

IMPORTANT!
Read and Save These Instructions!

intelliPANEL™
SCR Power Control Panel
Setup Guide



Chromalox®
PRECISION HEAT AND CONTROL

Chromalox® intelliPANEL™ is a complete process temperature power control solution with “industry-best” price and performance. IntelliPANEL provides the user with an easy touch-screen interface, continuous built-in monitoring, scalability, and customization.

intelliPANEL™ specifications include:

- Color Touchscreen Operator Panel
- 8 Points of temperature monitoring
- Temperature and Alarm Display for all 8 Temperature Sensors
- 4 Control Modes: Single Loop, Temperature Differential, and 2 Cascade modes
- Temperature Range Selection of 0-250°, 0-500°, 0-1000°, 0-1500°, 0-2000°
- Programmable Setpoint Ramping
- Adjustable Deadband and HI-HI, HI, LO, & LO-LO Alarm Setpoints for each point
- Input Sensor Type, Engineering Unit, and Open Sensor Selection (in groups of 4)
- Ground Fault Alarm/Trip, Adjustable from 30 to 300 mA with Graphical Trending
- 4 Alarm Outputs, Programmable as either Normally Open or Normally closed
- Temperature and Discrete Alarm Mapping to any of the 4 Alarm Outputs
- 4 User Definable Discrete Interlocks – Including one with Time Adjustable Delay
- 20 Character Text Entry Identification for all Temperature Inputs and Interlocks
- 4 Levels of Security with User Defined Numeric Passwords
- Programmable Setpoint Entry Range Limits
- Programmable Open Sensor Protection
- Virtual Chart Recorder
- Alarm History Logging
- Time and Date Stamp on Alarms
- RS-422/485 MODBUS Configurable Network Communications
- Language Selection
- NEMA 12 Enclosure Construction
- Operating Environment: 32-120°F



We think you'll be satisfied with the high quality product Chromalox has shipped to you. If you have application questions, refer to the Engineering Resource section of our website at www.chromalox.com, to find the answer you're looking for, or call one of our application engineers at 1-888-996-9258 for personal assistance.

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Safety Precautions

Important Safeguards

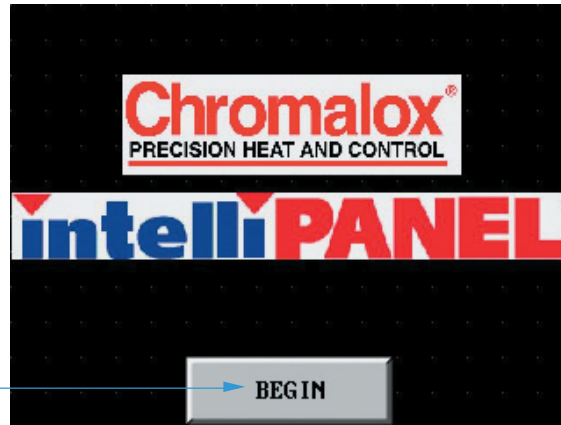


Throughout the intelliPANEL™ Setup Guide, these symbols will alert you to potential hazards. Safety precautions should always be followed to reduce the risk of fire, electrical shock, and injury to persons. Please read all instructions before operating your intelliPANEL™ Control Panel. To avoid electrical shock or injury, always remove power before servicing a circuit. Personnel working with or near high voltages should be familiar with modern methods of resuscitation. Contact an area supervisor or safety personnel for more information.

intelliPANEL™ Welcome Screen

intelliPANEL™ system provides users with an easy-to-use touchscreen interface. Getting into the system is as simple as touching the “Begin” button on the Welcome screen, as seen below.

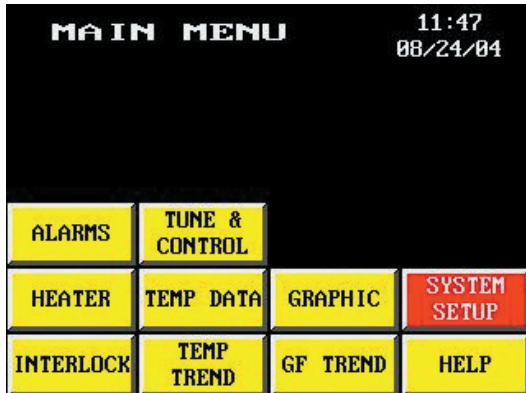
Press “Begin” on the touchscreen to enter the intelliPANEL™ system.



The “Begin” button takes the user to the Main Menu of intelliPANEL™, where the user can choose from several navigation buttons (displayed in yellow) which allow the user to setup the system, view alarm and interlock status, temperature and heater data, trend graphs, and access help menus.

intelliPANEL™ Main Menu

The Main Menu is where all the features and screens of the intelliPANEL system are accessed. The screens give the user the status of the system, alarm information, temperature data, trending, and the ability to setup the system.



Alarm – Displays alarm status and history

Tune/Control – Allows user to modify setpoint, change loop modes, adjust outputs and access the loop tuning screens. (This button is hidden when Remote Command Signal control mode is selected.)

Heater – Displays voltage, current, power, duty cycle, kilo-watt/hours, and resistance values. Unbalanced current alarm setpoint and indicators are also found on these screens.

Temp Data – Displays current temperature, high and low values, and allows reset of those values.

Graphic – Displays graphical picture of the heater and current temperatures.

System Setup – With the proper password, this button displays the System Setup Menu.

Interlock – Displays interlock status information.

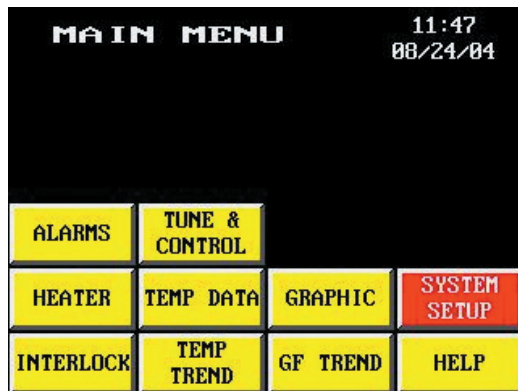
Temp Trend – Displays the 6-pen temperature trend chart.

GF Trend – Selects the Ground Fault Leakage Current chart recorder.

Help – Takes the user to the Help Menu which contains troubleshooting guides, product information, tuning help, spare parts list, preventive maintenance guides, and Chromalox contact information.

I. System Setup Menu

The System Setup Menu allows the user to access all of the parameters for the operation of the system including; input selection, control mode, setpoint limits, setpoint ramping, alarm settings, communications settings, and set the range for trend charts. Settings made on the System Setup screens provide operating ranges for the entire system, and define the parameters in which the system will operate. Please use caution when applying changes to the setup parameters. To begin the setup procedure, press the “System Setup” button on the Main Menu.



1. Press the “System Setup” button on the touchscreen.

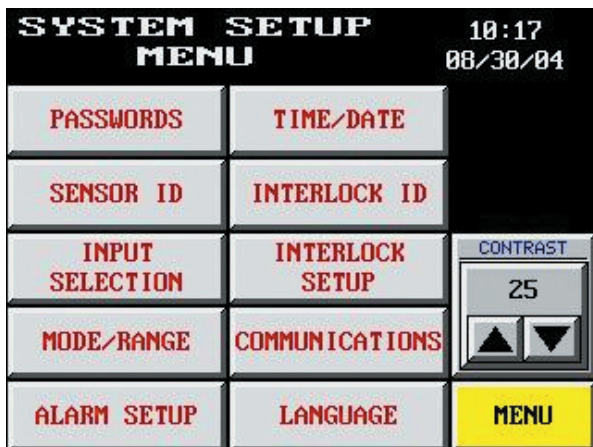
Security

intelliPANEL™ has built-in security settings that require a password for access to the System Setup screen. When accessing protected areas a keypad is displayed, requiring the user to enter a password. The factory default setting for the Manager’s password is 1234.

2. Use the touchscreen keypad to enter Manager’s password. (Factory preset Manager’s password: 1234)
3. Press “ENTER” display the System Setup Menu.



Upon entering the correct password, the user is permitted to access the System Setup Menu.



Setting User Passwords

Pressing the “Passwords” button on the System Setup Menu displays a numeric keypad for password entry. The Manager’s password is required to open the Passwords screen from the System Setup Menu.

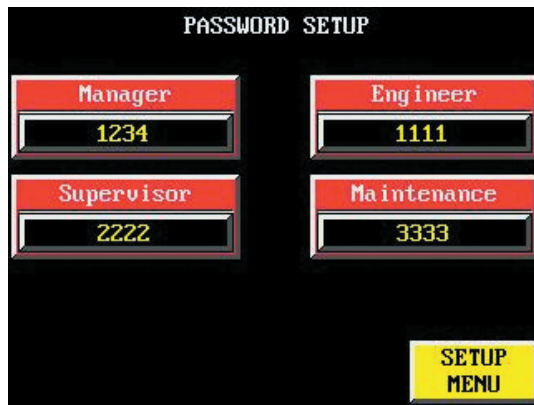
1. Press the “Passwords” button



Enter the Manager’s password and press the ENTER key to access the Password Setup feature.

Once the Manager’s password is entered, the user is given access to the password setup screen. From there, the four security level passwords can be changed to user defined numeric values. Each password can be assigned a value between 0 and 65535.

Note: If passwords are changed from the default values, the new values should be recorded and kept in a safe location. Passwords that are set to “0” allow unlimited access to that security level’s features



← 3. Press the numeric entry field to modify the selected password.

Any time a password is required to gain access to a particular feature, a numeric keypad is displayed that reads “ENTER SECURITY CODE”. Each level of security has different access rights within the system. These access rights are outlined below.

Manager Level: Allows access to all features in the intelliPANEL system *including* Password Setup.

Engineer Level: Allows access to all features in the intelliPANEL system *except* Password Setup.

Supervisor Level: Allows access to all features on the Main Menu *except* the System Setup Menu and Loop Tuning features. Supervisor level access or greater is required to activate the CLEAR and CLEAR ALL command buttons on the Alarm History and Alarm Count Screens. (See page 31, Section II, Alarm Screens - Alarm History)

Maintenance Level: Allows access to all features on the Main Menu except the System Setup Menu. Maintenance users are allowed access to all Loop Tuning features and may reset alarms, but cannot clear them.

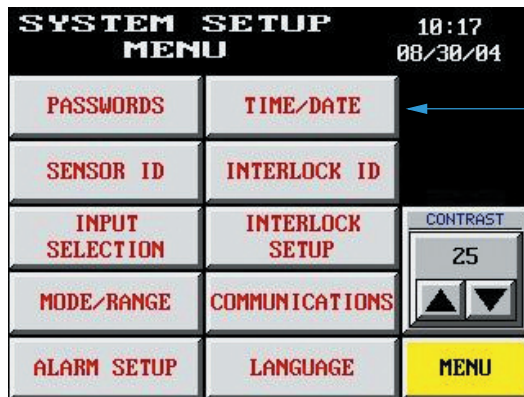
NOTE: A security code is not required to view or control any feature on the screens from the Main Menu other than the System Setup Menu and the Tuning features found on the Tune/Control screen. (See page 41, Section III, Loop Tuning)



IMPORTANT: To prevent unauthorized changes to system setup parameters, the user should go back to a screen that is not password protected such as the Main Menu prior to leaving the system.

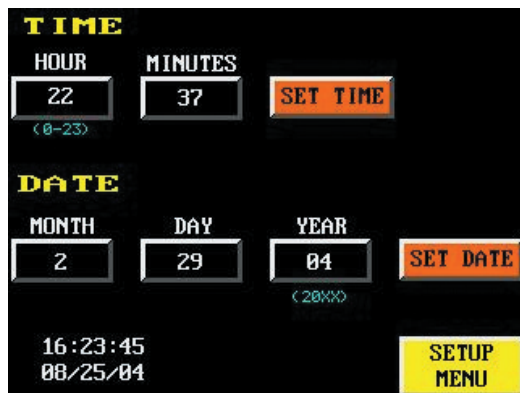
Setting Time and Date

From the System Setup Menu, press the “Time/Date” button at the top of the second column. This will open the screen for time and date entry.



1. Press the “TIME/DATE” button to open the time and date entry screen.

The current time and date are shown in the lower-left corner of the screen. The clock is in 24-hour format. To modify the time, press the value entry field labeled “Hour” and enter the current hour value (0-23) on the provided keypad. Next enter the current minutes. When both hours and minutes are correct, press the “Set Time” button and the time in the lower left will change to the adjusted values in the setting fields.



2. Enter hours and minutes followed by the “Set Time” button.

3. Enter month, day and year followed by the “Set Date” button.

Adjusting the date is done in a similar manner. First enter the numeric value for the month. It is important to set the correct month first since this determines the highest value that may be entered for the day. intelliPANEL recognizes the month entry and limits the day setting according to the number of days in that month. Leap years are already taken into account for the month of February so that a 29th day can be entered based on the year. Once the correct values are entered for month, day, and year, press the “Set Date” button. The entered values will be reflected in the date found in the lower-left corner of the screen.

Note: It is necessary to enter the year first when manually entering February 29th.

Sensor Identification Entry

All eight temperature inputs have text identification fields that allow the user to name the sensors for easier recognition. These character fields are each 20 characters long and will accept alphanumeric data. To enter the identification text, go to the System Setup Menu and press the button in the first column labeled “Sensor ID”.

1. Press the Sensor ID button on the touchscreen.



This will display the first sensor identification screen. From this screen the text identification for inputs 1-4 can be entered. Pressing the text entry field brings up the alphanumeric keypad for entering the text identifier.



2. Press the text entry field to display the keypad.

Sensor identifiers can be up to twenty (20) alphanumeric characters in length in either upper or lower case.

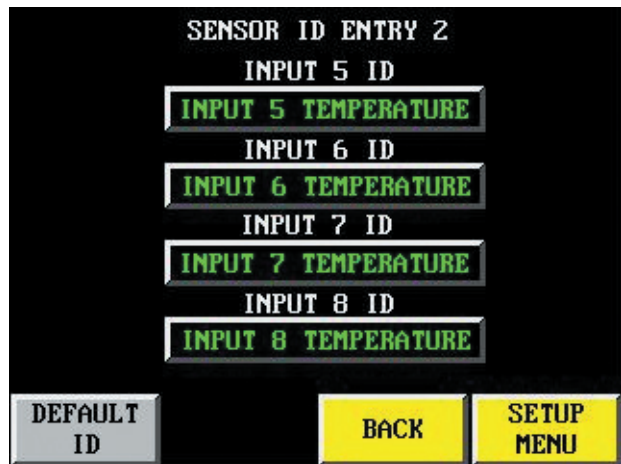
3. Use the keypad to enter the identifier. The results are displayed in the current edits window.

REACTOR TEMP						CAN	ENT
A	B	C	D	E	F	G	H
I	J	K	L	M	N	O	P
Q	R	S	T	U	V	W	X
Y	Z	1	2	3	4	CAP	SP
5	6	7	8	9	0	DEL	CLR

ENT – Enter key saves current edits to the selected identifier.
 CAN – Cancels current edits and closes the keypad.

CAP – Toggles upper / lower case.
 SP – Space Key.

DEL – Deletes last character.
 CLR – Clears all characters.



4. Press the “Next” button to open the screen for entry of the identifiers for sensors 5-8.

IMPORTANT: Pressing the ANY “Default ID” button will OVERWRITE ALL text identifiers in the system with the factory default shown in the screen prints of this manual. This includes Sensor Inputs 1-8, Interlocks 1-4 and both Discrete Alarm Inputs.

Interlock Identification Entry

Each of the 4 interlocks has a text identification field that allows the user to name the discrete interlocks. These character fields are each 16 characters long and will accept alphanumeric data. To enter the identification text, go to the System Setup Menu and press the button labeled “Interlock ID”.



1. Press the Interlock ID button on the touchscreen.

This will display the interlock identification screen. From this screen the text identification for the four interlocks can be entered. Pressing the text entry field brings up the alphanumeric keypad for entering the text identifier.



2. Press the text entry field to display keypad.



IMPORTANT: Pressing the ANY “Default ID” button will **OVERWRITE ALL** text identifiers in the system with the factory default shown in the screen prints of this manual. This includes Sensor Inputs 1-8, Interlocks 1-4 and both Discrete Alarm Inputs.

Interlock identifiers can be up to sixteen (16) alphanumeric characters in length in either upper or lower case.

- Use the keypad to enter the identifier. The results are displayed in the current edits window.

The diagram shows a keypad with a display at the top. The display shows the text 'REACTOR TEMP'. Below the display is a grid of keys. The keys are arranged in 5 rows and 8 columns. The first row contains 'CAN' and 'ENT'. The second row contains 'A', 'B', 'C', 'D', 'E', 'F', 'G', 'H'. The third row contains 'I', 'J', 'K', 'L', 'M', 'N', 'O', 'P'. The fourth row contains 'Q', 'R', 'S', 'T', 'U', 'V', 'W', 'X'. The fifth row contains 'Y', 'Z', '1', '2', '3', '4', 'CAP', 'SP'. The sixth row contains '5', '6', '7', '8', '9', '0', 'DEL', 'CLR'. A blue arrow points from the text above to the 'ENT' key.

REACTOR TEMP						CAN	ENT
A	B	C	D	E	F	G	H
I	J	K	L	M	N	O	P
Q	R	S	T	U	V	W	X
Y	Z	1	2	3	4	CAP	SP
5	6	7	8	9	0	DEL	CLR

- ← ENT – Enter key saves current edits to the selected identifier.
- ← CAN – Cancels current edits and closes the keypad.
- ← CAP – Toggles upper / lower case.
- ← SP – Space Key.
- ← DEL – Deletes last character.
- ← CLR – Clears all characters.

Input Selection

Input selection consists of three parts; choosing the input type, engineering unit selection, and open sensor setup. To prepare the sensor inputs, go to the System Setup Menu and press the button in the first column labeled “Input Selection”. This will open the first Input Selection screen which allows the setup of the first group of sensors (Inputs 1-4).

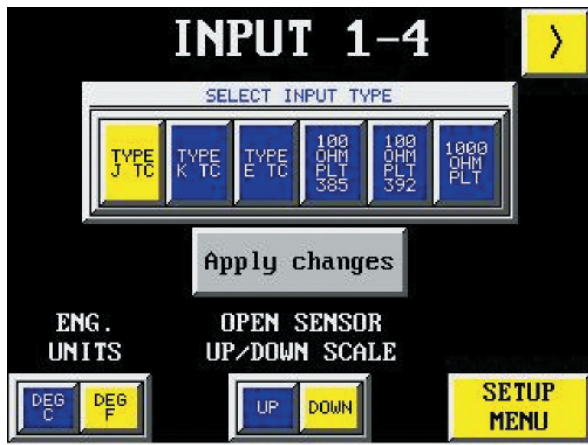
- “Input Selection” button and enter the security code when requested

The screenshot shows the 'SYSTEM SETUP MENU' screen. The title 'SYSTEM SETUP MENU' is at the top left, and the time '16:05' and date '06/07/04' are at the top right. The screen is divided into several sections. The main menu has buttons for 'PASSWORDS', 'TIME/DATE', 'SENSOR ID', 'INTERLOCK ID', 'INPUT SELECTION', 'INTERLOCK SETUP', 'MODE/RANGE', 'COMMUNICATIONS', 'ALARM SETUP', 'LANGUAGE', and 'MENU'. The 'INPUT SELECTION' button is highlighted in yellow. To the right of the main menu is a 'CONTRAST' section with a value of '25' and two arrow buttons.

SYSTEM SETUP MENU		16:05 06/07/04
PASSWORDS	TIME/DATE	
SENSOR ID	INTERLOCK ID	
INPUT SELECTION	INTERLOCK SETUP	CONTRAST 25
MODE/RANGE	COMMUNICATIONS	▲ ▼
ALARM SETUP	LANGUAGE	MENU

Sensor Input Type

Temperature inputs in the IntelliPANEL™ system are configured in groups of four. Thermocouple inputs can be configured as Type J, K, or E thermocouple. RTD inputs can be configured as either 100 Ω Platinum 385 or 100 Ω Platinum 392, or 1000 Ω. The exact configuration will depend on the IntelliPANEL™ option purchased and the sensors being installed. To setup inputs 1-4, press the appropriate button for the type of sensor being used. Yellow indicates the type selected.



2. Press the appropriate button for the correct module and type of sensor being used.

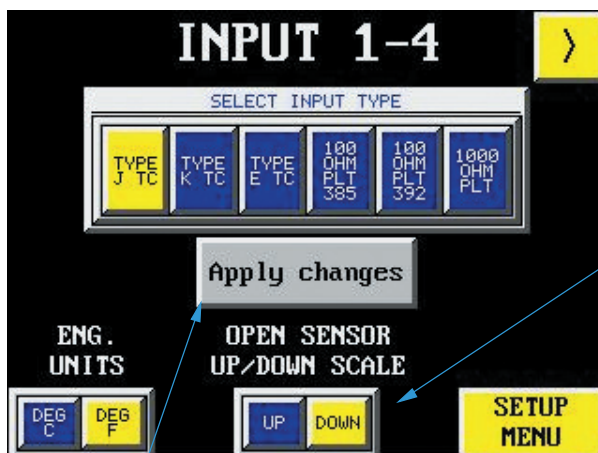
3. Select Fahrenheit (F) or Celsius (C) for temperature display units. The selection is universally applied to all eight sensors.

Engineering Unit Selection

The next step is to select the desired engineering units for display. The intelliPANEL™ system supports both Celsius and Fahrenheit temperatures, and will automatically convert from °C to °F and vice versa if the temperature units are changed. (This setting is universally applied to all eight sensor inputs.)

Open Sensor Protection

Temperature values can be set to read either up scale or down scale on sensor burnout. Press the button that represents the direction temperature values should go when an open sensor is detected. Once the settings have been made, press the “Apply Changes” button. This writes the user selections to the controller. If the “Apply Changes” button is not pressed, no changes are made to the configuration.



Press the “>” button to go to the setup screen for Inputs 5-8.

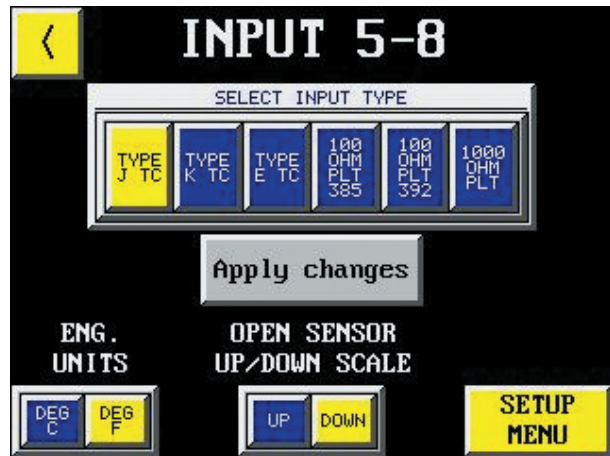
4. For up scale temperature readings in the event an open sensor is detected press “UP”. Pressing “DOWN” will yield a down scale reading upon burnout.

5. After setting the parameters, press the “Apply Changes” button to write the changes to the controller.

Next, press the “>” button to open the setup screen for Inputs 5-8. Follow the same procedure for the configuration of the second group of sensors. If the “Apply Changes” button is not pressed, no changes are made to the configuration. To return to the Setup Menu, press the “Setup Menu” button.

Pressing the “<” button returns the user to the setup screen for Inputs 1-4.

Set the parameters and press the “Apply Changes” button to write the configuration data to the controller.

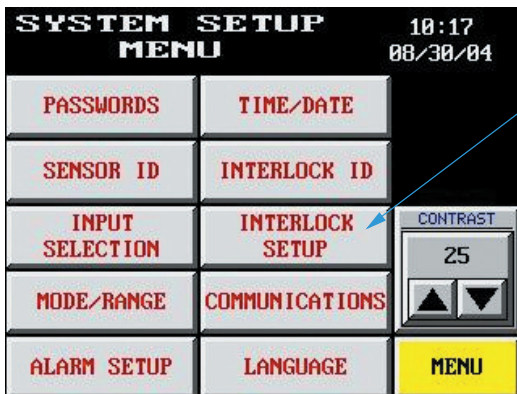


Press the “Setup Menu” button to return to the System Setup Menu.

IMPORTANT: Incorrect setup of the input sensors can cause injury to personnel or equipment damage due to errors in temperature readings. Verify that you are changing the right group of inputs prior to applying changes and that changes match the sensor type used on your system.

Interlock Setup

From the System Setup Menu, press the button labeled “Interlock Setup”.



1. Press the “Interlock Setup” button to open the interlock setup screen.

There are 4 user-definable interlocks in the IntelliPANEL™ system. Three of the interlocks are immediate acting and one can be setup with a time delay. Each can be individually configured to accept an open or closed contact for activation. Any interlock that is not being used can be disabled by pressing the corresponding button in the “Enabled” column. Text identifiers entered by users are displayed for easier recognition. (See page 13, Section I, Interlock Identification Text Entry)

2. Pressing the “Active State” buttons toggle the selection between Open and Closed.

INTERLOCK SETUP

ACTIVE STATE - Contacts
Open/Closed

	Open	Closed	ENABLED
FLOW	Closed	YES	Delay Time (Seconds)
PRESSURE	Open	NO	
TIME DELAY	Closed	YES	
SPARE	Open	YES	
			15.0
			SETUP MENU

3. Pressing the buttons in the “Enabled” Column toggles the selection between “Yes” (enabled) and “No” (disabled). Disable interlocks that are not being used.

4. Pressing the numeric entry field displays a keypad for entry of the interlock delay time in seconds. This can be any value between 0.0 and 999.9 seconds. One decimal place is implied.

IMPORTANT: Incorrect setup of the interlocks may prevent the system from starting or cause an unexpected shutdown. Verify that the active state chosen matches the inputs wired to the system.

Mode and Range Settings

The IntelliPANEL™ controller has five control modes available: Single Loop – Outlet; Single Loop – Differential Outlet/Inlet; Cascade – Outlet to Sheath; Cascade – Input 5 to Sheath; and Remote Command Signal. There are five user selectable temperature ranges; 0-250°F, 0-500°F, 0-1000°F, 0-1500°F, and 0-2000°F. Minimum and maximum setpoint limits can be set and setpoint ramping is configurable. To access the setup of these features, go to the System Setup Menu and press the “Mode/Range” button.

1. Press the “Mode/Range” button to access the Control Mode, Range Selection, Setpoint Limits and Setpoint Ramping features.

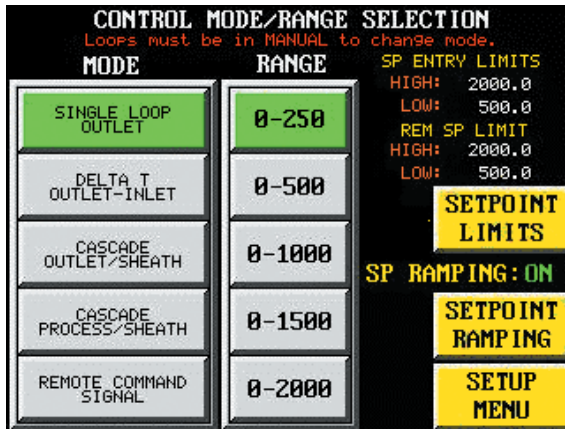
SYSTEM SETUP MENU

16:05
06/07/04

PASSWORDS	TIME/DATE	CONTRAST 25 ▲ ▼
SENSOR ID	INTERLOCK ID	
INPUT SELECTION	INTERLOCK SETUP	
MODE/RANGE	COMMUNICATIONS	
ALARM SETUP	LANGUAGE	
		MENU

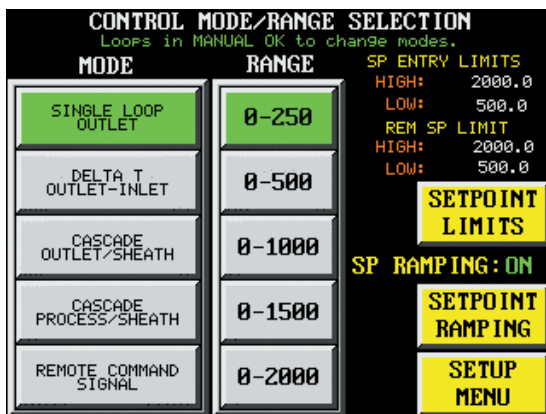
Control Mode

With the Control Mode/Range Selection Screen displayed, select one of the four control modes. **Single Loop Outlet** mode controls the Outlet temperature (Input 2) with a single PID loop. **Delta T Outlet-Inlet** (Input 2 minus Input 1) mode uses a single PID controller to maintain a constant differential temperature between the Outlet and Inlet temperatures. **Cascade Outlet/Sheath** mode uses the outlet temperature loop as the major cascaded to the sheath temperature (Input 4) minor loop. The **Cascade Process/Sheath** mode uses process temperature (Input 5) loop as the major cascaded to the sheath temperature (Input 4) minor loop. **Remote Command Signal** mode allows a 4-20mA signal from an external source (i.e.: DCS, PLC, etc.) to be passed through to the SCR controller.



← Loop mode warning message. Control mode cannot be changed.

IMPORTANT: The Control Mode Selection CANNOT be changed without both loops being in Manual mode. If either of the loops is not in manual mode, the loop mode warning message at the top of the screen will flash red.

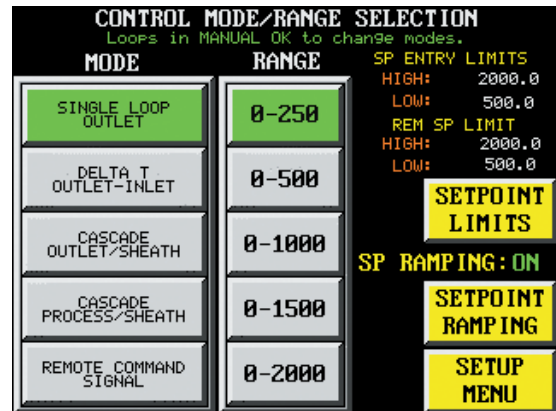


← Loops are in Manual mode. The control mode can now be changed.

Temperature Range

Selection of the temperature range will set up the correct span for the trend charts discussed later. (See page 41, Section II, Temperature Trending) Choose the most appropriate temperature range for your process by pressing the button for the range that most closely represents your process.

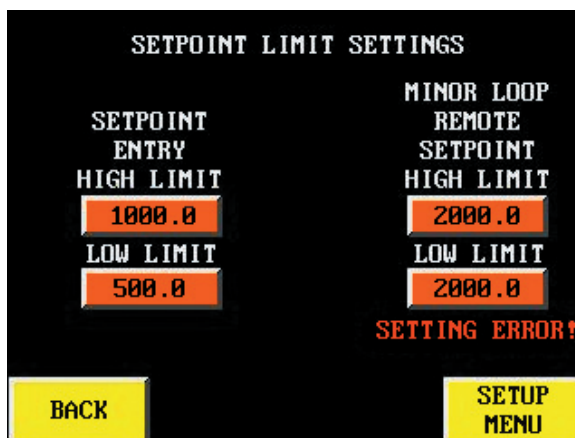
2. Press the desired “Mode” button to set the control mode. Single Loop - Outlet control is currently selected.



3. Select the temperature range by pressing the appropriate button in the second column. As shown, the 0-250°F range is selected.

Setpoint High and Low Limits

To access the Setpoint Limit setup screen, press the “Setpoint Limits” button on the Control Mode/Range Selection screen. This will open the Setpoint Limit Setting screen.



4. Press the numeric entry field for the High or Low Setpoint Limits and enter the values using the numeric keypad. If the same values are entered for the High and the Low a “Setting Error!” message will be displayed.

There are two sets of limits to be set. The “Setpoint Entry” limits on the left are the limits that control the high and low values that can be entered by the operator. They apply to the operator entered setpoints for single loop, differential, and both the major and minor cascade loops. The “Minor Loop Remote Setpoint” limits are used to scale the 0-100% output of the Major loop for use as the temperature setpoint of the Minor loop. For example, if the high limit for the remote setpoint is set to 2000° and the low limit is set to 500°, the setpoint of the minor loop will have a total range of 1500°. When the minor loop is in cascade mode and the major loop’s output is 50% the remote setpoint will be 1250°.

$$\text{Remote Setpoint} = (2000 - 500) \times 0.50 + 500 = 1250^\circ$$

To set a limit, press the corresponding numeric entry field and enter the new value using the keypad provided. If the high limit and the low limit are set to the same values, a “Setting Error!” message will be displayed. To reset the error, correct the limit settings. If the high limit is set to a value that is lower than the low limit, the new value will not be accepted and the high limit will revert to the previously entered high limit. If the low limit is set to a value that is higher than the high limit, the low limit will revert to the previously entered value. These fields are limited by the engineering units chosen on the Input Selection screen, 0-1250° when °C is selected and 32-2000° when °F is selected.

Setpoint Ramping

The unique Setpoint Ramping feature of the intelliPANEL™ system allows the user to set up a ramp rate in degrees/hour for the setpoint. When enabled, the setpoint that is fed to the controller will ramp from the current temperature to the entered setpoint at the rate specified. This feature can also be disabled allowing the loop control to reach setpoint at a rate based solely on the PID tuning values entered for the loop. To access the Setpoint Ramping setup screen press the “Setpoint Ramping” button on the Control Mode/Range Selection screen.

The screenshot shows the 'CONTROL MODE/RANGE SELECTION' screen. It features a table of control modes and their corresponding ranges, along with setpoint limits and a status indicator for Setpoint Ramping.

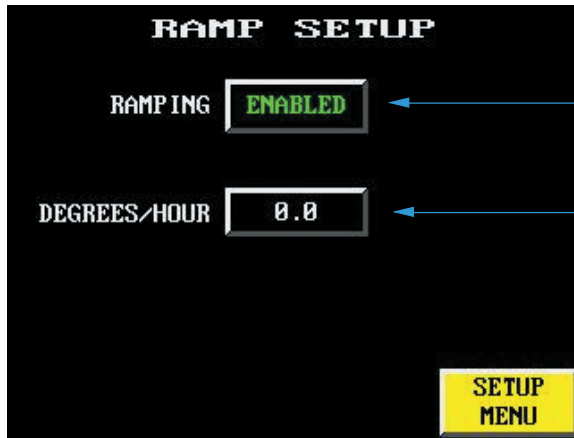
MODE	RANGE	SP ENTRY LIMITS
SINGLE LOOP OUTLET	0-250	HIGH: 2000.0 LOW: 500.0
DELTA T OUTLET-INLET	0-500	
CASCADE OUTLET/SHEATH	0-1000	REM SP LIMIT HIGH: 2000.0 LOW: 500.0
CASCADE PROCESS/SHEATH	0-1500	
REMOTE COMMAND SIGNAL	0-2000	

Below the table, there are three yellow buttons: 'SETPOINT LIMITS', 'SETPOINT RAMPING', and 'SETUP MENU'. The 'SETPOINT RAMPING' button is highlighted with a yellow background and an arrow pointing to it from a text box. The status indicator 'SP RAMPING: ON' is also visible.

Status indicator displays ON/OFF status of the Setpoint Ramping feature.

1. Press the “Setpoint Ramping” button to open the Setpoint Ramping Setup Screen.

This will open the Ramp Setup screen. Pressing the button to the right of the word “Ramping” toggles the setpoint ramp On (Enabled) and Off (Disabled). Pressing the numeric entry field will open a keypad for entry of the ramp rate in degrees/hr.

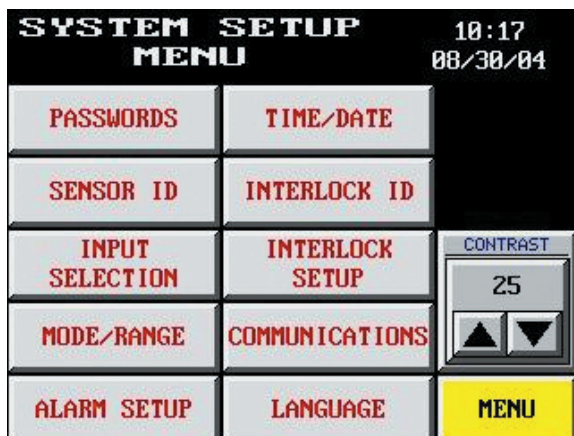


2. Pressing the “Ramping” button toggles the Setpoint Ramping feature On (Enabled) and Off (Disabled). The button indicates the current status of the setpoint ramping feature.
3. Pressing the numeric entry field will display a keypad for entering the ramp rate in degrees/hr.
4. Press here to return to the System Setup Menu when done.

Applying Communication Settings

The IntelliPANEL™ system can be setup and monitored by connecting it with a personal computer, PLC or DCS. IntelliPANEL™ communications can be configured for either RS-422 or RS-485 Modbus communications protocol and operates as a slave on the network. Baud Rate, Parity, Stop Bits, and Station Address must be set in accordance with the type of software/network being used. We suggest you check with the Information Technology professionals at your facility regarding the type of hardware and communications settings your network hardware requires. To access the communications settings, press the “Communications” button on the System Setup screen.

NOTE: Access to this screen requires either the Manager’s or the Engineer’s password.



1. Press the “Communications” button and enter the Manager’s or the Engineer’s password to open the Communications Setup screen.

This will open the Communications screen. From here the baud rate, RTS values, parity, number of stop bits, and mode can be set.* Current selections are highlighted in yellow.

2. Set the required baud rate. → BAUD RATE (2400, 4800, 9600, 19200, 38400)

3. Select the values for RTS On and Off delays. → ON RTS DELAY (5ms, 10ms, 20ms) and OFF (2ms, 5ms, 10ms, 20ms)

4. Choose none, odd, or even parity. → PARITY (NONE, ODD, EVEN)

5. Select the number of stop bits. → STOP BITS (1, 2)

6. Set the communications mode. → MODE (RS-422, RS-485)

7. Set the slave address for the IntelliPANEL. → ADDRESS (1)

Buttons: UPDATE PORT 2, SETUP MENU

The final step to complete the communications configuration is to press the “Update Port 2”. The selected communication values are not written to the controller until the “Update Port 2” button is pressed. To leave this screen without saving the selections to the controller, press the “Setup Menu” button. You will be returned to the System Setup Menu.

*For a complete list of the communicated variables and their MODBUS™ addresses, refer to the Appendix in the back of this manual.

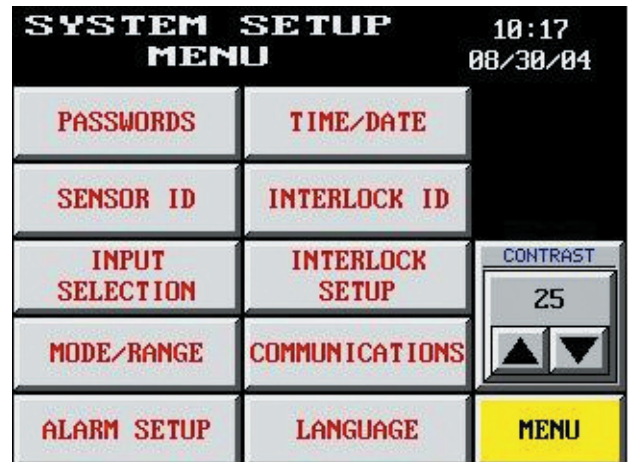
8. Press the “Update Port 2” button to save the selections to the controller. → UPDATE PORT 2

9. Press the “Setup Menu” to exit without saving or when finished with communications setup. This will open the System Setup Menu. → SETUP MENU

Alarm Setup

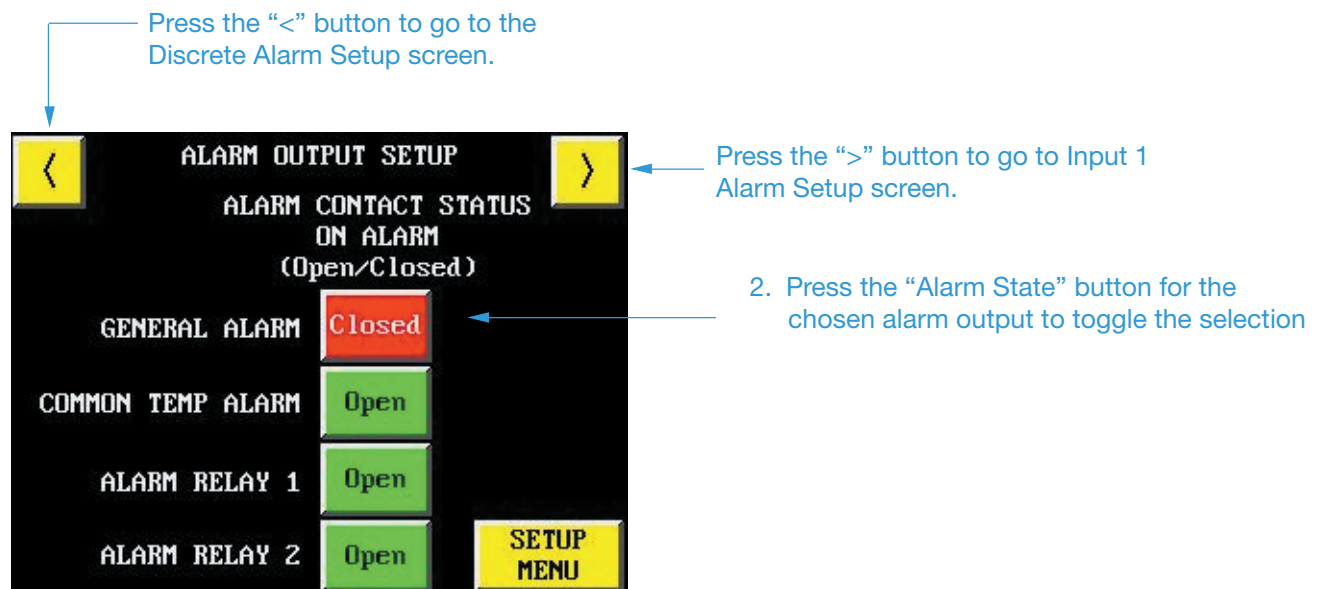
Alarm Outputs

The intelliPANEL™ system has four configurable alarm outputs. These alarm outputs can be set up as either normally open or normally closed. The alarm outputs are referenced as General Alarm, Common Temperature Alarm, Alarm Relay 1, and Alarm Relay 2. From the System Setup Menu, press the “Alarm Setup” button to access the setup screens.



1. Press the “Alarm Setup” button to access the first alarm setup screen.

The first screen allows the user to set up the alarm outputs. Each output has a corresponding button for the selection of the output state. Pressing an “Alarm State” button toggles the selection between open and closed and the selection is indicated by the button’s text. When “Open” is selected, the contact will normally be closed. When any alarm condition is detected the contact will open. When “Closed” is selected, the contact will normally be open. When an alarm condition is detected the contact will close. Pressing the “<” and “>” buttons takes the user through the alarm setup screens.



Low Battery Alarm Output:

The memory in the CPU is protected by a battery backup. When the battery is low, output contact Y17 is closed and the alarm is displayed in the alarm history. This alarm can only be reset by replacing the battery. See page A.4 in the Appendix for battery replacement instructions.



WARNING: If the CPU has been without power for more than ten days with a low battery the system configuration data may have to be reloaded.

Temperature Alarms

The intelliPANEL™ system has the ability to monitor up to 8 temperature inputs for any one of four conditions: HI-HI, HI, LO, and LO-LO alarms. Additionally, each alarm can be programmed as either latching or non-latching, and can be mapped to any or all of the alarm outputs. From the System Setup Menu press the “Alarm Setup” button. Then, from the Alarm Output Setup screen press the “>” button in the upper right corner. This will open the first alarm setup screen for Input 1.

To set the alarm setpoints, press the numeric entry field adjacent to the alarm description. Using the provided keypad, enter the alarm setpoint for the chosen alarm and press enter. The Deadband is a common value per input channel that sets the amount below (HI & HI-HI) or above (LO & LO-LO) the alarm point the temperature must reach for the alarm to clear. Enter the Deadband following the same procedure as the alarm setpoints.

Press the “<” button to go back to the Alarm Output Setup screen.

DEAD BAND	10.0	DEG. C	LATCHING
Hi Hi	1800.0	ON	SETPOINT ERROR
Hi	1750.0	OFF	2. Press the “Latching” Button to toggle between latching and non-latching.
Lo	1500.0	OFF	3. Press “More” to complete the alarm setup for the currently selected input.
Lo Lo	1450.0	ON	MORE
			SETUP MENU

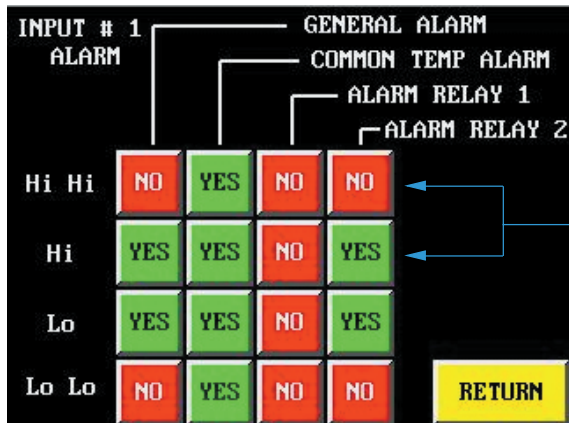
1. Enter the Deadband and alarm setpoints by pressing the numeric entry fields.

Press the “>” button to go forward to the next Alarm Setup Screen.

The setpoint entry error indicator flashes red if an entry error has been detected.

Alarm setpoints must maintain the relationship of HI-HI>HI>LO>LO-LO. If an entry causes this relationship to no longer be true, the setpoint entry error indicator will change from green “Setpoint OK” to flashing red “Setpoint Error”. To correct the error, simply modify the setpoints to make the relationship true again.

Pressing the “More” button opens the second alarm setup screen for the currently selected input. This screen is used to map the selected alarms to the alarm outputs. The temperature alarms are listed on the left and the alarm outputs are listed across the top. Setting an alarm to “Yes” will cause that alarm to be mapped to the selected alarm output. A selection of “No” will remove it. For instance, in the example below, Input 1’s HI-HI and LO-LO alarms will not be sent to the General Alarm output, but both the HI and the LO will be sent.

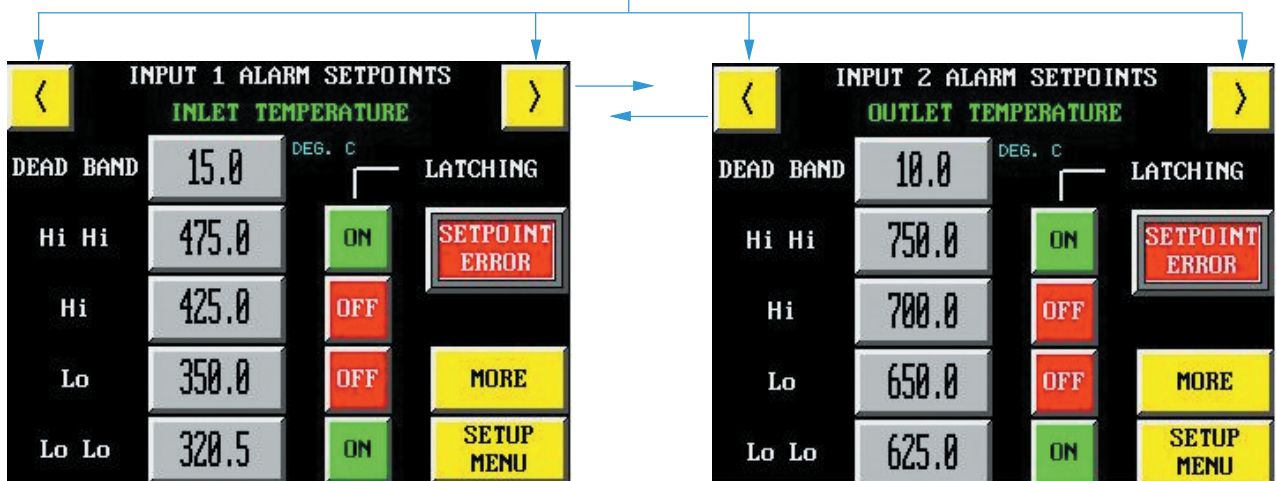


4. Press the appropriate alarm buttons to toggle their mapping to the alarm outputs.

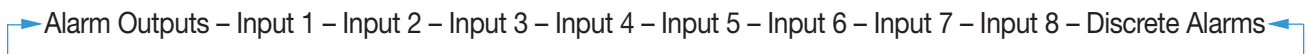
5. When finished with this portion of the alarm setup, press the return button.

Press the “Return” button when you are satisfied with the alarm mapping. This will reopen the Alarm Setup screen for the selected input. Press the “>” button in the upper right hand corner of the display to proceed to the Alarm Setpoint Setup screen for Input 2. Using this procedure, continue to setup the temperature alarms for Inputs 2-8.

Pressing the “>” and “<” buttons will scroll forward and backward through the alarm setup screens.

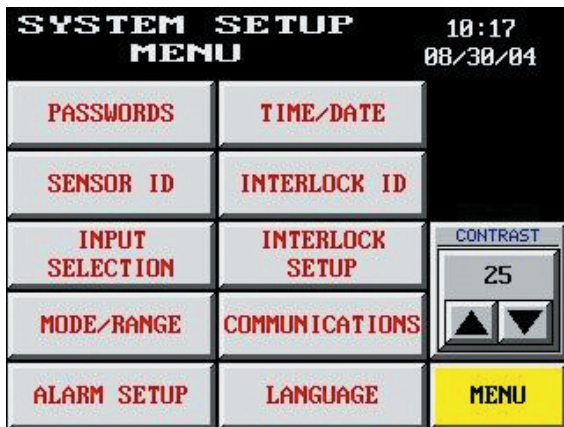


The “<” and “>” buttons scroll through the setup screens in a loop as shown below:

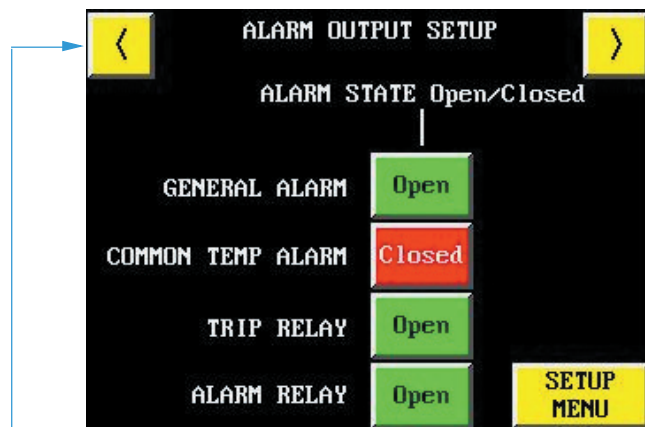


Discrete Alarms

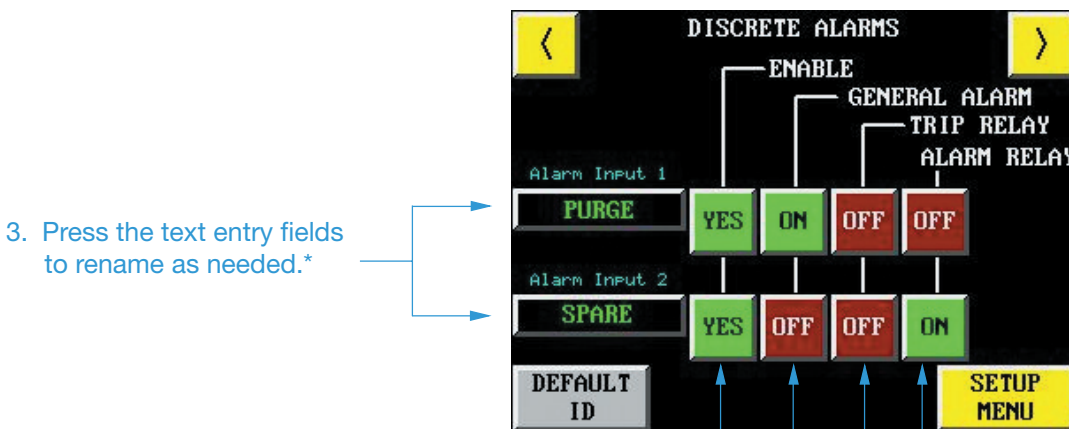
Two discrete alarm inputs are available on the IntelliPANEL™ system. Alarm Input 1 is predefined as a purge alarm and is provided for use on systems with the cabinet purge option. If the purge option is not installed, the alarm input can be setup as a user defined alarm input. Alarm Input 2 is labeled as “Spare” and is available for user defined alarming. The alarms can each be renamed (10 characters) to suit the user’s preference. Both alarms have to be enabled to function and can be mapped to the General Alarm, Alarm Relay 1 or Alarm Relay 2. These two alarm inputs accept normally closed inputs that open on alarm. To access the Discrete Alarm Setup screen from the System Setup Menu press the “Alarm Setup” button. This will open the Alarm Output screen. From there press the “<” button and the Discrete Alarms setup screen will open. This screen can also be accessed from the Input 8 Alarm Setpoint setup screen by pressing the “>” button.



1. Press the “Alarm Setup” button on the System Setup Menu.



2. Press the “>” button on the Alarm Output screen.



3. Press the text entry fields to rename as needed.*

4. Pressing the “Enable” button toggles the chosen alarm enable between YES and NO.

5. Select the alarm outputs to be associated with the chosen alarm input.

***Note:** When the discrete alarms are displayed in the Alarm History, the entry is listed as “Alarm Input 1” and “Alarm Input 2” regardless of the names entered here.

Language Selection

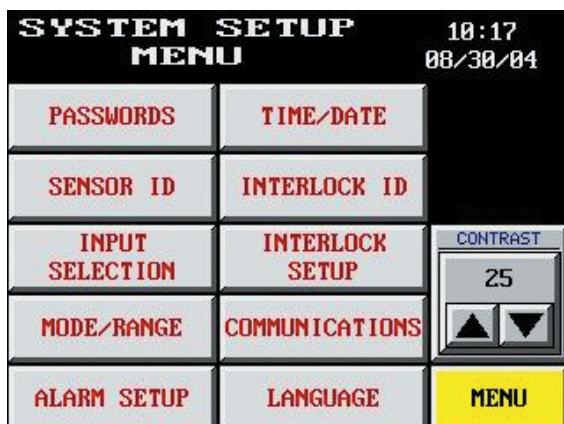
The intelliPANEL™ system can be configured for display in English, Spanish, Italian, French, German, Portuguese, Italian, Dutch, French, or Norwegian.



← Press the appropriate button for the desired language. The currently selected language is indicated at the bottom of the screen.

Setting the Display Brightness/Contrast

The intelliPANEL™ touchscreen display contrast and brightness can be adjusted to compensate for environmental lighting conditions. This is accomplished from the System Setup Menu. The contrast adjust is located directly above the “Menu” button on the right side. The value range for contrast is 0-32 with 0 being the lightest setting and 32 the darkest. Each touch of the up arrow button increases the value and touching the down arrow button decreases it.

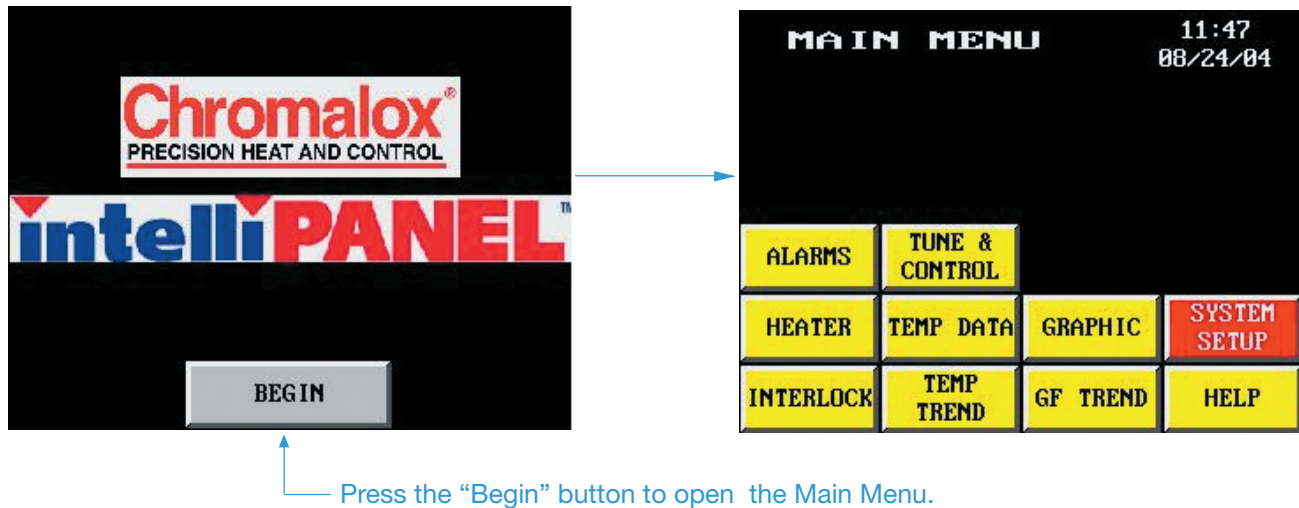


← Touch the up or down arrow button to adjust the display contrast. Up is darker and down is lighter.

II. Operating the intelliPANEL™

Once the intelliPANEL™ has been setup, the system is ready to begin control functions. All of the system's operational information and controls can be accessed from the Main Menu. This section of the manual will guide the user through the operation of the system.

On power-up the Welcome screen is displayed. Press the "Begin" button to access the Main Menu. This will open the Main Menu. Yellow buttons are used throughout the system for navigation through the different displays. Pressing a "Menu" button anywhere in the system will open the Main Menu.



The following areas can be accessed from the Main Menu:

Alarm – Displays alarm status and history.

Tune/Control – Allows user to modify Setpoint, change controller modes, and adjust outputs.

Heater – Displays voltage, current, power and resistance values.

Temp data – Displays current temperature, high and low values, and allows reset of those values.

Graphic – Displays graphical picture of the heater and current temperatures.

System Setup – With the proper password, this button displays the System Setup Menu.

Interlock – Displays interlock status information.

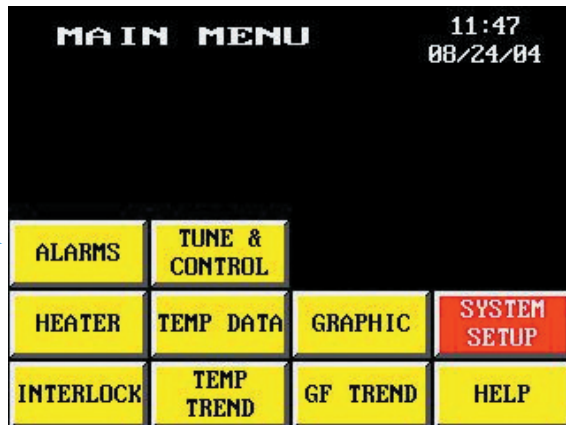
Temp Trend – Displays the 6-pen temperature trend chart.

GF Trend – Selects the Ground Fault Leakage Current chart recorder.

Help – Takes the user to the Help Menu which contains troubleshooting guides, product information, tuning help, spare parts list, preventive maintenance guides, and contact information.

Alarm Screens

The temperature alarms are arranged in groups of four. The first alarm screen covers alarms for inputs 1-4, the second covers inputs 5-8. Other key indicators appear in the right side of alarm screen 1 and the left side of alarm screen 2. From the Main Menu press the “Alarm” button to access Process Alarm Screen 1. Once displayed, pressing the “5-8” button will open Process Alarm Screen 2.



Press the “Alarm” button to display Process Alarm Screen 1.



Press the “5-8” button to display Process Alarm Screen 2.



Indicators are solid green when no alarm is present.

Indicators will flash red/yellow when an alarm condition exists.

Alarm Indication & Reset

Alarm status indicators are displayed on two screens: Process Alarm screens 1 & 2. Alarms will flash red/yellow when active. Inactive alarms are indicated as solid green. This convention is used throughout the system. Each column of alarms is labeled with the associated input number as well as the first word of the identifier (maximum 9 characters) for easier recognition.

Each of the temperature alarms react as programmed from the Alarm Setup screens. (See page 23, Section I, Alarm Setup) For instance, if the Low Temperature Setpoint for Input 6 is set at 100°F, and the temperature falls to or below that value, an alarm is generated. If a Deadband of 10°F is programmed, the temperature will have to rise to 110°F before the alarm will clear. If that same alarm has been programmed as a latching alarm, the alarm will not clear until the Alarm Setpoint and Deadband values are satisfied, AND the “RESET” button has been pressed. Temperature alarms that are not programmed as latching will clear themselves as soon as the temperature Alarm Setpoint and Deadband values are satisfied. Alarms that are mapped to the alarm outputs will energize/de-energize the appropriate output as programmed in the Alarm Setup screens. (See page 23, Section I, Alarm Output Setup)

The screenshot shows the 'PROCESS ALARM 1' screen with a grid of indicators and buttons. The grid is as follows:

PROCESS ALARM 1				Alarm In 1 Purge OK
INPUT 1 INLET	INPUT 2 OUTLET	INPUT 3 SHELL	INPUT 4 SHEATH	
Hi Hi TEMP	Hi Hi TEMP	Hi Hi TEMP	Hi Hi TEMP	GROUND FAULT
Hi TEMP	Hi TEMP	Hi TEMP	Hi TEMP	SCR OK
Lo TEMP	Lo TEMP	Lo TEMP	Lo TEMP	Disconnect Closed
Lo Lo TEMP	Lo Lo TEMP	Lo Lo TEMP	Lo Lo TEMP	High Limit
Alarm History	RESET	5-8	MENU	

Annotations on the screenshot:

- An arrow points from the text "Press here to open the Alarm History screen." to the "Alarm History" button.
- An arrow points from the text "Pressing the 'Reset' button will reset latched temperature alarms if the alarm condition has cleared." to the "RESET" button.
- An arrow points from the text "Press here to open the Process Alarm screen 2." to the "5-8" button.

In addition to the temperature alarms, there are 5 status indicators for key system elements per screen. The discrete indicators on Process Alarm screen 1 include Alarm Input 1(or Purge Alarm), Ground Fault alarm, SCR Shorted alarm, Disconnect Status alarm, and High Limit alarm. These indicators are defined as follows:

Alarm Input 1/Purge Alarm: For systems equipped with the control panel purge option, purge integrity is monitored by this input. For systems without this option installed, Alarm Input 1 may be used for user defined alarming. When alarming for Alarm Input 1 is enabled (See page 26, Section I, Alarm Setup, Discrete Alarms) and the input signal is not present, an alarm is generated.

Ground Fault: Ground fault leakage current is continuously monitored and an alarm contact is closed when the defined limit value is reached. This limit is defined by switch settings on the ground fault monitor in the control panel.

SCR Status: The SCR pack is constantly monitored for a shorted condition. If the SCR is shorted the indication will change from green to red and the text will change from “SCR OK” to “SCR shorted”.

Disconnect Status: The disconnect status is an indication of the open or closed status of the main disconnect.

High Limit Trip: The high limit trip is an indication of the high limit controller. If the high limit controller has experienced an over-temperature reading it will be indicated here.



The discrete indicators on Process Alarm screen 2 include Alarm Input 2, Hand-Off-Auto Selector Switch status, Breaker status, Heatsink Over-Temp, and Threshold Clear status. These indicators are defined as follows:

Hand-Off-Auto Selector Status: The indicator displays whether or not the HOA selector switch on the panel is in the Auto position.

Breaker Status: The load side breakers are constantly monitored by the system. If any of these breakers are found to be in a tripped condition an alarm will be generated.

Heatsink Overtemp: The SCR pack is cooled by a built-in heatsink. The temperature of the heatsink is being monitored by the system. If the temperature reaches 186°F (85°C) an alarm is generated. The SCR pack will shut itself down at a heatsink temperature of 200°F (93°C).

Threshold clear: The Threshold clear is an indication that the temperature reading of the high limit controller has cleared the low threshold setting confirming the function of the sensor input and that it is wired correctly. If the sensor wiring is reversed the temperature reading will go down scale when heat is applied to the system. This will cause the contact to open and an alarm will be generated.

System Master

The System Master screen is automatically displayed any time a shut-down event occurs within the system. The shut-down conditions are listed on the System Master screen and the event(s) that caused the shut-down are indicated by flashing red text. Elements that are not responsible for the shut-down and are in their 'normal' state are indicated by solid green text. In the example below, a High Limit Trip has been detected and shut the system down.



Once the System Master screen has been displayed, the user can press the "Return" button to reopen the previous screen. After the "Return" button has been pressed, the user can move through the system screens as required to help determine the cause of the shut-down. However, if the cause of the shut-down has not been corrected within 10 minutes, the System Master screen will be redisplayed. This will cycle until the condition or conditions have been resolved. When ever a shut-down event occurs, temperature control loops are set to Manual mode with zero output. Once the shut-down conditions have been cleared the operator must go to the Tune & Control screen and set the controller(s) back to the desired loop control mode.

Alarm History

To access the Alarm History screen press the “Alarm History” button at the bottom of either Process Alarm screen 1 or 2. The first screen that appears will show the total alarms logged, the order in which they were logged, and the associated message. Press the “Page Down” button at the bottom of the screen to view more entries. Press “Line Up” or “Line Down” to select a particular alarm entry. Once an entry is highlighted, you may then press the “DTLS” button for more detailed information about that entry. Press the “Alarm Count” button to go to the Alarm Count screen. Pressing the “Clear All” button will open a keypad for password entry. Only those with Supervisor, or greater, security level access may clear alarms. Upon entry of the correct password, all alarms in the history will be cleared. Press “Exit” to return to the graphical alarm screen.

ALARM HISTORY		TOTAL OF 6 ALARMS
ENTRY	MESSAGE	
01	Input 2 LO Temp Alarm	
02	E-Stop Detected	
03	Input 4 HI HI Temp Alarm	
04	Input 4 HI Temp Alarm	
05	Heatsink Overtemp	
06	Threshold temperature not cleared	

ALARM COUNT	PAGE UP	PAGE DOWN	LINE UP	LINE DOWN	DTLS	CLEAR ALL	EXIT
-------------	---------	-----------	---------	-----------	------	-----------	------

Button Descriptions

Alarm Count – Opens the Alarm Count screen.

Page Up – Moves the cursor one full page toward the top of the list.

Page Down – Moves the cursor one full page toward the bottom of the list.

Line Up – Moves the cursor one line toward the top of the list.

Line Down – Moves the cursor one line toward the bottom of the list.

DTLS – Displays details of the alarm highlighted by the cursor including time and date of activation.

Clear All – Clears all alarms in the list. (Requires Supervisor security level or higher.)

Exit – Closes the Alarm History.

Alarm Count

The Alarm Count screen lists all of the possible alarms in the system and indicates how many times each alarm has been activated since the last time the list or the individual alarm was cleared. The counts for the entire list can be cleared using the “Clear All” button. The count for an individual alarm can be cleared by moving the cursor to the desired alarm and pressing the “Clear” button. Both clear buttons require Supervisor security access level or higher. A keypad is displayed for entry of the security code.

Note: Clearing Alarm Counts does not clear the Alarm History.

ALARM COUNT		
ALARM	COUNT	MESSAGE
001	00000	Shorted SCR
002	00000	Ground Fault Detected
003	00001	Heatsink Over-Temperature Detected
004	00000	High Temperature Limit Trip
005	00001	Threshold Temperature not cleared
006	00000	Input 1 HI HI Temp Alarm
007	00000	Input 2 HI HI Temp Alarm
008	00000	Input 3 HI HI Temp Alarm
009	00000	Input 4 HI HI Temp Alarm
010	00003	Input 5 HI HI Temp Alarm
011	00000	Input 6 HI HI Temp Alarm
012	00000	Input 7 HI HI Temp Alarm
013	00001	Input 8 HI HI Temp Alarm
014	00004	Input 1 HI Temp Alarm
015	00001	Input 2 HI Temp Alarm
016	00000	Input 3 HI Temp Alarm
017	00000	Input 4 HI Temp Alarm
018	00003	Input 5 HI Temp Alarm
019	00000	Input 6 HI Temp Alarm

ALARM HIST	PAGE UP	PAGE DOWN	LINE UP	LINE DOWN	CLEAR	CLEAR ALL	EXIT
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Button Descriptions

Alarm Hist – Opens the Alarm History screen.

Page Up – Moves the cursor one full page toward the top of the list.

Page Down – Moves the cursor one full page toward the bottom of the list.

Line Up – Moves the cursor one line toward the top of the list.

Line Down – Moves the cursor one line toward the bottom of the list.

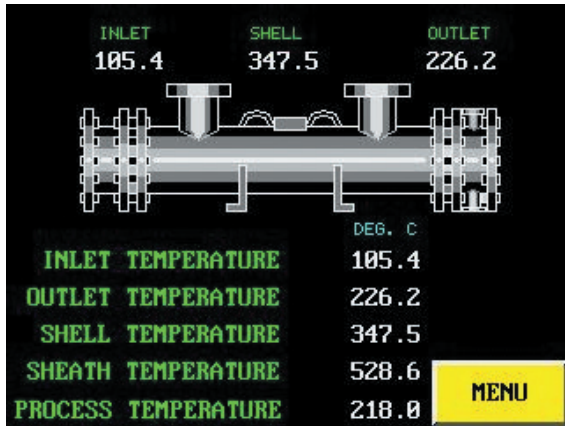
Clear – Clears the count for the currently highlighted alarm. (Requires Supervisor security level or higher.)

Clear All – Clears the count for all alarms in the list. (Requires Supervisor security level or higher.)

Exit – Closes the Alarm Count and Opens the Alarm History.

Graphic

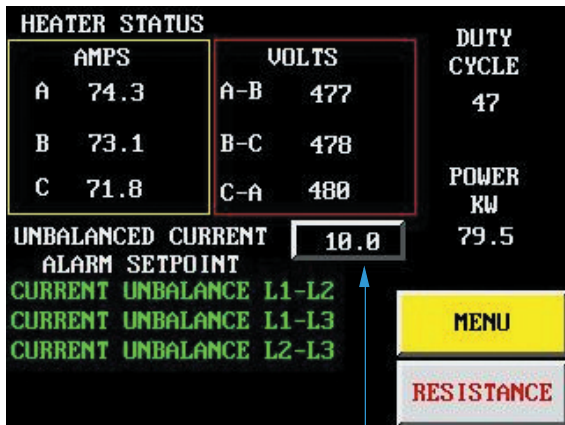
The Graphic screen shows a representation of a typical circulation heater, the current temperature values of sensor inputs 1-5, and the text identifiers for each.



Press the "Menu" button to return to the Main Menu.

Heater Status

The Heater Status screen displays the load amperage and voltage for each phase of the power circuit. Also displayed on the right side of the screen are the duty cycle and the power in kilowatts. The unbalanced current alarm setpoint is entered by pressing the numeric entry field and using the keypad provided to enter the value in amps. If there is an unbalanced current condition in the system, the text indicators will flash red indicating which phase-pair has caused the alarm.



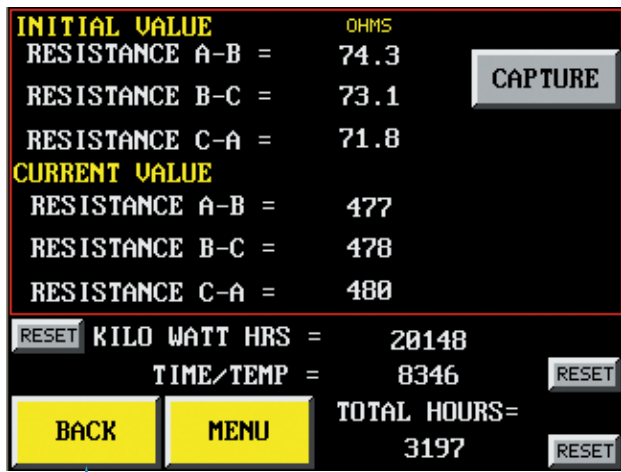
Press the "Menu" button to return to the Main Menu.

Press to enter the unbalanced current alarm setpoint.

Press the "Resistance" button to open the second heater status screen.

Heater Resistance

The Resistance screen displays the both the initial and current load element resistance, the kilowatt-hours, total operating hours and the time/temperature (Life Factor) values for the system. The kilowatt-hour, total hours, and the life factor values can be reset but require either the manager or engineer level security password.



Pressing the “Capture” button moves the Current resistance values to the Initial resistance values. This should be performed when the system is commissioned or the elements replaced to give a baseline value for the load resistance. This function is password protected.

Pressing the reset buttons will display a keypad for password entry to allow reset of the values.

Press the “Back” button to return to the Heater Status screen.

Press the “Menu” button to return to the Main Menu.

Pressing the Capture and Reset buttons will display a keypad for entry of either the Manager or Engineer password. Entry of the correct password will complete the action and the captured value will be moved or the selected value reset depending on the button pressed.

Temperature Data

The Temperature Data screens display the text identifier, the actual current temperature, the highest temperature, and lowest temperature recorded for each input sensor. The high and low values for each sensor can be reset by pressing the reset button to the right of the low temperature reading. When the reset button is pressed the high and low values go to zero briefly and then record the actual temperature at the moment of reset. From that point onward the highest and lowest temperatures are recorded. The temperatures are displayed in the units selected during system setup.

Temperature Data 1 screen displays the actual, high, and low temperature for each of the input sensors 1-4 as well as the differential temperature between Outlet and Inlet. Pressing the “Next” button opens Temperature Data 2 where the high and low temperatures for input sensors 5-8 can be observed and reset.

The screenshot shows the TEMPERATURE DATA 1 screen with the following data:

Category	Actual	HIGH	LOW	Unit	Action
INLET TEMPERATURE	127.2	136.9	123.6	DEG. C	RESET
OUTLET TEMPERATURE	164.9	171.2	160.1	DEG. C	RESET
SHELL TEMPERATURE	358.1	364.0	349.5	DEG. C	RESET
SHEATH TEMPERATURE	402.1	402.1	402.1	DEG. C	RESET
OUTLET-INLET Delta T	37.7			DEG. C	

Navigation buttons: NEXT, MENU

Callouts:

- Displays the highest temperature since last reset. (Points to HIGH value of Inlet Temperature)
- Pressing a “Reset” button sets the lowest and highest temperatures to the current temperature. New high and low temperatures are recorded from that point onward. (Points to a RESET button)
- Displays the lowest temperature since last reset. (This channel appears as it would immediately after a reset.) (Points to LOW value of Sheath Temperature)
- Differential Temperature between outlet and Inlet. (Points to Delta T)
- Press the “Next” button to advance to Temperature Data 2. Press the “Menu” button to return to the Main Menu. (Points to NEXT and MENU buttons)

Pressing the Capture and Reset buttons will display a keypad for entry of either the Manager or Engineer password. Entry of the correct password will complete the action and the captured value will be moved or the selected value reset depending on the button pressed.

Temperature Data 2 screen displays the actual, high, and low temperature for each of the input sensors 5-8 and provides the resets for those channels. Pressing the “Previous” button returns the user to Temperature Data 1. To return to the Main Menu press the “Menu” button

The screenshot shows the TEMPERATURE DATA 2 screen with the following data:

Category	Actual	HIGH	LOW	Unit	Action
INPUT 5 TEMPERATURE	1805.4	1987.3	1758.1	DEG. C	RESET
INPUT 6 TEMPERATURE	653.7	656.4	653.7	DEG. C	RESET
INPUT 7 TEMPERATURE	1122.7	1225.9	1117.8	DEG. C	RESET
INPUT 8 TEMPERATURE	1726.9	1726.9	1716.1	DEG. C	RESET

Navigation buttons: BACK, MENU

Callouts:

- Press the “Back” button to go back to Temperature Data 1. Press the “Menu” button to return to the Main Menu. (Points to BACK and MENU buttons)

Tune & Control

The “Tune & Control” button on the Main Menu gives the user access to one of four control screens depending upon which control mode is selected in the System Setup Menu (See page 18, Section I, Control Mode and Range Settings). The five available control modes are; Single Loop, Differential, Cascade – Outlet to Sheath, Cascade –Input 5 to Sheath, and Remote Command Signal.

Single Loop Control

When Single Loop control mode is selected, pressing the “Tune & Control” button on the Main Menu opens the Single Loop Control screen. This screen contains the text identifier, process variable, ramp setpoint, actual setpoint display and entry, controller output percentage indication, manual output entry, setpoint high limit, setpoint low limit, auto/manual selection and the setpoint ramping On/Off indicator. Additionally, the PID tuning parameters for the control loop can be accessed from this screen with the proper security code.

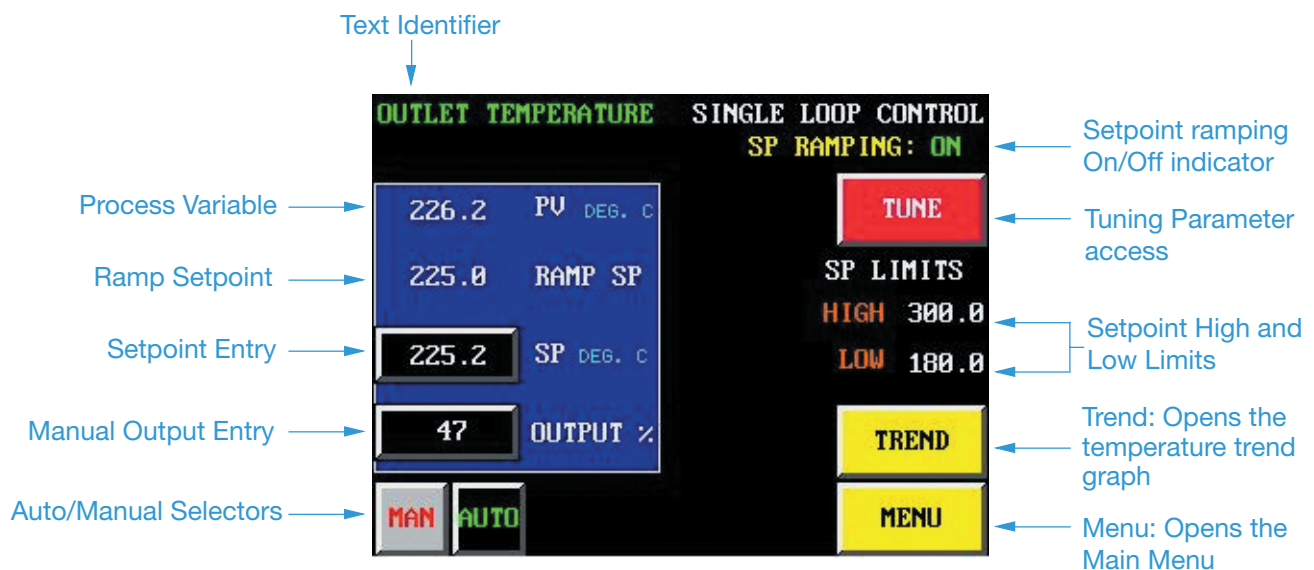
The process variable (PV) for single loop mode is Input 2 (factory default: Outlet Temperature) and is the current process temperature that the loop is controlling. The setpoint (SP) is a numeric entry field for the desired temperature. The setpoint is limited by the high and low limits shown on the right side of the display. Controller output is the current level of output (0-100%) from the temperature controller. In manual mode, the output of the controller is adjusted using the Manual Output Entry field. The Auto and Manual selector buttons allow the user to set the control mode. The current mode is indicated by green text with a black background on the selector buttons. In the example below, the loop is in Auto mode. Tuning parameters for the control loop are accessed by pressing the “Tune” button. (See page 43, Section III, Loop Tuning) These parameters are protected by security code.

Setpoint ramping is used to cause the setpoint being fed to the controller to gradually ramp to the entered setpoint at the specified rate in degrees/hour. Setpoint Ramping is configured from the System Setup Menu (See page 19, Section I, Setpoint Ramping). The status of setpoint ramping is indicated in the upper right corner of the display.

Setpoint Ramping is considered to be complete when any one of the following conditions is encountered:

1. The process variable (PV) exceeds the entered setpoint.
2. The entered setpoint is set to a value which is less than the process variable.
3. The ramp setpoint equals the entered setpoint.
4. Setpoint ramping is disabled from the Setpoint Ramping Setup screen.

Upon completion of Setpoint Ramping, the Ramp SP value will be reset to zero and normal PID control will resume using the operator-entered setpoint.



Differential Control

When Differential Control mode is selected, pressing the “Tune & Control” button on the Main Menu opens the Differential Control screen. This screen contains the text identifier, process variable, ramp setpoint, actual setpoint display and entry, controller output percentage indication, manual output entry, setpoint high limit, setpoint low limit, auto/manual selection and the setpoint ramping status indicator. Additionally, the PID tuning parameters for the control loop can be accessed from this screen with the proper security code.

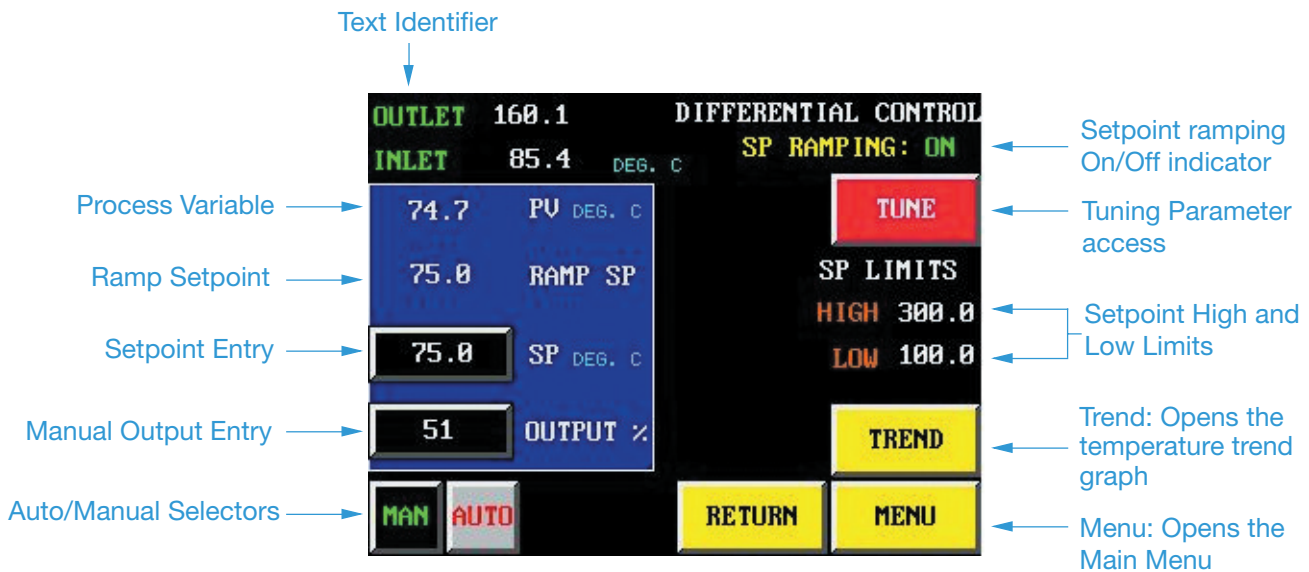
The process variable (PV) for differential control mode is composed of the temperature difference between Input 2 (factory default: Outlet Temperature) and Input 1 (factory default: Inlet Temperature). The control loop is designed to maintain the differential temperature. The setpoint (SP) is a numeric entry field to enter the desired temperature. The setpoint is limited by the high and low limits shown on the right side of the display. Controller output is the current level of output (0-100%) from the temperature controller. In manual mode, the output of the controller is adjusted using the Manual Output Entry field. The Auto and Manual selector buttons allow the user to set the control mode. The current mode is indicated by green text with a black background on the selector buttons. In the example below, the loop is in Auto mode. Tuning parameters for the control loop are accessed by pressing the “Tune” button. (See page 43, Section III, Loop Tuning) These parameters are protected by security code.

Setpoint ramping is used to cause the setpoint being fed to the controller to gradually ramp to the entered setpoint at the specified rate in degrees/hour. Setpoint Ramping is configured from the System Setup Menu. (See page 20, Section I, Setpoint Ramping) The status of setpoint ramping is indicated in the upper-right corner of the display.

Setpoint Ramping is considered to be complete when any one of the following conditions is encountered:

1. The process variable (PV) exceeds the entered setpoint.
2. The entered setpoint is set to a value which is less than the process variable.
3. The ramp setpoint equals the entered setpoint.
4. Setpoint ramping is disabled from the Setpoint Ramping Setup screen.

Upon completion of Setpoint Ramping, the Ramp SP value will be reset to zero and normal PID control will resume using the operator-entered setpoint.



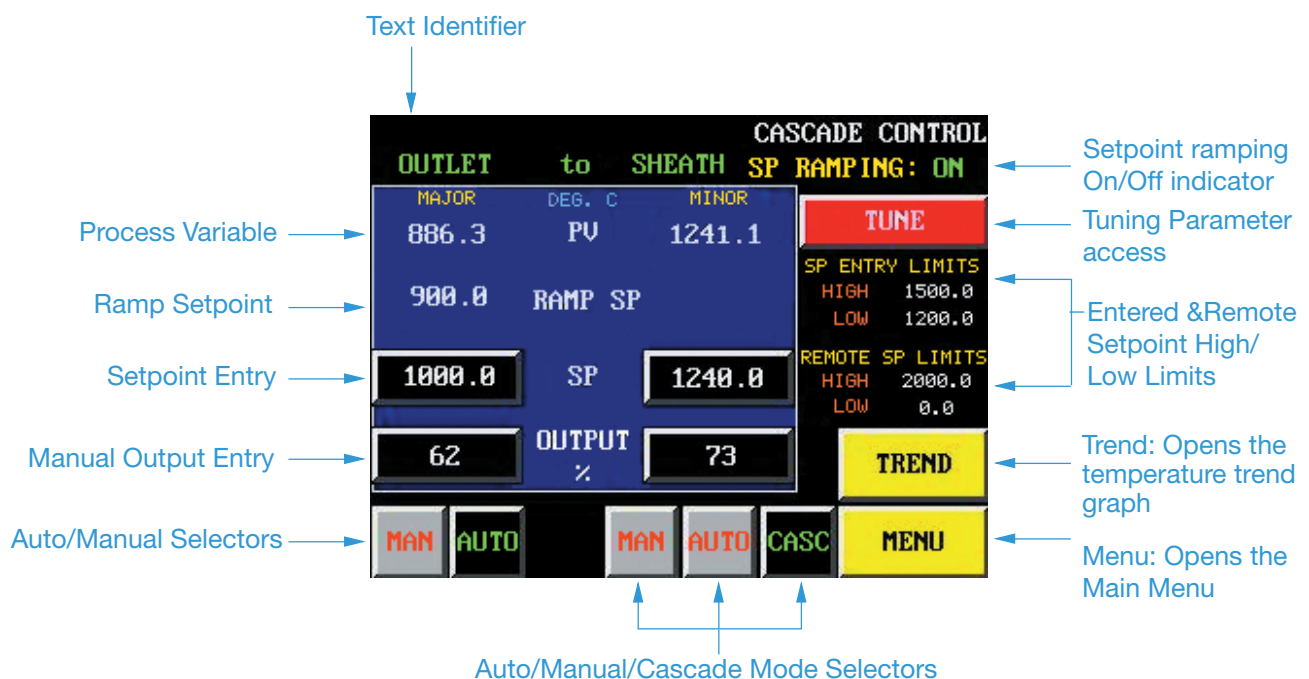
Cascade Control

Two modes of cascade control are available in the IntelliPANEL™ system; Outlet to Sheath and Process to Sheath. Outlet to Sheath Cascade mode uses Input 2 (factory default: Outlet Temperature) as the process variable for the major loop and Input 4 (factory default: Sheath Temperature) as the process variable for the minor loop. Process to Sheath Cascade mode uses Input 5 (factory default: Outlet Temperature) as the process variable for the major loop and Input 4 (factory default: Sheath Temperature) as the process variable for the minor loop.

When either Cascade control mode is selected, pressing the “Tune & Control” button on the Main Menu opens the Cascade Control screen. This screen contains the text identifiers, process variables, ramp setpoint, actual setpoint displays and entries, controller output percentage indications, manual output entries, setpoint high limit, setpoint low limit, auto/manual/cascade selections and the setpoint ramping On/Off indicator. Additionally, the PID tuning parameters for the control loops can be accessed from this screen with the proper security code.

Cascade control is comprised of two complete PID control loops working together to control the process temperature. The first loop of the pair is referred to as the major loop. The process variable (PV) for the major loop is the temperature being controlled. The major loop reacts to the process variable by changing the controller output. This output is then scaled and fed to the setpoint of the minor loop as a temperature value. The temperature value’s range is determined by the range selected from the System Setup Menu (See page 19, Section I, Mode and Range Settings, Temperature Range). The minor loop responds by regulating its output to control to the setpoint being fed from the major loop’s output.

The operator entered setpoints of both loops are limited to values that fall between the high and low “SP Entry Limits” shown on the right side of the display. Pressing the numeric entry fields labeled “SP” opens the keypad for setpoint entry. When the loops are in manual mode the outputs can be adjusted by pressing the “Manual Output” numeric entry field. In cascade mode the 0-100 % output of the Major loop is scaled to the high and low values of the “Remote SP Limits” and sent to the setpoint of the Minor loop. Keep in mind that if the minor loop is in Cascade mode and the major loop’s output is adjusted, the setpoint being fed to the minor loop will change and the process will be affected.



Loop modes are set by pressing the mode selector buttons associated with each loop. Loop modes are indicated on the selector buttons by green text on a black background. When the IntelliPANEL™ system is initially started both loops will be in manual mode. To enter cascade mode, the minor loop's mode selectors have to be operated in sequence. The loop cannot go directly from manual to cascade mode or from cascade to manual mode. From manual mode, press the minor loop's "Auto" selector button. Auto mode will then be indicated. Only then can the loop be switched to cascade mode by pressing the "Casc" button. The major loop can only be set to auto mode when the minor loop is in cascade mode.

Setpoint ramping is used to cause the setpoint being fed to the major loop to gradually ramp to the entered setpoint at the specified rate in degrees/hour. Setpoint Ramping is configured from the System Setup Menu. (See page 20, Section I, Setpoint Ramping) The status of setpoint ramping is indicated in the upper right corner of the display.

Setpoint Ramping is considered to be complete when any one of the following conditions is encountered:

1. The process variable (PV) exceeds the entered setpoint.
2. The entered setpoint is set to a value which is less than the process variable.
3. The ramp setpoint equals the entered setpoint.
4. Setpoint ramping is disabled from the Setpoint Ramping Setup screen.

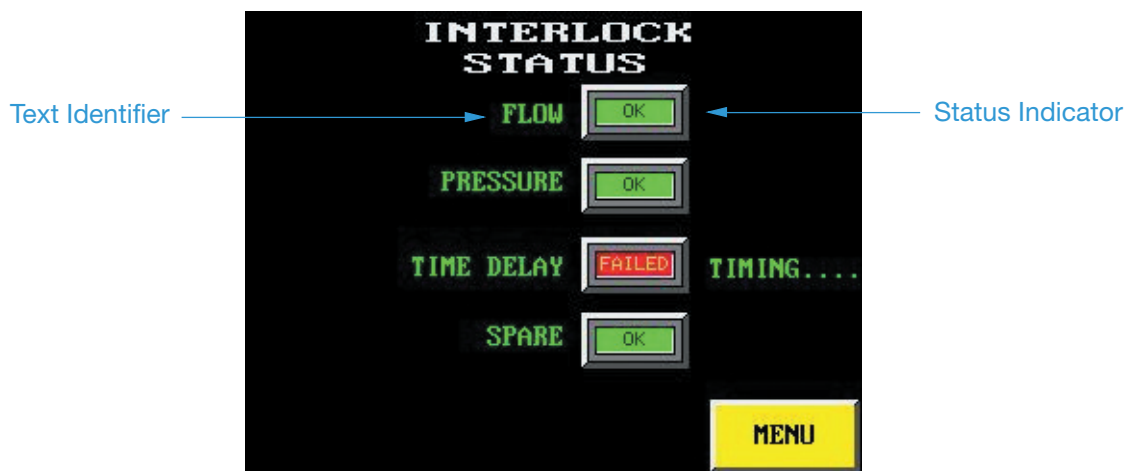
Upon completion of Setpoint Ramping, the Ramp SP value will be reset to zero and normal PID control will resume using the operator-entered setpoint.

Remote Command Signal

When Remote Command Signal is selected from the Mode/Range screen (See page 18, Section I, Mode and Range Settings, Control Mode) temperature control is generated from a remote source and passed through the controller to the SCR pack. In this mode, the "Tune & Control" button on the Main Menu and the Tuning screens are not accessible. All other screens function as described in this manual.

Interlock Status

The Interlock Status screen displays the status of the four interlock permissives. To access the Interlock Status screen from the Main Menu press the "Interlock" button. The status indicators are labeled using the text identifiers entered during system setup (See page 13, Section I, Interlock Identification Text Entry). In all cases, the status indicator is illuminated green when the interlock is satisfied and flashing red/yellow when the permissive is inhibiting operation. This convention is used regardless of whether the interlock has been programmed for an active state of open or closed. Interlocks that are not enabled are shown as satisfied (See page 17, Section I, Interlock Setup).

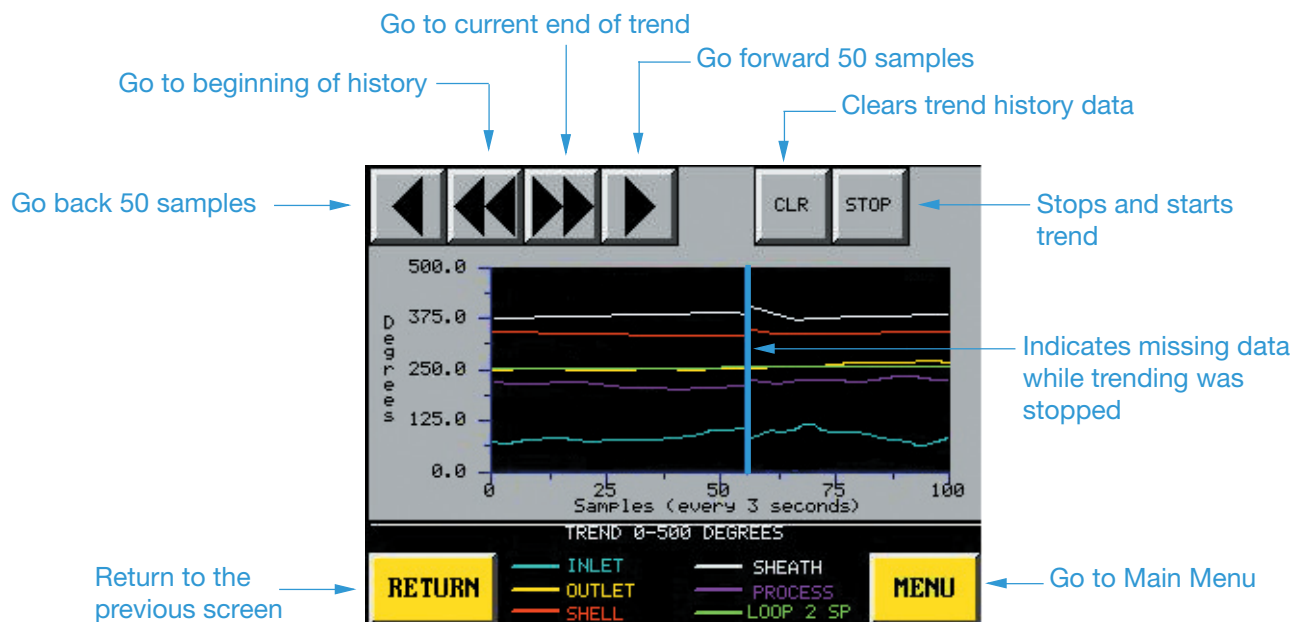


Temperature Trending

Temperature trending is accessed from the Main Menu by pressing the “Temp Trend” button. The temperature trend is a six pen trend chart. The six pens trace line graphs for Inputs 1-5 and the setpoint for Loop 2 (Single, differential, or cascade major loop setpoint). The trend graph automatically adjusts to the range selected by the user during system setup. (See page 19, Section I, Control Mode and Range Setting, Temperature Range) The ranges are; 0-250°, 0-500°, 0-1000°, 0-1500°, and 0-2000°. The vertical axis of the graph is marked in degrees and the horizontal axis is marked with the sample number.

The trend takes a sample every 3 seconds and displays 100 samples per screen (300 seconds or 5 minutes). The graph has a storage history of 999 samples. Samples are discarded on a first-in/first-out basis. The historical points are viewed by pressing the arrow buttons at the top of the display. The “<” and “>” buttons move the display backwards and forwards 50 samples at a time respectively until the end is reached. The “<<” and “>>” buttons move the display to the all the way to the beginning and the end of the trend.

The graph can be cleared using the “CLR” button. However, caution should be used, as this will clear ALL data in the history. The trend can also be stopped and started as desired. To stop the trend, press the “Stop” button. The indication on the button will change to “Start”. Press the button a second time and the graph will begin to record again. Each time the trend graph is stopped and started again a blue vertical line will appear to indicate missing data as seen in the example below.

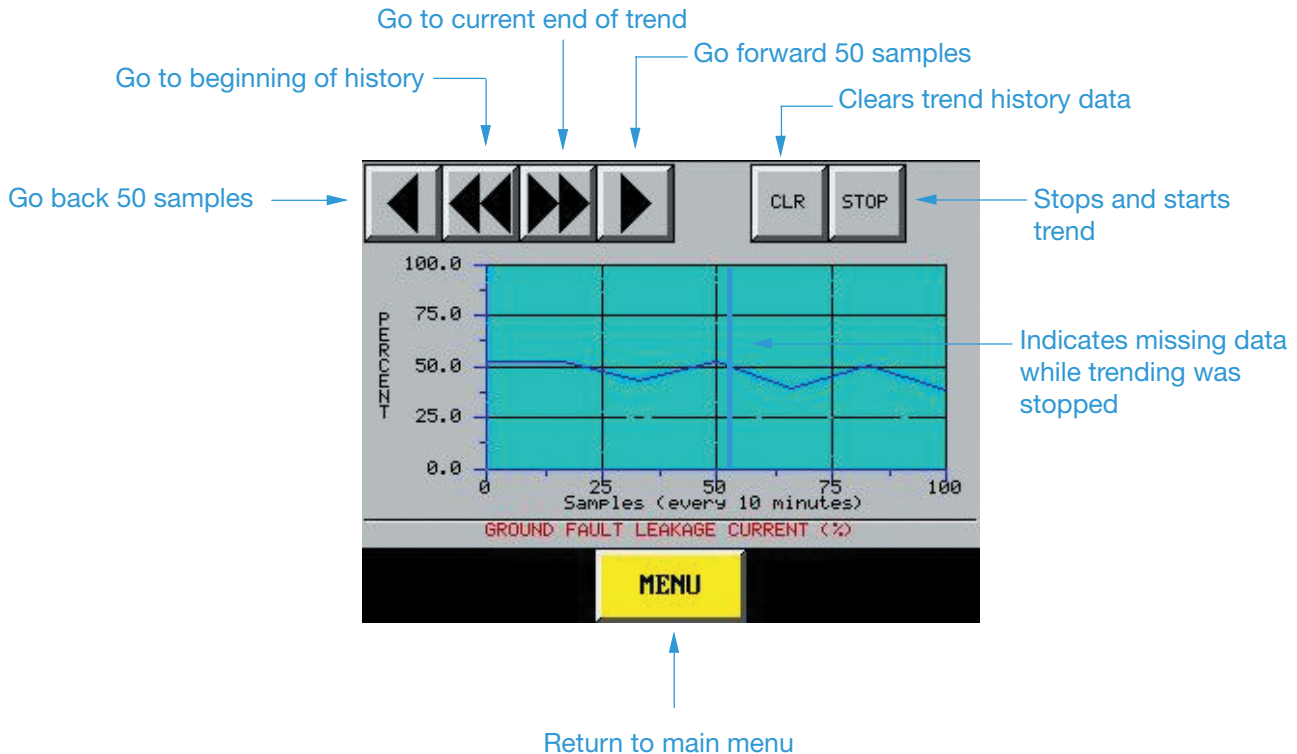


GF Trend

The GF Trend is accessed from the Main Menu by pressing the “GF Trend” button. This one line trend graph displays the ground fault (GF) leakage current of the SCR pack. The chart range is 0-100% and represents the range selected by rotary and DIP switch settings on the ground fault current monitor instrument in the control panel. Samples are taken at ten-minute intervals and displayed on the chart.

The trend takes a sample every 10 minutes and displays 100 samples per screen (1000 seconds or 16-2/3 hours). The graph has a storage history of 999 samples. Samples are discarded on a first-in/first-out basis. The historical points are viewed by pressing the Arrow buttons at the top of the display. The “<” and “>” buttons move the display backwards and forwards, 50 samples at a time respectively until the end is reached. The “<<” and “>>” buttons move the display all the way to the beginning and the end of the trend.

The graph can be cleared using the “CLR” button. However, caution should be used, as this will clear ALL data in the history. The trend can also be stopped and started as desired. To stop the trend, press the “Stop” button. The indication on the button will change to “Start”. Press the button a second time and the graph will begin to record again. Each time the trend graph is stopped and started again a blue vertical line will appear to indicate missing data as seen in the example below.



III. Loop Tuning

The IntelliPANEL system offers two methods of loop tuning. The user can choose to either tune the loops manually or can use the auto tune feature. Manual tuning can be used to enter the PID parameters from the touchscreen keypad. When the auto tune feature is used, the controller will automatically calculate the PID parameters based on loop performance. Both tuning methods are available in single loop, differential, or cascade control modes.

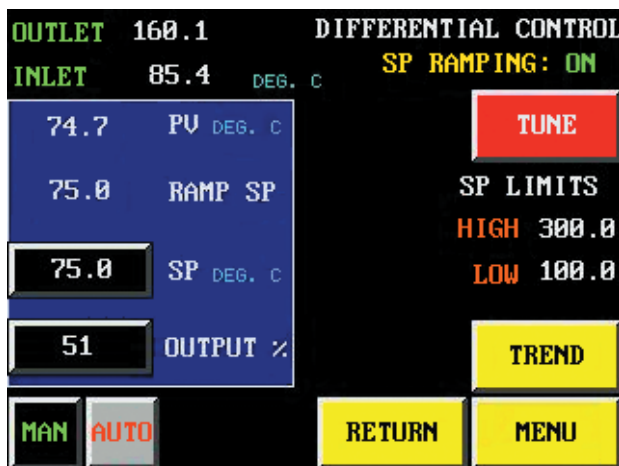
The proportional, reset and rate values are entered by touching the appropriate numeric entry fields and using the provided keypad. The units and spans for each term are outlined as follows:

	<u>Span</u>	<u>Units</u>
Proportional	20-2000	Degrees
Reset	0.61-60	Repeats/Minute
Rate	0.00-99.99	Seconds

Note: The numeric keypad does not have a decimal point key. However, the correct number of decimal places is predefined for each variable and will be displayed in the results window of the keypad. For example, if the desired value for Rate is 15.38, simply press the 1, 5, 3, and 8 keys and the value in the results window of the keypad will be 0.01, 0.15, 1.53, and 15.38 successively. Press the “Enter” key to accept the value. If you find that an error has been made in the entry, press the clear button and reenter the correct value. Pressing the “Cancel” button closes the keypad and the previous value is retained. This applies to all numeric entries throughout the system.

Single and Differential Mode Manual Tuning

Single Loop and Differential loop tuning procedures are identical. To access loop tuning, open the Tune & Control screen and press the “Tune” button in the upper right area of the screen. The tuning parameters are password protected. A keypad requesting a security code will be displayed. The user must have a Manager, Engineer, or Maintenance level security password to access the tuning screens. Once the proper security code is entered, the Manual Tuning screen will be displayed.

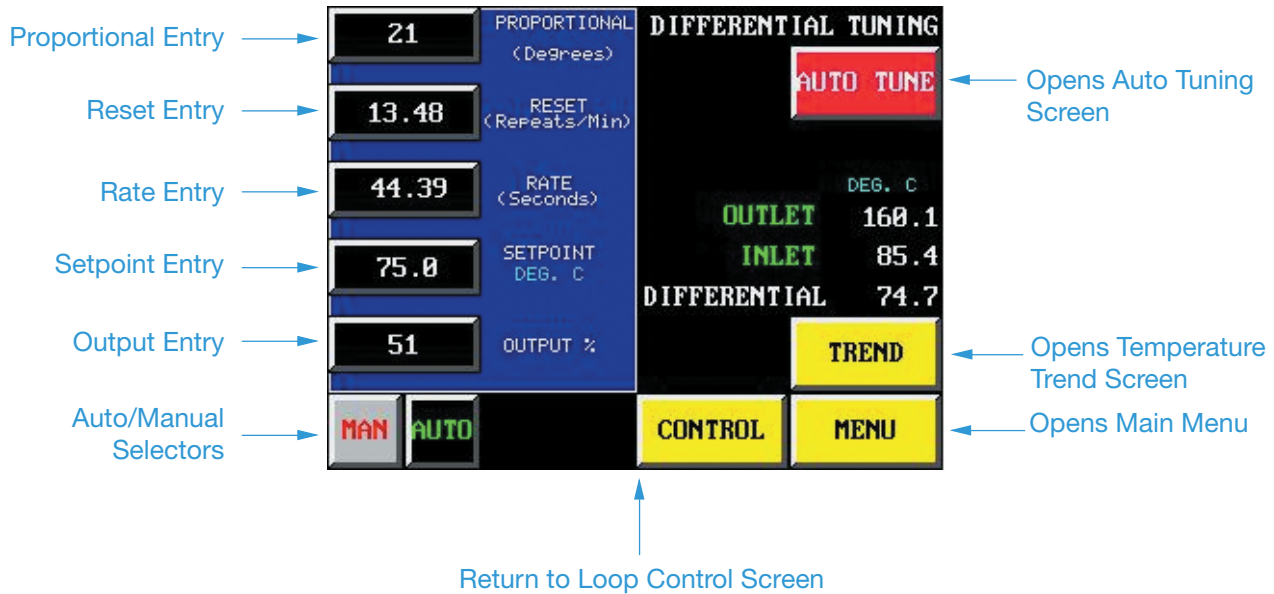


← Press the “Tune” button and enter the security code to open the Manual Tuning screen.



IMPORTANT: To prevent unauthorized changes to the PID tuning parameters, the user should go back to an unsecured screen such as the Main Menu or Loop Control Screen when the selected tuning procedure is complete.

The correct manual tuning screen will be displayed based on the current control mode. Proportional, reset, rate, setpoint and output entries can be made using the numeric entry fields. Loop mode can be selected by pressing the Auto/Manual mode selector buttons. Once the tuning parameters have been entered, the user can observe the results of the changes by pressing the “Trend” button. This will open the temperature trend graphic so that loop performance can be monitored. Pressing the “Control” button takes the user back to the Loop Control screen. To go to the Main Menu press the “Menu” button. Touching the “Auto Tune” button opens the Auto Tuning screen.



Single and Differential Mode Auto Tuning

The intelliPANEL™ system’s auto tune feature makes PID loop tuning easy. Before beginning an auto tune cycle, place the loop in manual mode and ensure that the PV and output values are near the middle of their respective ranges. There should be a separation of at least 20 degrees between the process variable and the setpoint. If this step is not followed, the auto tune function may generate an error and the tuning cycle will not be completed. In the event an error is generated, the display will indicate that an error has been encountered and a reset button will appear to allow a reset of the error.

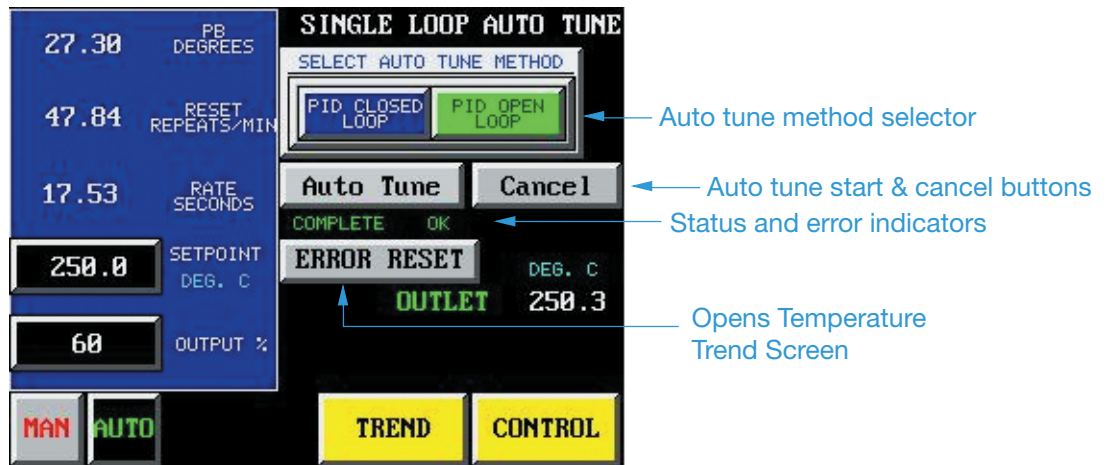
Auto tuning is accessed from the loop tuning screen by pressing the “Auto Tune” button. This will bring up the Auto Tuning screen so that the tuning method can be set and the cycle started.

There are two methods of auto tuning: open-loop and closed-loop. The open loop method induces a step change on the controller output and measures the response of the process variable (PV). Based on the response of the PV, the auto tune function calculates and applies the PID values to the loop controller. The closed-loop method applies alternating high and low output signals to the process for three cycles and measures changes in the PV. At the end of the auto tuning cycle, the PID variables are calculated and written to the controller.



Using the auto tuning procedures will affect the process, including inducing large changes in the control output value. Make sure you thoroughly consider the impact of any changes that could result in personnel injury or equipment damage and take adequate measures to minimize this risk!

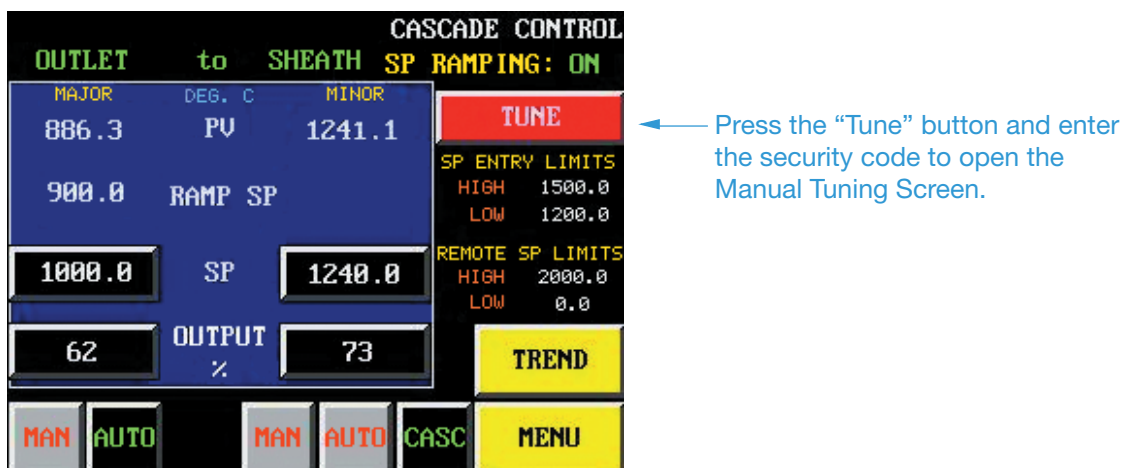
To begin an auto tuning cycle, first select the method by pressing either the “PID closed loop” or “PID open loop” button in the upper left corner of the display. The button for the selected method will turn green. Next, press the “Auto-Tune” button. This will begin the auto tune cycle. Once the cycle has begun, the “Cancel” button will appear and the status indicator will change from “Complete” to “Tuning...” and begin to flash. To abort the tuning cycle, press the “Cancel” button. The “Error Reset” button will only appear when an error occurs in the auto tuning cycle.



Pressing the “Trend” button at the bottom of the screen will open the temperature trend graph. The “Control” button returns the user to the Loop Control screen.

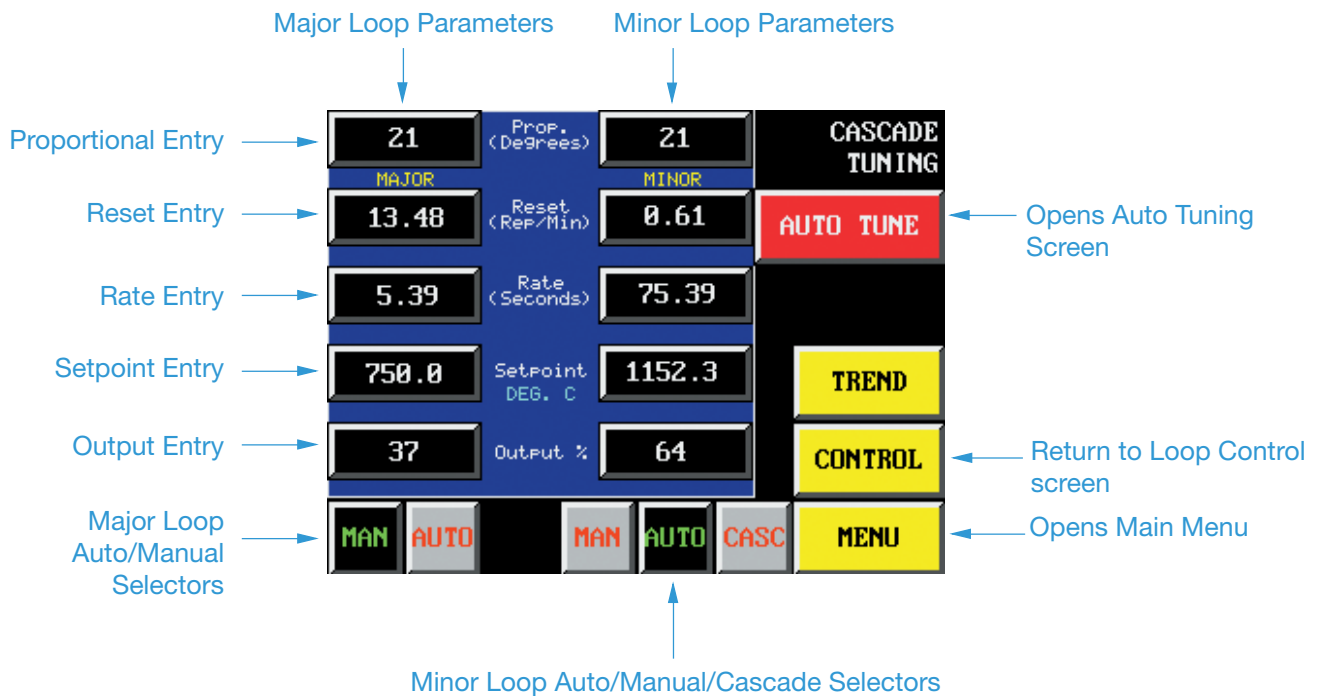
Cascade Mode Manual Tuning

The tuning procedures for both Cascade modes are identical. To access loop tuning open the Tune & Control screen and press the “Tune” button in the upper right area of the screen. The tuning parameters are password protected. A keypad requesting a security code will be displayed. The user must have Manager, Engineer, or Maintenance level security password to access the tuning screens. Once the proper security code is entered, the Manual Tuning screen will be displayed.



The correct manual tuning screen will be displayed based on the current control mode. Proportional, reset, rate, setpoint and output entries for both loops can be made using the numeric entry fields. Loop modes can be selected by pressing the Auto/Manual/Cascade mode selector buttons. (Remember, the major loop can only be set to Auto mode when the minor is in Cascade mode.)

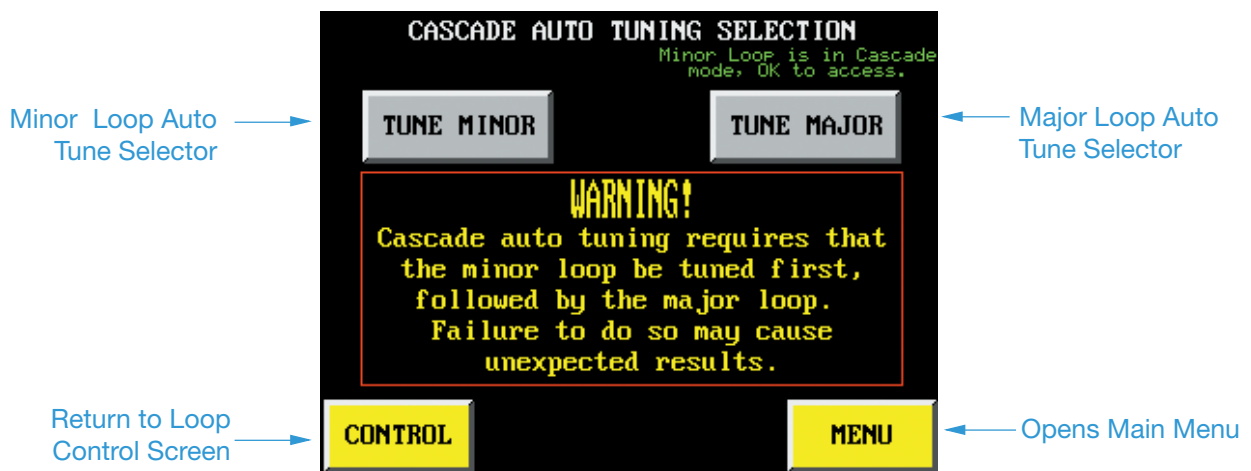
Once the tuning parameters have been entered the user can observe the results of the changes by pressing the “Trend” button. This will open the temperature trend graphic so that loop performance can be monitored. Pressing the “Control” button takes the user back to the Loop Control screen. To go to the Main Menu press the “Menu” button. Touching the “Auto Tune” button opens the Auto Tuning screen.



Cascade Mode Auto Tuning

Cascade Mode auto tuning is basically the same as for single loop and differential modes. The difference is that there are two loops to be tuned rather than one. Before beginning the minor loop auto tune cycle, the major loop should be set to manual mode with zero output. Additionally, set the minor loop in manual and ensure that the PV and output values are near the middle of their respective ranges. There should be a separation of at least 20 degrees between the process variable and the setpoint. If this is not done, the auto tune function may generate an error and the tuning cycle will not be completed. In the event an error is generated, the display will indicate that an error has been encountered and a reset button will appear to allow a reset of the error.

Auto tuning is accessed from the loop tuning screen by pressing the “Auto Tune” button. This will bring up the Auto Tuning Selection screen allowing the user to select the loop to be tuned. Since the minor loop is connected to the final control element and acts as a series component to the major loop, it needs to be tuned first.



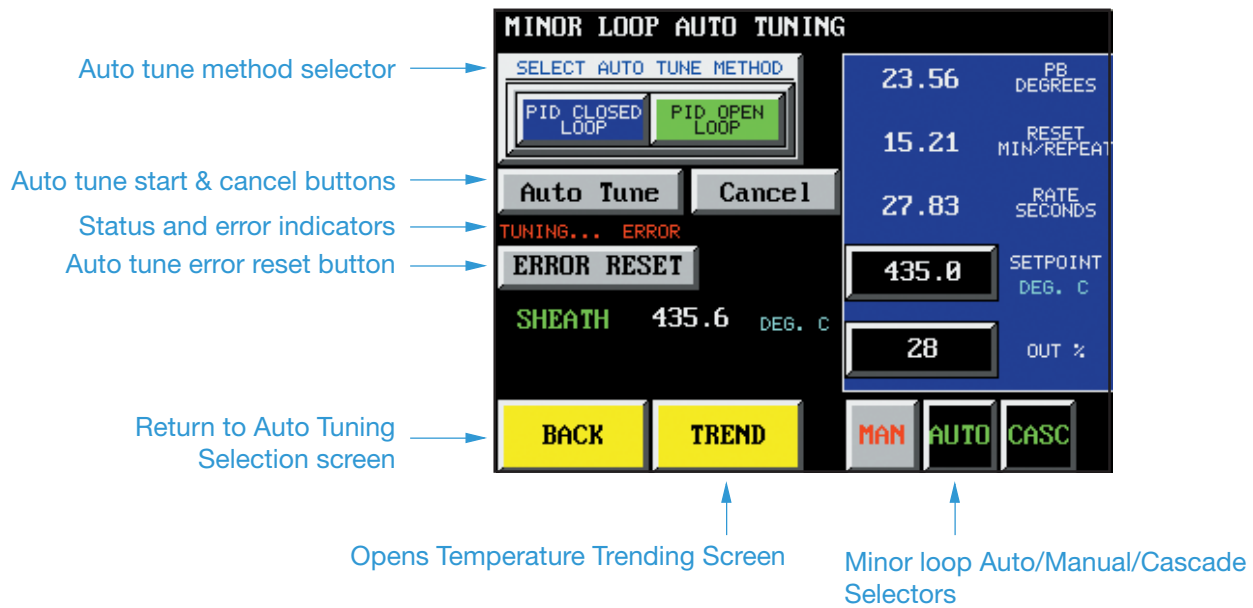
Pressing the “Tune Minor” button opens the Auto Tune screen for the minor loop so that the tuning method can be set and the cycle started.

There are two methods of auto tuning open-loop and closed-loop. The open loop method induces a step change on the controller output and measures the response of the process variable (PV). Based on the response of the PV, the auto tune function calculates and applies the PID values to the loop controller. The closed-loop method applies alternating high and low output signals to the process for three cycles and measures changes in the PV. At the end of the auto tuning cycle, the PID variables are calculated and written to the controller.



Using the auto tuning procedures will affect the process, including inducing large changes in the control output value. Make sure you thoroughly consider the impact of any changes that could result in personnel injury or equipment damage and take adequate measures to minimize this risk!

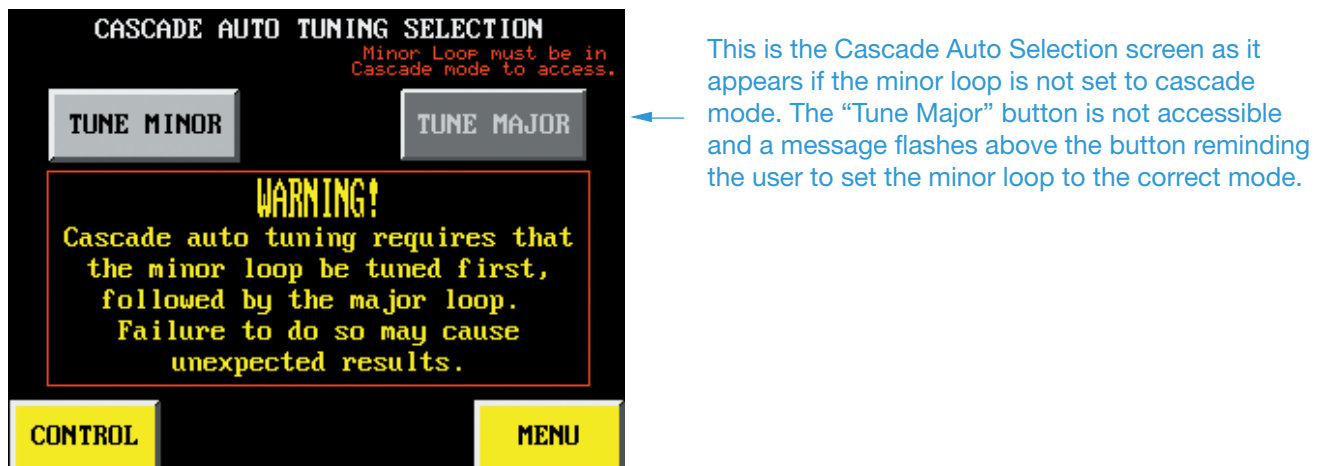
To begin an auto tuning cycle, first select the method by pressing either the “PID closed loop” or “PID open loop” button in the upper left corner of the display. Next, press the “Auto-Tune” button. This will begin the auto tune cycle. Once the cycle has begun, the “Cancel” button will appear and the status indicator will change from “Complete” to “Tuning...” and begin to flash. To abort the tuning cycle, press the “Cancel” button.



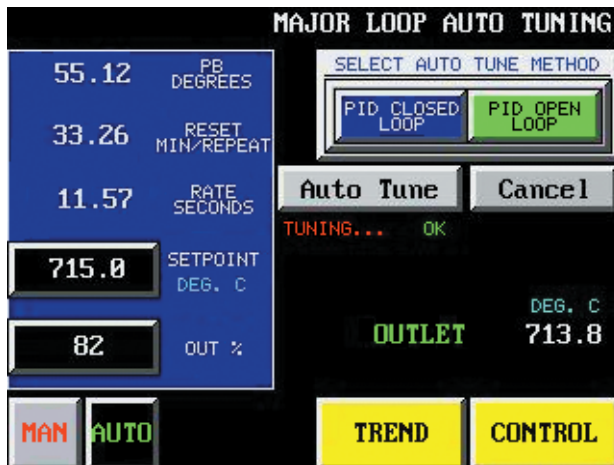
Pressing the “Trend” button at the bottom of the screen will open the temperature trend graph. The “Back” button returns the user to the Auto Tune Selection screen.

To begin an auto tuning cycle, first select the method by pressing either the “PID closed loop” or “PID open loop” button in the upper left corner of the display. Next, press the “Auto-Tune” button. This will begin the auto tune cycle. Once the cycle has begun, the “Cancel” button will appear and the status indicator will change from “Complete” to “Tuning...” and begin to flash. In the event an error is encountered, a reset button will be displayed to clear the error. To abort the tuning cycle, press the “Cancel” button. As soon as the auto tune cycle is finished, the PID parameters are written to the controller and the status indicator will change from “Tuning...” to “Complete”. The minor loop is now ready for process control. The last step prior to leaving this screen is to set the loop to Cascade mode in preparation for auto tuning of the major loop. Place the loop in Cascade mode and press the “Back” button. This will reopen the Cascade Auto Tuning Selection screen. From there, press the “Tune Major” button to continue with the next step of the auto tuning procedure.

If the minor loop is not set to Cascade mode before pressing the “Back” button, the “Tune Major” button will not be accessible. A message will appear above the “Tune Major” button reminding the user to set the minor loop to Cascade mode.



With the minor loop in cascade mode, the major loop is ready for auto tuning. From the Auto Tuning Selection screen press the “Tune Major” button. This opens the Major Loop Auto Tune screen. The current PID parameters, setpoint and output entry fields, and mode selectors are displayed on the left. The auto tuning features are shown on the right. Just as with the minor loop, all that is required is to select either the closed-loop or open-loop method and press the “Auto Tune” button



Just as with the minor loop, the major loop auto tune screen will show a button for canceling the auto tune process after a cycle is started and a button to reset an error, if encountered. When finished, the tuning function writes new PID values to the controller and the status will be displayed as complete. At this point, both loops of the cascaded pair are in control of the process. To prevent unauthorized changes to the PID parameters, the user should press the “Control” button to return to the Loop Control screen.



IMPORTANT: To prevent unauthorized changes to the PID tuning parameters, the user should go back to an unsecured screen such as the Main Menu or Loop Control Screen when the selected tuning procedure is complete.

V. IntelliPANEL Product Specifications

INPUTS:

4-Channel RTD Input Module

Input Ranges

Type Pt100: -200.0/850.0°C, -328/1562°F

Type Pt1000: -200.0/595.0°C, -328/1103°F

Type jPt100: -38.0/450.0°C, -36/842°F

RTD Excitation Current 200 μ A

Notch Filter > 50 db notches at 50/60 Hz

Maximum Setting Time 100 ms

(full-scale step input)

Common Mode Range 0-5 VDC

Absolute Maximum

Ratings Fault protected inputs to \pm 50 VDC

Sampling Rate 140 ms per channel

Notes:

1. The three wires connecting the RTD to the module must be the same type and length. Do not use the shield or drain wire for the third connection.
2. Unused channels require shorting wires (jumpers) installed from terminals CH+ to CH- to COM to prevent possible noise from influencing active channels.
3. If a RTD sensor has four wires, the plus sense wire should be left unconnected.

4-Channel Thermocouple Input Module

Input Ranges

Type J -190 to 760°C -310 to 1400°F

Type E -210 to 1000°C -346 to 1832°F

Type K -150 to 1372°C -238 to 2502°F

General Specifications

Number of Channels 4, differential

Common Mode Range -1.3 VDC to +3.8 VDC

Common Mode Rejection 100dB min.
@ VDC 50/60 Hz.

Input Impedance 5M Ω

Absolute Maximum Ratings Fault-protected
inputs to \pm 50 VDC

Update Rate 4 channels per scan

Open Circuit Protection Upscale or Downscale

Display Resolution \pm 0.1°C or \pm 0.1°F

Cold Junction Compensation Automatic

Conversion Time 270ms per channel

Warm-Up Time 30 minutes, typically
 \pm 1°C repeatability

Linearity Error

(End to End) \pm 1°C maximum, \pm 0.5°C typical

Maximum Inaccuracy \pm 3°C
(excluding thermocouple error)

Notes:

1. Shields should be grounded at the power source only.
2. All CH- terminals must be connected together.
3. Unused channels should have a shorting wire (jumper) installed from CH+ to CH-.

Permissive Digital Inputs:

All Dry contact or triac rated
for 120 VAC at 20 mA.

Relay Output Specifications

Output Voltage Range 6-240 VAC, 47-63 Hz
6-27 VDC

Maximum Voltage 264 VAC, 30 VDC

Maximum Current 2A/point

Maximum Leakage Current 0.1 mA @ 246 VAC

Smallest Recommended Load 5 mA @ 5 VDC

Relay Operating Cycles:

Voltage and Type of Load	Load 1A	Current 2A
24 VDC Resistive	600K	270K
24 VDC Solenoid	150K	60K
110 VAC Resistive	900K	350K
110 VAC Solenoid	350K	150K
220 VAC Resistive	600K	250K
220 VAC Solenoid	200K	100K

Touch Screen Display:

Screen Size 5.7 in. dia.

Resolution 320 x 240

Touch Grid 8 x 6

Communications:

Protocol ModBus Slave

Physical RS-422 4 wire
RS-485 2 wire

Baud Rate 2.4, 4.8, 9.6, 19.2, 38.4 Kbaud

Stop Bits 1 or 2

Parity odd, even, none

On Delay 5, 10, 20 ms.

Address 1 - 128

Max. network distance 4000 feet

Max. number of devices 32 per network

Max. baud rate 38.4 Kbaud

Max. driver load 62 ohms

Driver voltage \pm 1.5 V minimum

No load current 80mA

Max. current 100 mA (62 ohms)

Isolation resistance >1014 ohms/7pF

Voltage withstand 1.2 KVrms/1s

1.0 KVrms/1 minute

Termination Dipswitch selectable

Bias resistors Dipswitch selectable

RS485/RS422 Operation Dipswitch selectable

Connections Plug in removable terminals
for field termination

CONTROL AND ALARM

Control Modes: Single Loop PID
Differential PID
Cascade PID/PID

PID Parameters:

Proportional Band 20 to 2000 degrees
Reset61 to 60 repeats per minute
Rate 0 to 99.99 seconds
Reset Windup Limit 100% fixed
Rate Limit X10 fixed
Manual Output 0 to 100%, 1% steps
Control Setpoint full range, 0.1 deg. setting
Setpoint Limits high and low full range,
0.1 deg setting
Alarm Setpoint full range, 1 deg. Setting
Alarm Deadband 0 to 50.0, 0.1 deg. Setting
Ramp to Setpoint 0 to 2000 deg.
Per minute, 1 deg. setting

Time Delay on Interlock 0 to 9999 seconds,
1 second settable

Ground Fault Monitor

Trip setting range 6 to 600 mA
Current indication 0- 100% of trip set point

Password 4 levels settable
Time 24 Hr. clock hrs/min format

Date mm/dd/yy format

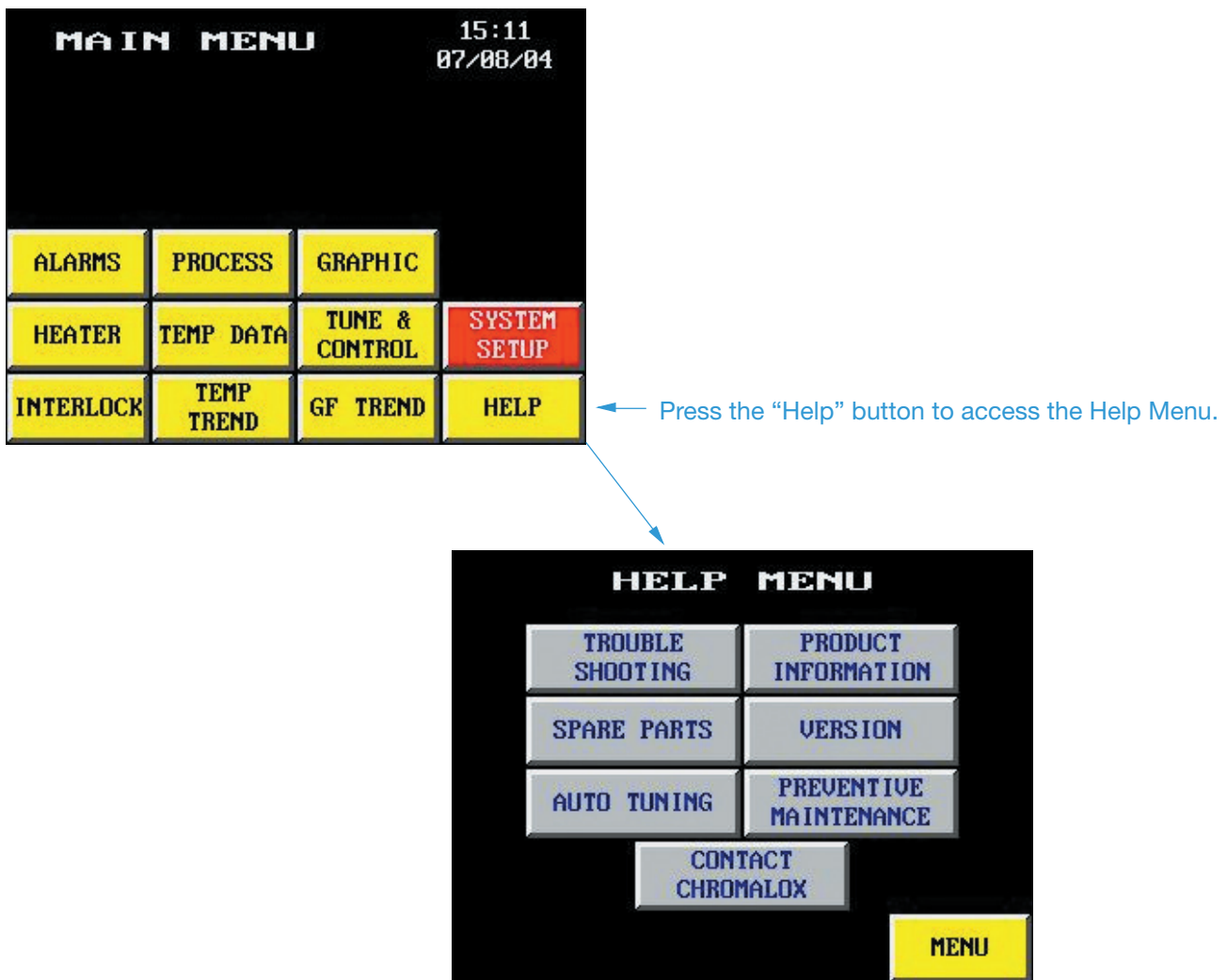
Power Train Components

Main Disconnect Switch load rated shunt trip
with 25 kaic
I²T fusing > 125% load with 100 kaic
Load Circuit Breakers >125% load rated
with 25 kaic
Contactors if supplied load rated

V. Help Menu

The intelliPANEL™ system incorporates help screens to aid in troubleshooting, performing preventive maintenance, and identifying spare parts when repairs are required. Also included are help screens that provide information such as the software versions for the controller and touchscreen. The Product Information screen contains information specific to your system like PO number, date purchased, and drawing numbers for the system components. This information is useful should you ever need to contact Chromalox, Inc. regarding your intelliPANEL™ system. We have even provided contact information so that if you need assistance there is no need to search for our contact information. It's all right there at your fingertips!

To Access the Help Menu, go to the Main Menu and press the “Help” button. The Help Menu will be displayed showing the possible selections.



Troubleshooting – Opens the troubleshooting menu which contains links to information for troubleshooting high cabinet temperature, high heatsink temperature, shorted SCRs, temperature alarms, control issues, and current unbalances.

Spare Parts – Opens the Spare Parts screen which lists commonly used spare parts for the system.

Auto Tuning – Displays a series of screens with useful information regarding the auto tuning feature.

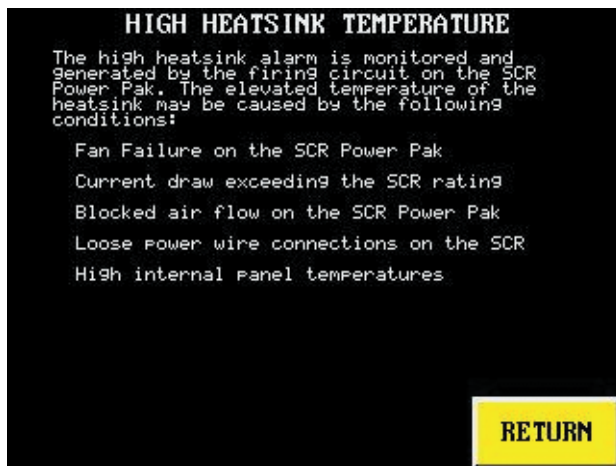
Product Information – Opens the Product Information screen which shows the purchase order number, ship date, panel part number, panel drawing number, heater part number, heater drawing number, and tag number specific to the user’s system.

Version – Displays the installed display and controller software version numbers.

Preventive Maintenance – Displays important safety warnings and useful preventive maintenance actions that should be followed for trouble free operation.

Contact Chromalox – Opens a screen containing address, telephone number, and web site address for contacting Chromalox for additional information.

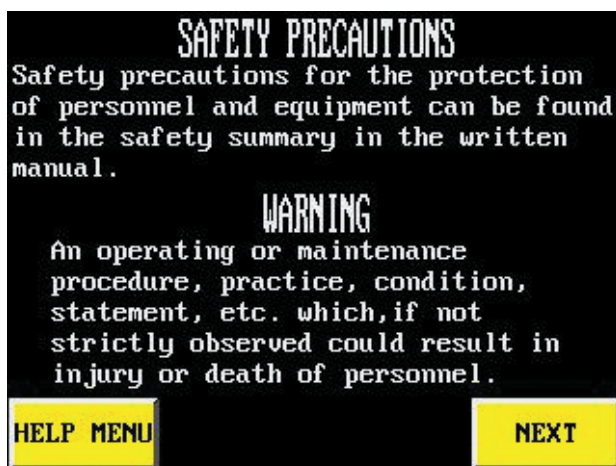
Examples of the help screens are shown below:



High Heatsink Temperature



Shorted SCR Help



Preventative Maintenance 1



Preventative Maintenance 2

Purchase Order	SHIP DATE
YOUR PO NUMBER	JUNE 8th 2004
Panel Part#	PANEL DRAWING #
Z12371991N	E37829411J
Heater Part #	HEATER DRAWING #
HT47721H221	RT371991234
TAG #	
TIC06082004	

RETURN

Product Information

SPARE PARTS

1. SCR Pwr. Pak	CHROM	MXPXII-30111-F03L45
2. Contactor	SO D	56LW3456
3. OT Alarm	CHROM	3101-23456
4. Controller Kit	CHROM	0135-30203-02
5. HMI Display Kit	CHROM	0135-30234
6. CB, 2P 30 amp	SO D	0023EPD
7. Cont, 3P 175 AMP	SO D	LCIF11566
8. Disc, 100 AMP	SO D	FHL3600M
9. PLT, Amber	SO D	ZB480053

RETURN

Spare Parts

DISPLAY SOFTWARE
0135-30202-01

CONTROLLER SOFTWARE
0135-30210-03

RETURN

Software Versions

CHROMALOX INC.
103 Gamma Drive Ext.
Pittsburgh Pa. 15238
412-967-3800
www.chromalox.com

RETURN

Contact Us

VI. Service Information

Chromalox is a global supplier, providing the highest level of customer support. If you should have questions concerning your IntelliPANEL™ control panel, or need information, you may contact Chromalox at:

Chromalox
103 Gamma Drive Ext.
Pittsburgh, PA 15238
Telephone: 800-443-2640
(412) 967-3800
Fax: (412) 967-5148

For application questions, you can:

1. Call one of our application engineers for personal assistance at 1-888-996-9258.
2. Visit the technical reference section of our website at www.chromalox.com for downloadable manuals in .pdf format.

VII. Appendix

Modbus™ Register Numbers

Modbus Address Table

Alarm Coils (Read)¹

	Input 1 ² [Inlet]	Input 2 [Outlet]	Input 3 [Shell]	Input 4 [Sheath]	Input 5 [Input5]	Input 6 [Input6]	Input 7 [Input7]	Input 8 [Input8]
Lo-Lo Alarm	3073	3077	3081	3085	3089	3093	3097	3101
Lo Alarm	3074	3078	3082	3086	3090	3094	3098	3102
Hi Alarm	3075	3079	3083	3087	3091	3095	3099	3103
Hi-Hi Alarm	3076	3080	3084	3088	3092	3096	3100	3104
Sensor Fault	3105	3106	3107	3108	3109	3110	3111	3112
Alarm Setpoint Error	3113	3114	3115	3116	3117	3118	3119	3120

Discrete Alarm Input 1	3121
Discrete Alarm Input 2	3122
Unbalanced I L1-L2	3123
Unbalanced I L1-L3	3124
Unbalanced I L2-L3	3125
Reserved	3126-3136

Miscellaneous Coils (Read)

Disconnect Status	3137	Cascade Minor Loop Mode	
Load Side Breaker Status	3138	Manual	3151
Heatsink Overtemp	3139	Auto	3152
SCR Shorted	3140	Cascade	3153
Ground Fault	3141	Single, Differential, or Cascade	
Selector Switch Auto	3142	Major Loop Mode	
E-stop	3143	Manual	3154
Sheath High Limit	3144	Auto	3155
Threshold Clear	3145	Degrees Celsius Selected	3156
Shell High Limit	3146	(On=Celsius, Off=Fahrenheit)	
Interlock 1 [Flow]	3147	Single Loop Mode	3157
Interlock 2 [Pressure]	3148	Differential Mode	3158
Interlock 3 [Time Delay]	3149	Cascade 1 [Outlet/Sheath]	3159
Interlock 4 [Spare]	3150	Cascade 2 [Input5/Sheath]	3160
		Remote Command Signal	3161

Registers (Read)³

⁴	Single Loop	Differential		Cascade Major		Cascade Minor		
Setpoint (SP)	41035	41035		41035		41033		
Process Variable (PV)	41036	41036		41036		41034		
Output %	41114	41114		41114		41113		
⁴	Input 1 ² [Inlet]	Input 2 [Outlet]	Input 3 [Shell]	Input 4 [Sheath]	Input 5 [Input5]	Input 6 [Input6]	Input 7 [Input7]	Input 8 [Input8]
Temperature	41037	41040	41043	41046	41049	41052	41055	41058
Highest Recorded	41038	41041	41044	41047	41050	41053	41056	41059
Lowest Recorded	41039	41042	41045	41048	41051	41054	41057	41060
Delta T (Input2-Input1)	41061							
Hi-Hi Alarm Setpoint	41062	41066	41070	41074	41078	41082	41086	41090
Hi Alarm Setpoint	41063	41067	41071	41075	41079	41083	41087	41091
Lo Alarm Setpoint	41064	41068	41072	41076	41080	41084	41088	41092
Lo-Lo Alarm Setpoint	41065	41069	41073	41077	41081	41085	41089	41093
Deadband	41094	41095	41096	41097	41098	41099	41100	41101
Volts								
A-B	41102							
B-C	41103							
C-A	41104							
Amps								
A	41105							
B	41106							
C	41107							
Duty Cycle	41108							
Power - kW	41109							
Resistance								
A-B	41110							
B-C	41111							
C-A	41112							

Coils (Write)

	Input 1 ²[Inlet]	Input 2 [Outlet]	Input 3 [Shell]	Input 4 [Sheath]	Input 5 [Input5]	Input 6 [Input6]	Input 7 [Input7]	Input 8 [Input8]
Reset Highest/Lowest Recorded Values	3569	3570	3571	3572	3573	3574	3575	3576

Registers (Write)

4	Single Loop	Differential	Cascade Major	Cascade Minor
Setpoint	40770	40770	40770	40769
Output % (Manual mode)	40812	40812	40812	40811

4	Input 1 ²[Inlet]	Input 2 [Outlet]	Input 3 [Shell]	Input 4 [Sheath]	Input 5 [Input5]	Input 6 [Input6]	Input 7 [Input7]	Input 8 [Input8]
Hi-Hi Alarm Setpoint	40771	40775	40779	40783	40787	40791	40795	40799
Hi Alarm Setpoint	40772	40776	40780	40784	40788	40792	40796	40800
Hi Alarm Setpoint	40773	40777	40781	40785	40789	40793	40797	40801
Lo-Lo Alarm Setpoint	40774	40778	40782	40786	40790	40794	40798	40802
Deadband	40803	40804	40805	40806	40807	40808	40809	40810

Notes:

1. Alarm coils are ON when NOT in alarm, OFF when in alarm. An internal communications error will cause all Alarm Coils to be set to OFF or alarm state. This does not apply to Miscellaneous Coils.
2. Text in square brackets [] are factory default text identifiers.
3. An internal communications error will cause all read registers to go to the maximum value of 32767.
4. All temperature and setpoint registers have one implied decimal place (i.e.: 15457 = 1545.7 degrees)

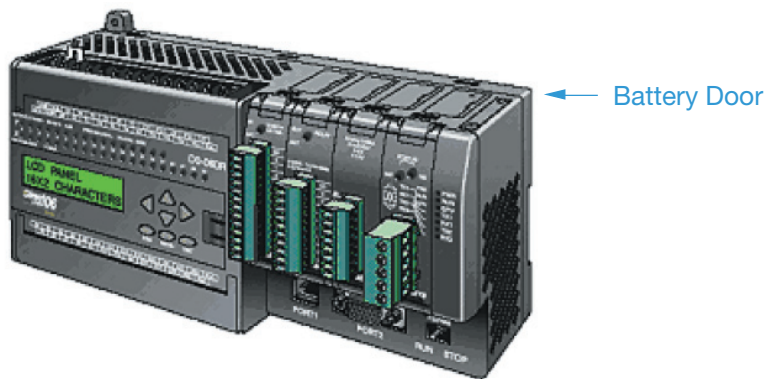
Replacing the CPU Backup Battery

The intelliPANEL™ system is equipped with a lithium backup battery (Chromalox Part Number 0108-70102) to retain RAM memory if the processor is without power for an extended period of time. Typical battery life is 5 years. If the battery voltage is low, output Y10 will be on (contacts closed).

Warning: If the CPU has been without power for more than ten days with a low battery the system configuration data may have to be reloaded.

To install the battery in the CPU:

1. Press the retaining clip on the battery door back and swing the door open.
2. Place the battery into the slot as shown on the top of the battery door.
3. Rotate the battery door back into position making sure that it locks securely in place.
4. Make a note of the date the battery was installed.



Theory of Operation

The set up of the individual parameters is explained in each section of the manual. This overview is intended to give a quick summary of system functionality.

One of five modes of control can be set up by the user. The available control modes are:

Single Loop: Temperature Input 2 is used as the process variable for modulating the control output.

Delta T (Differential): The difference between Temperature Input 2 and Input Temperature 1 is used as the process variable for modulating the final control element.

Cascade Mode 1: Cascade control is accomplished by use of Temperature Input 2 as the process variable of the Major Loop. The control output of the Major loop is routed to the Minor loop as a variable temperature setpoint. The Minor Loop uses Temperature Input 4 as the process variable for modulation of the final control element.

Cascade Mode 2: Cascade control is accomplished by use of Temperature Input 5 as the process variable of the Major Loop. The control output of the Major loop is routed to the Minor loop as a variable temperature setpoint. The Minor Loop uses Temperature Input 4 as the process variable for modulation of the final control element.

Remote Command Signal: A 4-20 mA signal from a remote source (PLC, DCS, or other controller) is passed through the IntelliPANEL controller for modulation of the final control element.

Up to eight temperature sensors can be wired to the controller for monitoring and alarming. All eight temperatures are monitored and the highest and lowest values are automatically recorded. The high/low values can also be reset. HI-HI, HI, LO, and LO-LO configurable alarms are available for each temperature input. The user can choose which alarms to send to the four alarm relay outputs.

All shut-down conditions are monitored and when one is encountered a pop-up System Master screen is displayed indicating the status of the items that can cause the shut-down. Items that caused the shut-down flash red while items that are in a “healthy” state are indicated in solid green. When a shut-down occurs, the control loops are set to Manual mode with zero percent output.

System variables can be communicated to and from the controller via MODBUS™ protocol after setting up the communications port. Refer to the Section titled “Applying Communication Settings” for information on how to properly set the communication parameters. A list of communicated variables and their addresses can be found at the beginning of the Appendix.

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