setpoints (reference the RUN section for the explanation of the Startup Functions).

Please Note: For more information on the IDLE function, please reference the Zone Boost/Idle SETUP section, page 25 of this manual.

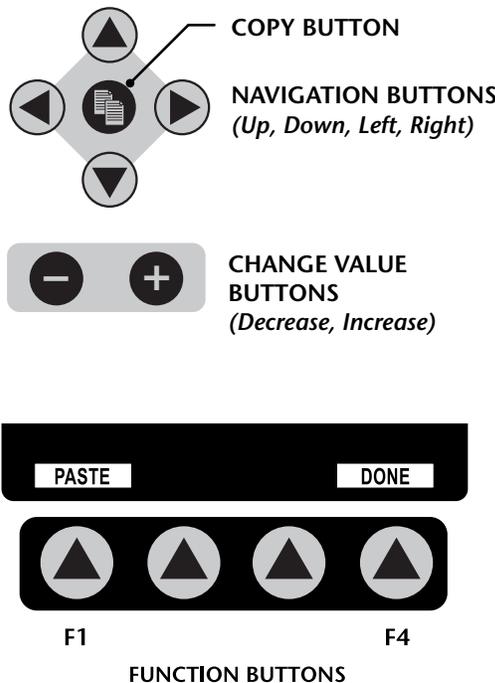
Navigating, Changing and Copying Values

The Pulse display unit has a main cursor which is used to indicate a selected value that can be changed or copied. A set of navigation buttons moves the cursor throughout the screen when pressed. Once the cursor is moved to the desired location, the change value buttons decrease or increase the value.

To copy a value, highlight the desired value using the navigation buttons, then push the COPY button.

To paste the value, move the cursor using the navigation buttons to the desired location, then push the “F1” or PASTE button.

After completing all desired copy/paste tasks, push the “F4” or DONE button to return to normal operation.



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PULSE SCREENS

The following sections describe the features contained in the Pulse screens:

Certain features of the screen remain constant on all screens. Those components are located at the top and bottom section as referenced in the diagram of the MAIN SCREEN below indicated by sections A, B, C, D and E.

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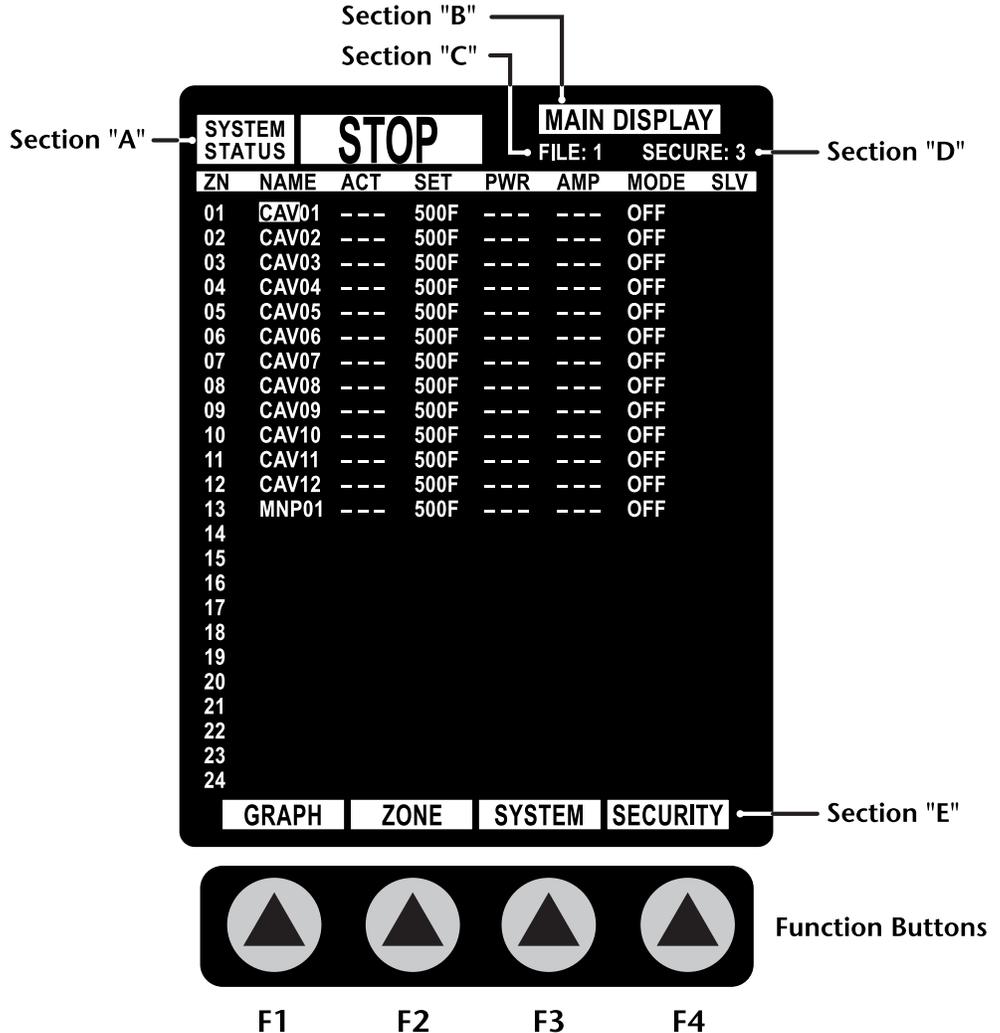
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Section A:

At the top section, just above the column indicators and to the left, is the SYSTEM STATUS indicator. The System status indicator will indicate which MODE the system is currently operating in.

The system contains the following modes:

- **STOP** = System is stopped; no control is imposed on any zones although AC is being applied to zones whose mode is anything other than OFF or VIEW.
- **RUN** = System is in control mode and is currently controlling zones that are set with anything other than OFF or VIEW.

There are SUB-MODES within RUN that assist in controlling a hot runner system. These modes are detailed in the RUN section of this manual.



During the operation of these sub-modes, the status of operation is indicated on the SYSTEM STATUS Indicator.

These status indicators are:

- EVENSOAK (reference System Setup section on Evensoak for more details)
- BAKEOUT (reference System Setup section on Bakeout for more details)

- **BOOST** = System is set to Boost setpoints for the duration of the Boost timer for zones that have a Boost setpoint that is set higher than the temperature setpoint (reference SYSTEM SETUP section for more information on the Boost function).
- **IDLE** = System is set to Idle setpoints for the duration of the Idle timer for zones that have an Idle setpoint that is set lower than the temperature setpoints.

Section B:

The Screen Status Indicator indicates the current screen in operation.

There are a total of 13 screens, consisting of:

- MAIN = Main operating screen.
- TEMP GRAPH = Temperature horizontal bar graph.
- POWER GRAPH = Power horizontal bar graph.
- ZONE Setup = Setup zone’s alarm and T/C location settings.
- ZONE Limits = Setup zone’s setpoint limits.
- ZONE Boost/Idle = Setup zone’s Boost and Idle setpoint.
- ZONE PID = View or change a zone’s PID settings.
- SYSTEM = System setup screen where global parameters are changed.
- FILE = File recipe selection screen.
- SECURITY = Security password entry screen.
- SECURITY Setup = Change access to various security levels.
- ALARM = Indicates alarm status on all zones.
- PRINT = Prints one of five available reports.

Please Note: For more information on these screens reference their individual sections in this manual.

Section C:

The File In Use Indicator will indicate the current file that is being used as selected in the FILE screen (reference the FILE Screen section of this manual for more information). Any one of 10 stored files can be selected.

Section D:

The Security Level Indicator will indicate the current level of security that is in use. To access or change Security parameters, reference the Security and Security Setup section of this manual.

Section E:

At the bottom of the screen, there are four highlighted sections which correspond to the function-buttons directly below them.

These are known as Screen function buttons and are named F1 through F4 (from left to right – reference the diagram of the MAIN SCREEN, page 12).

Each screen has corresponding text signifying what the buttons will do for that particular screen. To view more details on the function of these buttons, reference the various screen explanations in this section.

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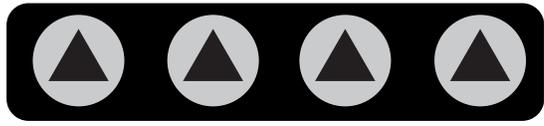
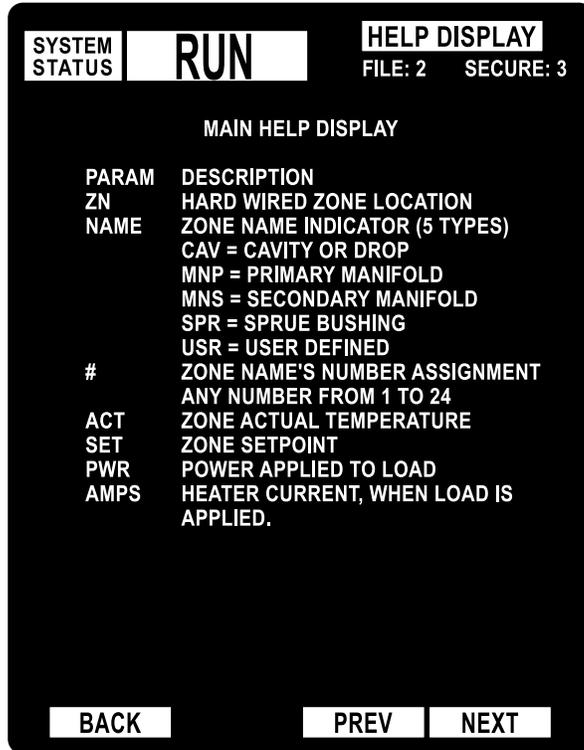
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Screen sensitive Help is available for all screens in the Pulse control system. Help can be accessed at any time from any screen.



HELP (Screen Help)



F1 F3 F4

FUNCTION BUTTONS

HELP Function buttons:

If there happens to be more information on a particular section than what can be displayed on one screen, there will be a set of Help Text navigation buttons located on function keys F3 and F4.

F3 PREV (Previous screen) will show the previous set of help text for that particular screen.

F4 NEXT (Next screen) will show the next set of help text for that particular screen.

F1 BACK (Return to screen) returns to the screen that was originally being viewed.



MAIN SCREEN

The Main screen is the most common screen used during normal Pulse control operation. It contains all of the information needed to run and maintain control without having to go to multiple screens for information.

The Main screen has 8 primary sections of information displayed in a column format for all zones (up to 24):

SYSTEM STATUS		RUN		MAIN DISPLAY			
				FILE: 2	SECURE: 3		
ZN	NAME	ACT	SET	PWR	AMP	MODE	SLV
01	CAV01	300F	300F	010%	02.0A	AUTO	
02	CAV02	300F	300F	010%	02.0A	AUTO	
03	CAV03	300F	300F	010%	02.0A	AUTO	
04	CAV04	300F	300F	010%	02.0A	AUTO	
05	CAV05	300F	300F	010%	02.0A	AUTO	
06	CAV06	300F	300F	010%	02.0A	AUTO	
07	CAV07	300F	300F	010%	02.0A	AUTO	
08	CAV08	300F	300F	010%	02.0A	AUTO	
09	CAV09	300F	300F	010%	02.0A	AUTO	
10	CAV10	300F	300F	010%	02.0A	AUTO	
11	CAV11	300F	300F	010%	02.0A	AUTO	
12	CAV12	300F	300F	010%	02.0A	AUTO	
13	CAV13	300F	300F	010%	02.0A	AUTO	
14	CAV14	300F	300F	010%	02.0A	AUTO	
15	CAV15	300F	300F	010%	02.0A	AUTO	
16	CAV16	300F	300F	010%	02.0A	AUTO	
17	CAV17	300F	300F	010%	02.0A	AUTO	
18	CAV18	300F	300F	010%	02.0A	AUTO	
19	CAV19	300F	300F	010%	02.0A	AUTO	
20	CAV20	300F	300F	010%	02.0A	AUTO	
21	CAV21	300F	300F	010%	02.0A	AUTO	
22	CAV22	300F	300F	010%	02.0A	AUTO	
23	CAV23	300F	300F	010%	02.0A	AUTO	
24	CAV24	300F	300F	010%	02.0A	AUTO	

GRAPH	ZONE	SYSTEM	SECURITY
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F1 F2 F3 F4

FUNCTION BUTTONS

MAIN SCREEN Function buttons:

The function buttons on the Main Screen navigate to other Pulse screens:

- F1 GRAPH = Go to the temperature GRAPH.
- F2 ZONE = Go to the ZONE Setup screen.
- F3 SYSTEM = Go to the SYSTEM Setup screen.
- F4 SECURITY = Go to the SECURITY screen.

Column 1: ZN “Hard Wired Zone Location”

Range: 1 to 24 zones.

Description: This field cannot be altered, as it reflects the hard-wired location of the zones as wired on the supplied Pulse cabinet heater/thermocouple connector(s).

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Column 2: NAME “Zone Name and Number”

Range of Selection, Column NAME:

CAV (Cavity or drop) indicates the zone is a cavity or drop in the hot runner system.

MNP (Manifold Primary) indicates the zone is a primary manifold in a multi-manifold system, or can be selected for hot runner systems with a single manifold.

MNS (Manifold Secondary) indicates the zone is a secondary manifold in a multi-manifold system.

SPR (Sprue or Nozzle) indicates the zone is the sprue or heated nozzle of the hot runner system.

USR (User defined) indicates this is a non-hot runner application and allows the user to change the PID values after Fast Tune has been applied (reference PID section in this manual for more information on using PID).

Description NAME: Describes the type of zone being controlled. This selection is primarily used for the Evensoak and Auto Slaving functions – please reference the Evensoak or Slaving section in this manual for more details.

Range column NAME #: 1 to 99

Description NAME #: A number assigned to a zone; this is an optional setting, allowing for multiple zones of the same type to be assigned a separate number by the user. *Example:* CAV 01, CAV 02, etc...

Column 3: ACT “Actual Zone Temperature”

Description: This column indicates actual temperature being read by the T/C assigned in ZONE SETUP (reference Zone Setup screen for more information). By default, all T/C locations are the same as the hard-wired zone location indicated in the first column marked “ZN”.

Column 4: SET “Zone Setpoint”

Range for temperature setpoints: 0 to 999 deg F or 0 to 999 deg C.

Description: In Auto Mode the SET column will indicate the user-specified temperature setpoint for a given zone. In Manual Mode the SET column will indicate the Percent power setpoint applied to the load.

Reference Zone Mode section below for more information.

Note: For ease of use, when this field is highlighted by the cursor, the least significant digit is always highlighted first.

Column 5: PWR “Power Applied to Load”

Range: 0 to 100%

Description: This field cannot be altered, as it indicates the actual power being applied to the load.



Column 6: AMP “Amps Applied to Load”

Range: 0 to 20 Amps (dual zone 20 Amp power module); 0 to 30 Amps (single zone 30 Amp power module).

Description: This field cannot be altered, as it indicates the actual current being applied to the load. Current is based on an average “peak and hold”, and can vary slightly at lower power levels.

Column 7: MODE “Zone Operating Mode”

Range is a selection of:

OFF Mode: The power module’s secondary relays are opened thus turning that particular zone off.

MANUAL Mode: The zone is placed in open loop mode and the zone’s setpoint is changed by the user to signify power output instead of temperature.

AUTO (Automatic) Mode: The zone is placed in closed loop mode, allowing the control to apply Fast Tune to a zone, changing the zone’s setpoint temperature.

VIEW Mode: The zone is placed in a mode where no output or control is done. This mode is primarily used to view the T/C location’s temperature as set in the ZONE SETUP screen. This mode is used to diagnose issues with temperature and calibration.

SLAVE Mode: The zone is placed in a corrective mode which, when used with Column 8 of the Main screen, will slave the power output of a selected zone to this zone. This mode can be selected manually or can be automatically selected by the T/C AUTO COMP feature, as described in the SYSTEM SETUP screen. Depending on the thermal properties of the tool, when this feature is selected due to an open or shorted thermocouple, it can track temperature changes and change it’s output power where basic MANUAL mode applies power as set by the user (open loop).

Description: This column allows the zone to be set for one of 5 modes that the zone will operate.

Column 8: SLV “Zone Slaved To”

Range of selection: 1 to 24 zones.

Description: When the zone’s mode is set to SLAVE a zone number will appear in this column. This zone number is the zone whose output will be copied to that particular zone. Example: if zone 3 is set to SLAVE 04, a copy of zone 4’s output is sent to zone 3 and is used for control.

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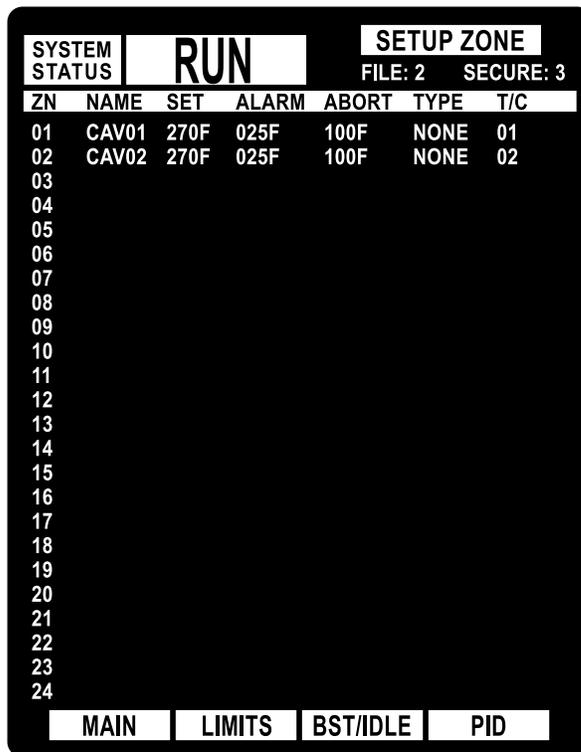
ZONE SETUP PARAMETERS

The following section describes the four setup screens that allow the user to adjust all zone parameters. They are: Zone Main Setup; Zone Boost and Idle Setup; Zone Limits Setup; and Zone PID setup.

Zone Main Setup

The primary purpose of this screen is to set both the zone's alarm and abort bands, abort type and the T/C read location for a particular zone. This screen is accessed from the Main Screen, or any of the other Zone Setup screens in this section (reference each screen's function button layout for more details).

The Zone Main Setup screen has 7 sections of information displayed in a columnar format as shown below.



F1 F2 F3 F4

FUNCTION BUTTONS

ZONE SETUP Function buttons:

The function buttons on this screen navigate to other Zone Setup screens and the Main screen:

- F1 MAIN = Go to the MAIN screen.
- F2 LIMITS = Go to the setup zone setpoint LIMITS screen.
- F3 BST/IDL = Go to the setup BOOST and IDLE setpoints screen.
- F4 PID = Go to the PID settings screen.



Column 1: ZN “Hard-Wired Zone Location”

Range: 1 to 24 zones.

Description: This field cannot be altered, as it reflects the hard-wired location of the zones as wired on the supplied cabinet heater/thermocouple connector(s).

Column 2: NAME “Zone Name and Number”

Range of Selection, Column NAME:

CAV (Cavity or drop) indicates the zone is a cavity or drop in the hot runner system.

MNP (Manifold Primary) indicates the zone is a primary manifold in a multi-manifold system, or can be selected for hot runner systems with a single manifold.

MNS (Manifold Secondary) indicates the zone is a secondary manifold in a multi-manifold system.

SPR (Sprue or Nozzle) indicates the zone is the sprue or heated nozzle of the hot runner system.

USR (User defined) indicates this is a non-hot runner application and allows the user to change the PID values after Fast Tune has been applied (reference PID section in this manual for more information on using PID).

Description NAME: Describes the type of zone being controlled. This selection is primarily used for the Evensoak and Auto Slaving functions – please reference the Evensoak or Slaving section in this manual for more details.

Range column NAME #: 1 to 99

Description NAME #: A number assigned to a zone; this is an optional setting allowing for multiple zones of the same type to be assigned a separate number by the user. Example: CAV 01, CAV 02, etc...

Column 3: SET “Zone Setpoint”

Range for temperature setpoints: 0 to 999 deg F or 0 to 999 deg C.

Description: In Auto Mode the SET column will indicate the user-specified temperature setpoint for a given zone. In Manual Mode the SET column will indicate the Percent power setpoint applied to the load.

Reference Zone Mode section page 17 for more information.

Note: For ease of use, when this field is highlighted by the cursor, the least significant digit is always highlighted first.

Column 4: ALARM “Alarm Band Setting”

Range of band: 0 to 999 deg F or 0 to 999 deg C.

Description: This parameter is based on a band value that follows a zone’s setpoint and is NOT an actual setpoint temperature, but a user-specified value that resides above and below any given setpoint (band).

For example: If an alarm band of 025F was selected in the Alarm Band Setting and a temperature setpoint is set to 500F, an over-temperature alarm will occur when the temperature exceeds 525F. Conversely, an under-temperature alarm will occur when the temperature is below 475F.

Note: This value should not be set greater than the ABORT band setting described in Column 5 on page 20, otherwise only an Abort alarm will be reported.

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Column 5: ABORT “Abort Band Setting”

Range of band: 0 to 999 deg F or 0 to 999 deg C

Description: This parameter is based on a band value that follows a zone’s setpoint and is NOT an actual setpoint temperature, but a value that resides above and below any given setpoint (band). This user-specified value should always be set larger than the alarm band described in Column 4 on page 19, otherwise an Abort alarm will always be reported.

Abort not only reports an Abort condition on the alarm screen for a particular zone, but also initiates a function which is set by the user in the ABORT TYPE described in Column 7.

For example: If an Abort band of 100F was selected in the Abort Band Setting and a temperature setpoint is set to 500F, an over-temperature abort will occur when the temperature exceeds 600F. Conversely, an under-temperature abort will occur when the temperature is below 400F.

Column 6: TYPE “Abort Type Function”

Range of settings:

NONE = When an Abort limit is exceeded, the abort is reported to the alarm screen and no special function is initiated.

ZONE = When an Abort limit is exceeded, the abort is reported to the alarm screen and that particular zone’s mode will be automatically changed to OFF. This function is primarily used in critical applications where, if a zone was to exceed a maximum limit, it’s power would need to be shut off to prevent material from degrading in the hot runner system.

SYSTEM = When an Abort limit is exceeded, the abort is reported to the alarm screen and the SYSTEM status is changed to STOP. This function is primarily used in a critical application where, if a primary (manifold) zone was to exceed a maximum limit, it’s power would need to be shut off to prevent material from degrading in the hot runner system.

Column 7: T/C “Thermocouple Location”

Range: 1 to 24

Description: This parameter sets the actual hard-wired T/C location to a specific zone. By default, all zones’ T/Cs are set to the hard-wired location as displayed in column 1 “ZN”.



Zone Limits Setup

This screen shows individual zone's setup of setpoint limits for both temperature and power. These limits are used to prevent a lower level of security access from changing a setpoint value to an undesired limit determined by a higher level of security.

This screen is accessed from any of the other Zone Setup screens in this section (reference each screen's function button layout for more details).

The Zone Limits Setup screen has 7 sections of information displayed in a columnar format as shown below.

SYSTEM STATUS	RUN		SETUP LIMITS			
			FILE: 2	SECURE: 3		
ZN	NAME	SET	LO-AT	HI-AT	LO-MN	HI-MN
01	CAV01	270F	000F	999F	000%	100%
02	CAV02	270F	000F	999F	000%	100%
03						
04						
05						
06						
07						
08						
09						
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16						
17						
18						
19						
20						
21						
22						
23						
24						

MAIN ZONE BST/IDLE PID



F1 F2 F3 F4

FUNCTION BUTTONS

ZONE LIMITS SETUP Function buttons:

The function buttons on this screen navigate to other Zone Setup screens and the Main screen.

- F1 MAIN = Go to the MAIN screen.
- F2 ZONE = Go to the ZONE setup screen.
- F3 BST/IDL = Go to the setup BOOST and IDLE setpoints screen.
- F4 PID = Go to the PID settings screen.

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Column 1: ZN “Hard-Wired Zone Location”

Range: 1 to 24 zones.

Description: This field cannot be altered as it reflects the hard-wired location of the zones as wired on the supplied cabinet heater/thermocouple connector(s).

Column 2: NAME “Zone Name and Number”

Range of Selection, Column NAME:

CAV (Cavity or drop) indicates the zone is a cavity or drop in the hot runner system.

MNP (Manifold Primary) indicates the zone is a primary manifold in a multi-manifold system, or can be selected for hot runner systems with a single manifold.

MNS (Manifold Secondary) indicates the zone is a secondary manifold in a multi-manifold system.

SPR (Sprue or Nozzle) indicates the zone is the sprue or heated nozzle of the hot runner system.

USR (User defined) indicates this is a non-hot runner application and allows the user to change the PID values after Fast Tune has been applied (reference PID section in this manual for more information on using PID).

Description NAME: Describes the type of zone being controlled. This selection is primarily used for the Evensoak and Auto Slaving functions – please reference the Evensoak or Slaving section in this manual for more details.

Range column NAME #: 1 to 99

Description NAME #: A number assigned to a zone, this is an optional setting allowing for multiple zones of the same type to be assigned a separate number by the user. Example: CAV 01, CAV 02, etc...

Column 3: SET “Zone Setpoint”

Range for temperature setpoints: 0 to 999 deg F or 0 to 999 deg C.

Description: In Auto Mode the SET column will indicate the user-specified temperature setpoint for a given zone. In Manual Mode the SET column will indicate the Percent power setpoint applied to the load.

Reference Zone Mode section page 17 for more information.

Note: For ease of use, when this field is highlighted by the cursor, the least significant digit is always highlighted first.

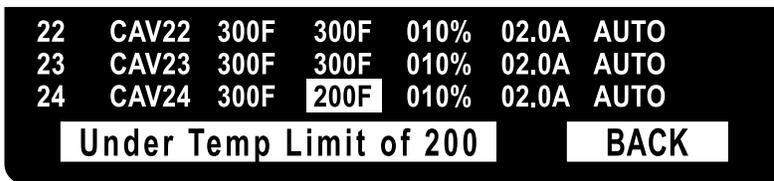


Column 4: LO-AT “Setpoint Auto Mode (Temperature) LOW End Setpoint”

Range for temperature setpoints: 0 to 999 deg F or 0 to 999 deg C.
 Description: When a zone is in Auto Mode and a zone’s setpoint is set lower than the setpoint setup in the LO-AT column, the setpoint is prevented from being lowered below the setpoint limit in LO-AT. As a warning, a small pop-up appears just above the function keys at the bottom of the screen (reference diagram below). The warning shows an “Under Temp Limit of X”; to the right of this message is a tag for function button F4 reading “BACK”. Pressing the BACK button will clear the warning.

For example: If a LO-AT limit of 50F is set and an attempt is made to lower the zone’s temperature setpoint (SET) below this, the limit warning will pop up above function keys F1 to F3 and indicate “Under Temp Limit of 50.”

Note: LO-AT must always be set lower than HI-AT or setpoint will be completely prevented from changes.

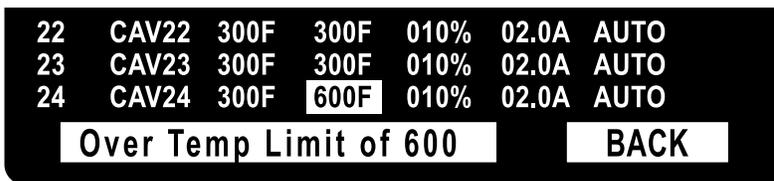


Column 5: HI-AT “Setpoint Auto Mode (Temperature) HIGH End Setpoint”

Range for temperature setpoints: 0 to 999 deg F or 0 to 999 deg C.
 Description: When a zone is in Auto Mode and a zone’s setpoint is set higher than the setpoint setup in the HI-AT column, the setpoint is prevented from being raised above the setpoint limit in HI-AT. As a warning, a small pop-up appears just above the function keys at the bottom of the screen (reference diagram below). The warning shows an “Over Temp Limit of X”; to the right of this message is a tag for function button F4 reading “BACK”. Pressing the BACK button will clear the warning.

For example: If a HI-AT limit of 700F is set and an attempt is made to raise the zone’s temperature setpoint (SET) above this, the limit warning will pop up above function keys F1 to F3 and indicate “Over Temp Limit of 700.”

Note: LO-AT must always be set lower than HI-AT or setpoint will be completely prevented from changes.



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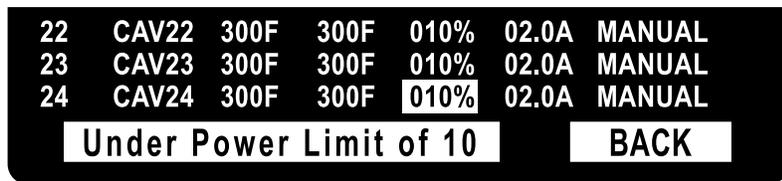
Column 6: LO-MN “Setpoint Manual Mode (% Power Control) LOW End Setpoint”

Range for % power setpoint: 0 to 100%

Description: When a zone is in Manual Mode and a zone’s setpoint is set lower than the setpoint setup in the LO-MN column, the setpoint is prevented from being lowered below the setpoint limit in LO-MN. As a warning, a small pop-up appears just above the function keys at the bottom of the screen (reference diagram below). The warning shows an “Under Power Limit of X”; to the right of this message is a tag for function button F4 reading “BACK”. Pressing the BACK button will clear the warning.

For example: If a LO-MN limit of 5% is set and an attempt is made to lower the zone’s % power setpoint (SET) below this, the limit warning will pop up above function keys F1 to F3 and indicate “Under Power Limit of 5.”

Note: LO-MN must always be set lower than HI-MN or setpoint will be completely prevented from changes.



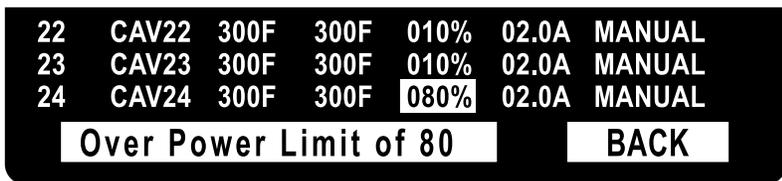
Column 7: HI-MN “Setpoint Manual Mode (% Power Control) HIGH End Setpoint”

Range for % power setpoint: 0 to 100%

Description: When a zone is in Manual Mode and a zone’s setpoint is set higher than the setpoint setup in the HI-MN column, the setpoint is prevented from being raised above the setpoint limit in HI-MN. As a warning, a small pop-up appears just above the function keys at the bottom of the screen (reference diagram below). The warning shows an “Over Power Limit of X”; to the right of this message is a tag for function button F4 reading “BACK”. Pressing the BACK button will clear the warning.

For example: If a HI-MN limit of 60% is set and an attempt is made to raise the zone’s % power setpoint (SET) above this, the limit warning will pop up above function keys F1 to F3 and indicate “Over Power Limit of 60.”

Note: LO-MN must always be set lower than HI-MN or setpoint will be completely prevented from changes.

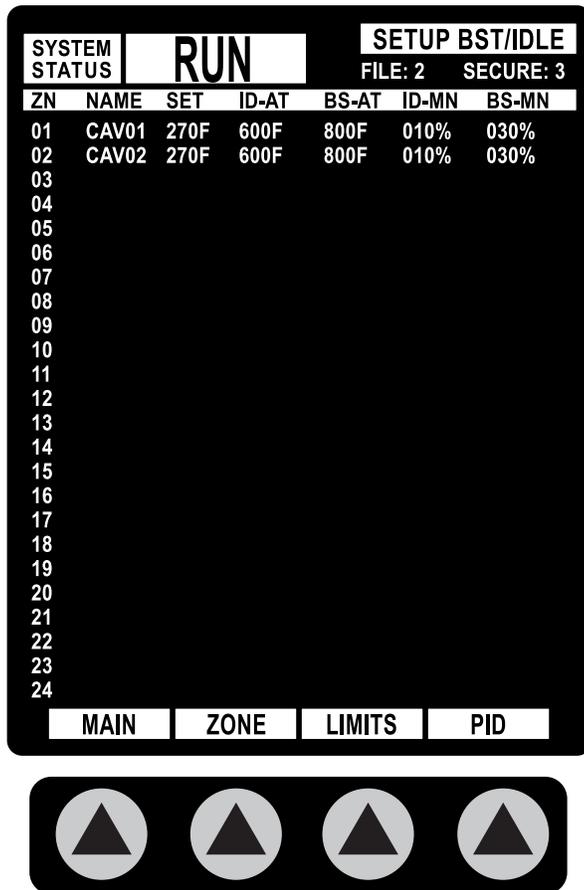




Zone BOOST and IDLE Setup

This screen sets up the Boost and Idle setpoint values for both temperature and power. This screen is accessed from all of the other Zone Setup screens in this section (reference each screen’s function button layout for more details).

The Zone Boost and Idle Setup screen has 7 sections of information displayed in a columnar format as shown below.



FUNCTION BUTTONS

ZONE BOOST/IDLE SETUP Function buttons:

The function buttons on this screen navigate to other Zone Setup screens and the Main screen:

- F1 MAIN = Go to the MAIN screen.
- F2 ZONE = Go to the ZONE setup screen.
- F3 LIMITS = Go to the setup zone setpoint LIMITS screen.
- F4 PID = Go to the PID settings screen.

Column 1: ZN “Hard-Wired Zone Location”

Range: 1 to 24 zones.

Description: This field cannot be altered as it reflects the hard-wired location of the zones as wired on the supplied cabinet heater/thermocouple connector(s).

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Column 2: NAME “Zone Name and Number”

Range of Selection, Column NAME:

CAV (Cavity or drop) indicates the zone is a cavity or drop in the hot runner system.

MNP (Manifold Primary) indicates the zone is a primary manifold in a multi-manifold system, or can be selected for hot runner systems with a single manifold.

MNS (Manifold Secondary) indicates the zone is a secondary manifold in a multi-manifold system.

SPR (Sprue or Nozzle) indicates the zone is the sprue or heated nozzle of the hot runner system.

USR (User defined) indicates this is a non-hot runner application and allows the user to change the PID values after Fast Tune has been applied (reference PID section in this manual for more information on using PID).

Description NAME: Describes the type of zone being controlled. This selection is primarily used for the Evensoak and Auto Slaving function – please reference the Evensoak or Slaving section in this manual for more details.

Range column NAME #: 1 to 99

Description NAME #: A number assigned to a zone; this is an optional setting allowing for multiple zones of the same type to be assigned a separate number by the user. Example: CAV 01, CAV 02, etc...

Column 3: SET “Zone Setpoint”

Range for temperature setpoints: 0 to 999 deg F or 0 to 999 deg C.

Description: In Auto Mode the SET column will show the user-specified temperature setpoint for a given zone. In Manual Mode the SET column will show the Percent power setpoint applied to the load.

Reference Zone Mode section page 17 for more information.

Note: For ease of use, when this field is highlighted by the cursor, the least significant digit is always highlighted first.

Column 4: ID-AT “Idle Auto Mode (Temperature) Setpoints”

Range for temperature setpoints: 0 to 999 deg F or 0 to 999 deg C.

Description: When a zone is set to AUTO mode, the setpoint value determined by the user in the ID-AT column temporarily replaces the zone’s temperature setpoint (SET) for a timed period, which is set in the SYSTEM setup screen (reference the System screen for more information on the Idle timer).

For example: If a zone’s setpoint is set at 500F and the ID-AT for that zone is set for 200F, when the IDLE system button is pressed the System Status indicator reads IDLE and that zone’s temperature is lowered to 200F for the timed period setup by the user in the SYSTEM setup screen. Once the timer has timed out, the System Status Indicator reads RUN and the zone’s temperature (ACT) is returned to what the temperature setpoint (SET) is – 500F.

Note: The ID-AT value must be set below the temperature setpoint in order for that zone to “IDLE”, otherwise the current temperature setpoint value will be used (SET) and the ID-AT setpoint will be ignored.



Column 5: BS-AT “Boost Auto Mode (Temperature) Setpoints”

Range for temperature setpoints: 0 to 999 deg F or 0 to 999 deg C.

Description: When a zone is set to AUTO mode, the setpoint value determined by the user in the BS-AT column temporarily replaces the zone’s temperature setpoint (SET) for a timed period, which is set in the SYSTEM setup screen (reference the System screen for more information on the Boost timer).

For example: If a zone’s setpoint is set at 500F and the BS-AT for that zone is set for 700F, when the BOOST system button is pressed the System Status indicator reads BOOST and that zone’s temperature is raised to 700F for the timed period setup by the user in the SYSTEM setup screen. Once the timer has timed out, the System Status indicator reads RUN and the zone’s temperature (ACT) is returned to what the temperature setpoint (SET) is – 500F.

Note: The BS-AT value must be set above the temperature setpoint in order for that zone to “BOOST”, otherwise the current temperature setpoint value will be used (SET) and the BS-AT setpoint will be ignored.

Column 6: ID-MN “Idle Manual Mode (% Power Control) Setpoints”

Range for % power setpoints: 0 to 100%

Description: When a zone is set to MANUAL mode, the setpoint value determined by the user in the ID-MN column temporarily replaces the zone’s % power setpoint (SET) for a timed period, which is set in the SYSTEM setup screen (reference the System screen for more information on the Idle timer).

For example: If a zone’s setpoint is set at 5% power and the ID-MN for that zone is set for 2% power, when the IDLE system button is pressed the System Status indicator reads IDLE and that zone’s % power is lowered to 2% power for the timed period setup by the user in the SYSTEM setup screen. Once the timer has timed out, the System Status Indicator reads RUN and the zone’s % power (PWR) is returned to what the temperature setpoint (SET) is – 5%.

Note: The ID-MN value must be set below the % power setpoint in order for that zone to “IDLE”, otherwise the current % power setpoint value will be used (SET) and the ID-MN setpoint will be ignored.

Column 7: BS-MN “Boost Manual Mode (% Power Control) Setpoints”

Description: When a zone is set to MANUAL mode, the setpoint value determined by the user in the BS-MN column temporarily replaces the zone’s % power setpoint (SET) for a timed period, which is set in the SYSTEM setup screen (reference the System screen for more information on the Boost timer).

For example: If a zone’s setpoint is set at 5% power and the BS-MN for that zone is set for 10% power, when the BOOST system button is pressed the System Status indicator reads BOOST and that zone’s % power is raised to 10% power for the timed period setup by the user in the SYSTEM setup screen. Once the timer has timed out, the System Status Indicator reads RUN and the zone’s % power (PWR) is returned to what the temperature setpoint (SET) is – 5%.

Note: The BS-MN value must be set above the % power setpoint in order for that zone to “BOOST”, otherwise the current % power setpoint value will be used (SET) and the BS-MN setpoint will be ignored.

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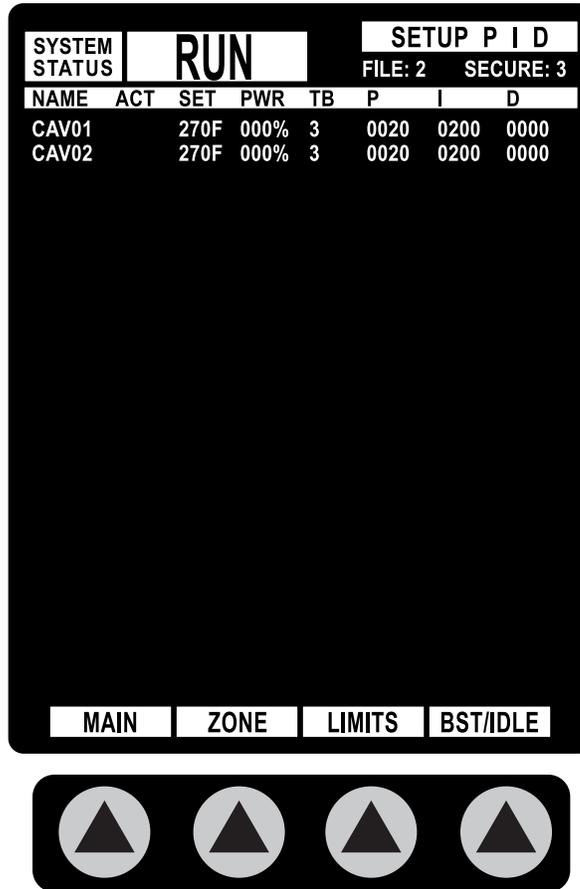
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Zone PID (Proportional, Integral, Derivative) setup

This screen's purpose is to view and/or change the PID values set by FT2 Fast Tune Technology. This screen is accessed from all of the other Zone Setup screens in this section (reference each screen's function button layout for more details).

The Zone PID Setup screen has 8 sections of information displayed in a columnar format as shown below.



F1 F2 F3 F4

FUNCTION BUTTONS

ZONE PID SETUP Function buttons:

The function buttons on this screen navigate to other Zone Setup screens and the Main screen.

- F1 MAIN = Go to the MAIN screen.
- F2 ZONE = Go to the ZONE setup screen.
- F3 LIMITS = Go to the setup zone setpoint LIMITS screen.
- F4 BST/IDL = Go to the setup BOOST and IDLE setpoints screen.



Column 1: NAME “Zone Name and Number”

Range of Selection, Column NAME:

CAV (Cavity or drop) indicates the zone is a cavity or drop in the hot runner system.

MNP (Manifold Primary) indicates the zone is a primary manifold in a multi-manifold system, or can be selected for hot runner systems with a single manifold.

MNS (Manifold Secondary) indicates the zone is a secondary manifold in a multi-manifold system.

SPR (Sprue or Nozzle) indicates the zone is the sprue or heated nozzle of the hot runner system.

USR (User defined) indicates this is a non-hot runner application and allows the user to change the PID values after Fast Tune has been applied (reference PID section in this manual for more information on using PID).

Description NAME: Describes the type of zone being controlled. This selection is primarily used for the Evensoak and Auto Slaving functions – please reference the Evensoak or Slaving section in this manual for more details.

Range column NAME #: 1 to 99

Description NAME #: A number assigned to a zone; this is an optional setting, allowing for multiple zones of the same type to be assigned a separate number by the user. Example: CAV 01, CAV 02, etc...

Column 2: ACT “Actual Zone Temperature”

Description: This column shows the T/C location value assigned in ZONE SETUP (reference Zone Setup screen for more information). By default all T/C locations are the same as the hard-wired zone location indicated in the first column marked “ZN”.

Column 3: SET “Zone Setpoint”

Range for temperature setpoints: 0 to 999 deg F or 0 to 999 deg C.

Description: In Auto Mode the SET column will show the user-specified temperature setpoint for a given zone. In Manual Mode the SET column will show the Percent power setpoint applied to the load.

Reference Zone Mode section page 17 for more information.

Note: For ease of use, when this field is highlighted by the cursor, the least significant digit is always highlighted first.

Column 4: PWR “Power Applied to Load”

Range: 0 to 100%

Description: This field cannot be altered, as it indicates the actual power being applied to the load.

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Column 5: TB “PID TABLE”

Range: 1 to 7

Description: Each table represents a preset value of PID settings for a particular load requirement. Fast Tune Technology will choose the most appropriate table and assign this table to the specific zone, which is then stored in the file recipe.

Table Mass description:

- 1 and 2 = Large Mass requirements
- 3 and 4 = Medium Mass requirements
- 5 and 6 = Small Mass requirements
- 7 = User defined settings

Although each of these tables are automatically selected by FT2, they can be changed manually by the user by highlighting the required table with the cursor and changing the value. When value 7 is selected, access to the PID columns 6 through 8 is allowed.

Note: As a standard feature, FT2 will choose the correct values that will, in turn, “tune” themselves and no user intervention is required.

⚠ CAUTION

The next three columns are to be set by technically qualified personel that have a good understanding of thermal dynamics and the use of PID controls.

Column 6: P “Proportional Band”

Range: 0000 to 9999

Column 7: I “Integral term”

Range: 0000 to 9999

Column 8: D “Derivative term”

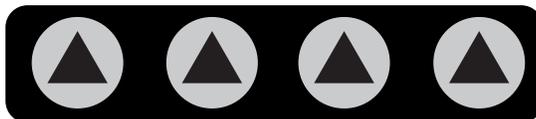
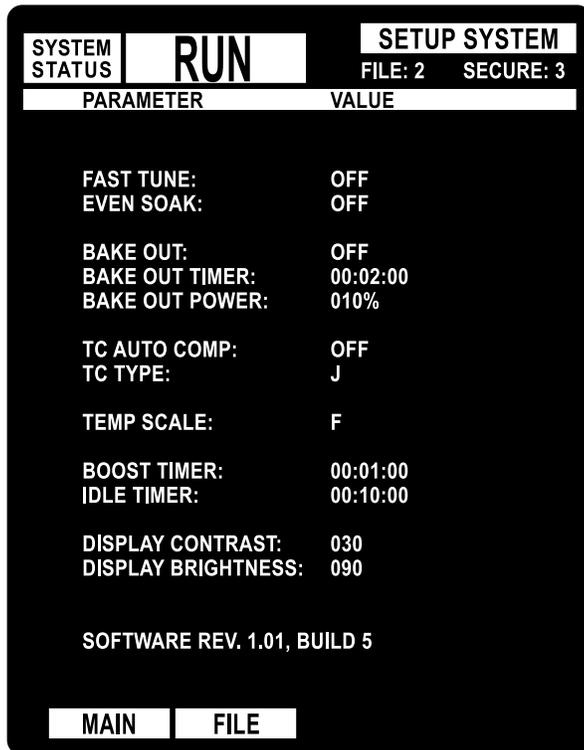
Range: 0000 to 9999



SYSTEM SETUP SCREEN

System parameter changes are made in the System setup screen. To navigate to this screen from the MAIN screen, press function button “F3” SYSTEM.

Information on this screen is organized with the parameter description to the left and with it's value to the right.



F1

F2

FUNCTION BUTTONS

SYSTEM SETUP Function buttons:

The function buttons on this screen navigate to the MAIN or FILE screens:

- F1 MAIN = Go to the MAIN screen
- F2 FILE = Got to the FILE screen.

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Line 1: FAST TUNE “FT2 - Fast Tune Technology”

Selection: ON or OFF

Description: Fast Tune is the self-tuning feature of the Pulse Control System. When this parameter is set to ON, FT2 will be initiated as part of the Startup Function (when the RUN button is pressed). Tuning parameters are determined through internal models, after which the tuning parameters are stored in the selected file. At the next run, the model parameters are already stored in the file setup and are used for that file. Please note that once Fast Tune has performed on a FILE, the parameter is automatically turned off and does not need to be run again.

Note: Prior to re-running FT2 on a FILE, all zone’s temperatures will need a 50 degree differential. If one or more zones are less than 50 degrees from setpoint during the Startup function, the Pulse will wait until all zones’ temperatures have dropped past the limit before performing Fast Tune.

Line 2: EVENSOAK “Evensoak HR System”

Selection: ON or OFF

Description: Evensoak is a safety feature that, when activated, will startup the hot runner system properly in order to assist in the prevention of leakage. Evensoak works in conjunction with the ZONE NAME parameter that is described in the MAIN screen. Using the ZONE NAME parameters:

- CAV = Cavity or Drop
- MNP = Primary Manifold or Single Manifold Application
- MNS = Secondary Manifold
- SPR = Sprue or Heated Nozzle
- USR = User Defined Zone

The Evensoak sequence is as follows: the MNP (Primary Manifold) will be brought to setpoint first. Once the primary manifold has reached setpoint, the MNS (Secondary Manifold) will be brought to setpoint. After both the primary and secondary manifolds have reached setpoint, all other zones (drops) are brought to setpoint.

Line 3: BAKE OUT “System BakeOut”

Selection: ON or OFF

Description: Bakeout is a safety feature that, when activated, performs the ground fault bakeout for the entire hot runner system. BAKEOUT works in conjunction with the user-defined settings just below it:

Line 4: Bakeout timer = Timer value that Bakeout operates in.

Line 5: Bakeout power = Power level Bakeout reaches when the timer is done.

Line 6: TC AUTO COMP “Thermocouple Loss Auto Compensation”

Selection: ON or OFF

Description: T/C Auto Comp is a safety feature that, when activated, acts as a means to continue applying power to a zone when a thermocouple fails (open or short). There are two methods used to compensate for a lost T/C: Auto Comp Level 1 and Auto Comp Level 2.

Auto Comp Level 1 (ACL1) is the primary compensation routine that runs when a thermocouple fails. In order for ACL1 to run, an automatic analysis is performed during the Startup Function which determines



what the similarities between zones are. This information is then stored in the FILE and is used to automatically SLAVE a zone to another. In order for Slaving to work, a few criteria must be met:

1. There must be a zone that is similar to the failed zone.
2. There must be a similarity in setpoints. If either one of the criteria isn't met, the zone then performs Auto Comp Level 2.

Auto Comp Level 2 (ACL2) is the secondary compensation routine that runs if ACL1 cannot be used. During the operation of the zone, a number of power levels are stored in memory for a particular zone. When a thermocouple fails and ACL1 cannot be performed on that zone, ACL2 will output an average of the power levels stored in memory. In a sense, this zone is placed into a "MANUAL" mode.

Line 7: TC TYPE "Thermocouple Type Selection"

Selection: J or K

Description: T/C Type allows for the selection of either type J or type K thermocouples to be used.

Note: Internal wiring is compensated copper but proper type thermocouple mold cables should be used in order to maintain calibration.

Line 8: TEMP SCALE "Temperature Scale"

Selection: F or C

Description: Two types of temperature scales are available on the Pulse; Fahrenheit or Celsius.

Line 9: BOOST TIMER "Boost System Timer"

Selection: hh:mm:ss (hours, minutes, seconds); maximum limit is 99:59:59

Description: This BOOST TIMER is the timer used to time the duration of the Boost function.

Line 10: IDLE TIMER "Idle System Timer"

Selection: hh:mm:ss (hours, minutes, seconds); maximum limit is 99:59:59

Description: This IDLE TIMER is the timer used to time the duration of the Idle function.

Note: When the IDLE TIMER is set to 99:59:59 it will not "time-out". This setting allows the Idle timer to be on for an indefinite amount of time.

Line 11: SCREEN CONTRAST "Screen Contrast Adjustment"

Settings: 0 to 100

Description: Adjusts screen contrast – typical setting between 45 to 55

Line 12: SCREEN BRIGHTNESS "Screen Brightness Adjustment"

Settings: 0 to 100

Description: Adjusts screen brightness to desired level.

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FILE SYSTEM

The File system is the main storage area for all zone parameters in the Pulse. Up to 10 separate File “recipes” can be stored within a Pulse control system. Storage includes: all setpoint changes, mode, and all zone setup parameters. Access to the FILE screen is done through the System Setup screen. From the MAIN screen press F3 SYSTEM, then F2 FILE.

There are two columns of information for the FILE SYSTEM screen:

Column 1: FILE “File Number”

Description: The file number is preassigned by the Pulse system and cannot be altered.

Column 2: STATUS “File Status”

Selection of the following:

- EMPTY = File location is set to factory default.
- FULL = File location has been stored with previous parameters.
- SELECTED = Current file that has been selected.

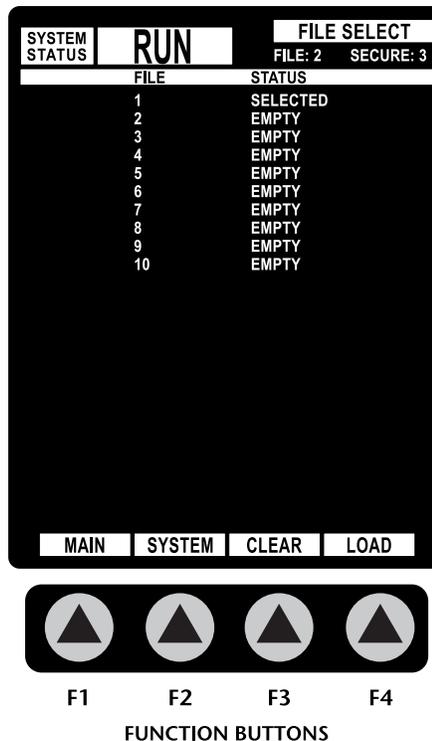
FILE SYSTEM Function buttons:

The function buttons on this screen navigate to the MAIN or FILE screens and perform:

- F1 MAIN = Go to the MAIN screen.
- F2 SYSTEM = Go to the SYSTEM screen.
- F3 CLEAR = CLEAR a highlighted file to factory default settings.
- F4 LOAD = LOAD a highlighted file.

Note:

1. Files cannot be loaded or cleared while the system is in RUN, BOOST, IDLE or any Startup Function. The system must be in STOP mode in order to load or clear a file.





SECURITY

Logging in and out of a desired level is done through the password entry screen. A 4-digit security code is required to enter any one of the 3 levels of security available.

To access the password entry screen of SECURITY, from the MAIN screen press F4 SECURITY.

In the center of the screen is a prompt for a password, as shown, with the cursor at the left most position:

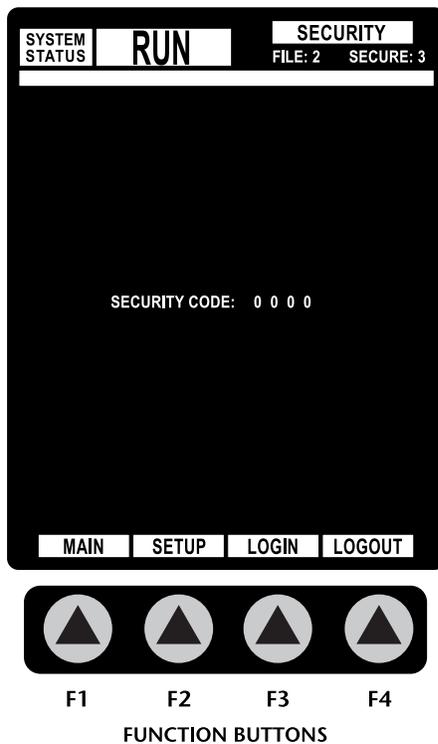
SECURITY CODE: **0** 0 0 0

If this is a new startup, enter the security code in the envelope provided by Fast Heat with the Pulse; otherwise, enter your security code by changing the values from 0 to 9 in each of the 4 columns using the navigation and change keys, and press the LOGIN button F3.

SECURITY Function buttons:

The function buttons on this screen navigate to the MAIN or FILE screens and perform:

- F1 MAIN = Go to the MAIN screen.
- F2 SETUP = Go to SECURITY SETUP screen.
- F3 LOGIN = LOG IN the security code entered.
- F4 LOGOUT = LOG OUT of the current security level to lowest level 1.



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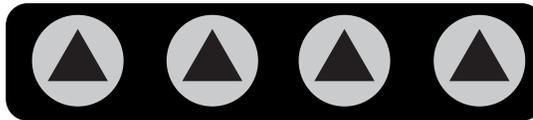
Security Setup

The Security Setup screen sets what access is available for each of the three levels available in the Pulse. The primary purpose for Security is to assist in the prevention of errors that occur primarily with some of the ZONE SETUP parameters, as well as others.

To navigate to the Security Setup screen, a user must be logged in as level 3 security access.

The Security Setup screen is organized with 4 columns of information:

SYSTEM STATUS	SETUP SECURITY		
RUN	FILE: 2	SECURE: 3	
PARAMETER/SCREEN	L1	L2	L3
BOOST SETPOINTS	ON	ON	ON
IDLE SETPOINTS	ON	ON	ON
TEMPERATURE SETPOINT	ON	ON	ON
MANUAL POWER SETPOINT	ON	ON	ON
ZONE MODE	ON	ON	ON
SLAVE TO	ON	ON	ON
SETUP ZONE DISPLAY	ON	ON	ON
SETUP LIMITS DISPLAY	ON	ON	ON
SETUP PID DISPLAY	ON	ON	ON
SETUP SYSTEM DISPLAY	ON	ON	ON
FILE SELECT DISPLAY	ON	ON	ON
PRINT REPORTS DISPLAY	ON	ON	ON
ALARM ACKNOWLEDGE	ON	ON	ON
SECURITY CODES	0000	0000	0000
SECURITY CODES	0000	0000	0000
SECURITY CODES	0000	0000	0000
SECURITY CODES	0000	0000	0000
MAIN	SECURITY		



F1

F2

FUNCTION BUTTONS

SECURITY SETUP Function buttons:

The function buttons on this screen navigate to the MAIN or SECURITY screens:

F1 MAIN = Go to the MAIN screen

F2 SECURITY = Got to the SECURITY login screen.



Column 1 (Top): PARAMETER/SCREEN “Parameter or Screen to be Secured”

This column represents the parameter or screen that can be locked out in security. The parameters are as follows:

BOOST SETPOINTS	= Lockout on temperature and power setpoint for Boost under BOOST setup.
IDLE SETPOINTS	= Lockout on temperature and power setpoint for Idle under IDLE setup.
TEMPERATURE SETPOINTS	= Lockout on temperature setpoint on all screens indicating “SET” when in automatic mode.
MANUAL POWER SETPOINTS	= Lockout on manual power setpoint on all screens indicating “SET” when in manual mode.
ZONE MODE	= Lockout from Zone mode on all screens indicating “MODE”.
SLAVE TO	= Lockout on Slave To on MAIN screen.
SETUP ZONE SCREEN	= Lockout from access to Zone setup screen.
SETUP LIMITS SCREEN	= Lockout from access to Setup Limits screen.
SETUP PID SCREEN	= Lockout from access to PID setup screen.
SETUP SYSTEM SCREEN	= Lockout from access to System setup screen.
FILE SELECT SCREEN	= Lockout from access to File Select screen.
PRINT REPORTS SCREEN	= Lockout from access to Print Reports screen.
ALARM ACKNOWLEDGE	= Lockout from access to Alarm Acknowledge screen.

Column 1 (Bottom): SECURITY CODES

Selection: 0001 to 9999

Description: Under each of the three levels there is the ability to give four separate security codes for each level.

Column 2: L1 “Level 1 Access”

Selection: ON = Security lockout enabled; OFF = Security lockout disabled.

Description: This is typically setup as the lowest level access for security. It is recommended that if security is used that this be setup with no access to the setup screens.

Column 3: L2 “Level 2 Access”

Selection: ON = Security lockout enabled; OFF = Security lockout disabled.

Description: This is the secondary level access for security, typically recommended for setup personnel.

Column 4: L3 “Level 3 Access”

Selection: ON = Security lockout enabled; OFF = Security lockout disabled.

Description: This is the highest level of security. It is recommended that all the parameters be left “ON” for this level of security.

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ALARM



ALARM (System Alarm)

The alarm button can be pressed any time from any screen. When the alarm sounder and light have been activated by the Pulse due to an error and the alarm button is pressed, The Pulse will first turn off the alarm light and silence the sounder, then it will show the alarm screen.

The alarm screen is designed to view at-a-glance the alarm status for the entire system on a single screen.

There are two options to returning back to the normal screens. Pressing the function button marked MAIN will return the screen back to the MAIN screen and pressing GRAPH will return the screen to the Temperature Graph screen.

Alarm Error Explanation

OPEN TC (open thermocouple)

Problem: The thermocouple in the zone has been detected as open.

Action taken by Pulse:

1. Alarm light and sounder are turned on.
2. If Auto Comp has been turned on by the user in the Pulse control system:

and the zone has another zone that is similar in thermal properties that zone will be automatically SLAVED to the similar zone. (reference SLAVE function under Zone setup for more information).

and the zone does not have another zone that is similar in thermal properties (determined by the Pulse during the Startup Function) and the zone has achieved setpoint the zone's last average power will be applied to the load (forced manual mode).

For more information on Auto Comp reference the Auto Comp section, page 32 of this manual.

REV TC (reversed thermocouple)

Problem: The thermocouple in the zone was wired in reverse.

Action taken by Pulse: The Alarm light and sounder are turned on and REV TC is indicated on the alarm screen.

SHORT TC (shorted thermocouple)

Problem: The thermocouple in the zone has been detected as shorted.

Action taken by Pulse:

1. Alarm light and sounder are turned on.
2. If Auto Comp has been turned on in the Pulse control system:

and the zone has another zone that is similar in thermal properties that zone will be automatically SLAVED to the similar zone. (reference SLAVE function under Zone setup for more information).



and the zone does not have another zone that is similar in thermal properties (determined by the Pulse during the Startup Function) and the zone has achieved setpoint the zone's last average power will be applied to the load (forced manual mode).

For more information on Auto Comp reference the Auto Comp section, page 32 of this manual.

OPEN HTR (open heater)

Problem: The heater and / or fuse in the zone has been detected as open.

Action taken by Pulse:

1. Alarm light and sounder are turned on.
2. Power to the load has been shut off.

TRIAC SHRT (triac shorted)

Problem: A triac short was detected in the zone.

Action taken by Pulse:

Alarm light and sounder are turned on. The secondary cut-off relay opened its contacts – turning off power to the zone.

OVER TEMP (over alarm band)

Problem: An over temperature reading has been detected in the zone.

Action taken by the Pulse: Alarm light and sounder are turned on indicating the temperature has exceeded the alarm band setting (reference alarm band setting in this manual).

UNDR TEMP (under alarm band)

Problem: An under temperature reading has been detected in the zone.

Action taken by the Pulse: Alarm light and sounder are turned on indicating the temperature has exceeded the alarm band setting (reference alarm band setting in this manual).

OVER ABRT (over abort band)

Problem: An over temperature reading has been detected in the zone.

Action taken by the Pulse: Alarm light and sounder are turned on indicating the temperature has exceeded the abort band setting (reference abort band setting in this manual).

UNDR ABRT (under abort band)

Problem: An under temperature reading has been detected in the zone.

Action taken by the Pulse: Alarm light and sounder are turned on indicating the temperature has exceeded the abort band setting (reference abort band setting in this manual).

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The Pulse print function is capable of printing up to 5 reports used primarily for tracking of information produced by the Pulse.

The screen is organized in two basic sections:

Printing Errors: ON or OFF

When this function is turned on, as errors occur, they will be printed on the printer. This provides some history tracking of errors as they occur. Note: Printer needs to be hooked up to the Pulse as this is a real-time reporting feature.

Printing Reports: Select 1 of 4 report types

SETUP SHEET:

This is the first zone setup screen showing the zone, name, setpoint, mode and other basic information for all zones.

SETPOINT VS. ACTUAL:

Prints all zones setpoint versus actual temperature as a “snapshot” in a text format.

TEMPERATURE GRAPH:

Prints the temperature graph screen (reference temperature graph in this manual) as a “snapshot”.

POWER GRAPH:

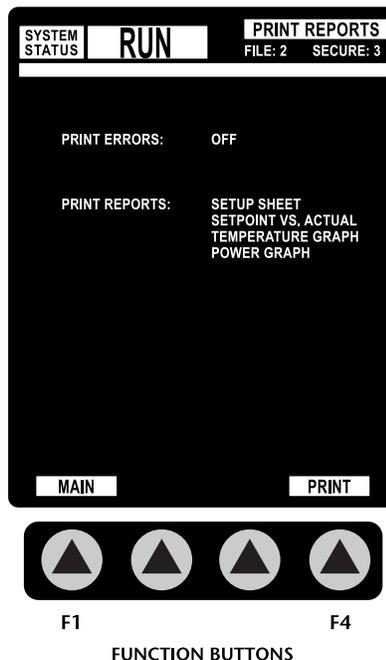
Prints the power graph screen (reference the power graph in this manual) as a “snapshot”.

PRINT REPORTS Function buttons:

F1 MAIN = Go to the MAIN screen.

F4 PRINT = Print the highlighted report in the PRINT REPORTS above.

Printer type: Is selected automatically - the output is capable of printing to a standard 24 pin IBM format or standard laser format.



HOW TO...

SHUTTING "OFF" THE ALARM



To shut off the alarm light and sounder press the alarm button. This will immediately silence the alarm and open the ALARM screen indicating the errors encountered. For more information about the ALARM screen reference the ALARM section of this manual. For more information on the errors shown on the ALARM screen reference the alarm error explanation of this manual.

SETTING UP MULTIPLE ZONES

STEP 1: SETTING ZONE NAME

The cursor should be located in the upper left corner of the display highlighting "Zone 1's" zone name (see *Figure A*). Enter the appropriate zone name and reference number for each zone that is going to be RUN using the (-) or (+) buttons. This ensures that "Even Soak" will run properly during system startup. Choose from the following name descriptions and number range:

Zone Name Descriptions:

- MNP = Primary Manifold
- MNS = Secondary Manifold
- CAV = Cavity or Drop
- SPR = Sprue
- USR = User Defined Zone

Name Ref. Number:

- 00 = From 00 to 99

NOTE: For more info on Main Display contents, reference the "?" (HELP) screen.

SYSTEM STATUS		STOP		MAIN DISPLAY			
				FILE: 1	SECURE: 3		
ZN	NAME	ACT	SET	PWR	AMP	MODE	SLV
01	CAV01	---	500F	---	---	OFF	
02	CAV02	---	500F	---	---	OFF	
03	CAV03	---	500F	---	---	OFF	
04	CAV04	---	500F	---	---	OFF	
05	CAV05	---	500F	---	---	OFF	
06	CAV06	---	500F	---	---	OFF	
07	CAV07	---	500F	---	---	OFF	
08	CAV08	---	500F	---	---	OFF	
09	CAV09	---	500F	---	---	OFF	
10	CAV10	---	500F	---	---	OFF	
11	CAV11	---	500F	---	---	OFF	
12	CAV12	---	500F	---	---	OFF	
13	MNP01	---	500F	---	---	OFF	
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							

Figure A

STEP 2: SETTING ZONE SETPOINT

Move your cursor to the SET (Setpoint) column (see *Figure A*). Enter the desired setpoint for every zone using the navigation buttons and the (-) or (+) buttons to select a temperature value (System setpoint default is 500°F).

Note: To change the temperature scale to Celsius: press "SYSTEM" button (Function button "F3") from MAIN display; navigate to "Temp Scale"; using the (-) or (+) buttons, change to the "C" setting; press "MAIN" button (Function button "F1") to return to the MAIN display and continue with setup.

STEP 3: SETTING ZONE MODE

Move the cursor to the MODE column (see *Figure A*). Enter the desired zone mode using the (-) or (+) buttons. Choose from the following zone mode descriptions:

Mode Descriptions:

- OFF = Zone's power is shut OFF to load
- MAN = Manual control or Open loop control mode
- AUTO = Automatic control or Closed loop control mode
- VIEW = Displays actual zone temperature only (ACT column see *Figure A*)
- SLAVE = Allows slaving of selected zone to another zone



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The following section assists in the most common troubleshooting questions found with the Pulse control system.

Module Troubleshooting

Reference the Module explanation section, page 6 of this manual for more information.

System Troubleshooting

Problem: Main screen does not come on.

Possible causes:

- Verify AC is applied to the Pulse control system.
- Verify all phases are present to the controller.
- Verify the Main Circuit breaker is in the ON position.
- Verify the CPU module is fully inserted into the Pulse cabinet.
- Ensure the display unit connector is fully inserted and locked in place.
- Ensure the display unit connector on the CPU module is fully inserted.

Problem: System does not Boost or Idle when I press the Boost or Idle button.

Possible cause: The global timers are not set under the SYSTEM SETUP screen (reference the systems setup screen for more information).

Problem: All zones show open thermocouple.

Possible cause:

Verify the T/C cable is plugged into the correct connector on the Pulse and on the hot runner system. Verify the T/C module is fully inserted and the locking pins are locked.

Problem: All zones show open heater.

Possible cause: Verify the Heater cable is plugged into the correct connector on the Pulse and on the hot runner system.

Problem: A zone shows an open heater but the heater is actually not open.

Possible cause:

Verify the power module is fully inserted into the Pulse cabinet. Check to see if the fuses are open for that zone.

Problem: A zone shows an open thermocouple but the thermocouple is not actually open.

Possible cause:

Verify the T/C module is fully inserted into the Pulse cabinet. Check the thermocouple fuse for that zone on the T/C module.

SPECIFICATIONS

GENERAL SPECIFICATIONS

Cabinet & Display Unit:	29"x 12"x 12" (736.6mm x 304.8mm x 304.8mm) Weight: 55 lbs
Mobile Rack system:	52.5"x 14"x 16" (1333.5mm x 357mm x 406.4mm) Weight: 40 lbs
Transformer kit dimensions:	52.5"x 14"x 16" (1333.5mm x 357mm x 406.4mm) Weight: 450 lbs

SYSTEM SPECIFICATIONS

Performance Specifications:

Auto/Manual Control Modes:	Time proportioning with zero cross
Temp Range:	Ambient to 999°F; Ambient to 800°C
Control Accuracy:	+/- 0.5°F (+/- 1°C) dependent on thermal dynamic properties
Temperature Stability:	+/- 0.5% of full scale value over ambient to 120°F
Calibration Accuracy:	Better than 0.2% of full scale
Cycle Time:	10 per second
Power Response Time:	Better than 0.5 sec
Reset Automatic:	Corrects reset at no more than +/- 2°F at all settings
Manual Range:	1% to 100%

Input Specifications:

Input Type:	Potentiometric
Input Impedance:	20 Megaohms
Input Protection:	Proprietary protection, diode clamp, RC, fusing
Input Amplifier Stability:	Greater than 0.02 F/F (0.01 C/C)
CMMR:	100db
Power Supply CMMR:	90db
T/C Type:	Type "J" or "K" grounded or ungrounded
External T/C Resistance:	High Z input
T/C Isolation:	Isolated by control circuitry and specialized fuse inputs
CJC:	Automatic, better than 0.02 F/F (0.01 C/C)

Output Specifications:

Voltage Power Capability:	20/30 Amps
Output Drive:	Triac w/zero cross
Output Protection:	20A fuses on I/O lines; 30A fuses on I/O lines
Transient Suppression:	dv/dt and transient pulse suppression
Power Line Isolation:	Optical and transformer isolation > 2500V



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WARRANTY

Fast Heat guarantees its Hot Runner Temperature Control products to be free of defects in materials and workmanship. If a unit should malfunction, it must be returned to the factory for evaluation. Upon examination by Fast Heat, if the unit is found to be defective, it will be repaired or replaced, at our option, at no charge. However, this warranty is void if the unit shows evidence of having been tampered with or has been abused, contaminated, improperly installed, or misapplied. This warranty does not cover abnormal wear and tear on lead wires caused by resins, electrical or non-electrical accessories.

SPECIFIC WARRANTY PERIODS:

Temperature Control Products:
90 Days from date of invoice - Service, Parts and Labor
2 Years from date of invoice - Parts Only

Hot Runner products must be used with a closed loop temperature controller with a bakeout feature designed for runnerless molding. This warranty does not cover electrical contact points or fuses.

LIABILITY

Fast Heat accepts no responsibility or liability for the APPLICATION by the customer of Hot Runner Temperature Controllers. The customer assumes this liability. Upon inspection, if our products meet our warranty requirements, the customer may be subject to a reasonable charge for troubleshooting, including travel.

There are no warranties, expressed or implied for Hot Runner Temperature Controllers except as stated herein. In no event shall Fast Heat be liable for consequential, incidental, or special damages. The buyer's sole remedy for any breach of this agreement by Fast Heat shall not exceed the purchase price paid by the buyer to Fast Heat.

All product specifications are subject to change without notification.



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