CHROMALOX
Advanced Thermal Technologies

HEAT TRACING PANEL CONTROL & MONITORING PHILOSOPHY

Panel operation procedure

Heat Tracing Control Panel Operation Procedure

Step 1: Preparation

Before panel energizing, please ensure all the MCCB, MCBs are all at OFF position. And ensure the output cable connection to the terminal blocks with good connection. Check the terminal block screws are tight.

Ensure the 'Emergency' button is at OFF position.

After the incoming power comes, the incoming power pilot lights will be active. the voltmeter on the panel will indicate the incoming voltage. Operator may use the voltage switch to check the voltage coming between different phases.

Step 2: Switch ON Main MCCB

Switch on the MCB F5 before switch on the Main MCCB, then push MCCB ON pushbutton S1 to Switch On Main MCCB. Push pushbutton S2 to Switch OFF MCCB.

Step 3: Switch ON auxiliary circuit MCBs

Switch ON all the auxiliary circuit MCBs for PLC, HMI, Air Condition, socket etc.

Step 4: Circuit Temperature Checking

When the PLC and HMI starting completed, the HMI screen will indicate the circuit temperature for each lien. If the indication shows as '##', please check the circuit temperature transmitter connection.

Step 5: Switch ON all MCBs for Heat Tracing

Switch ON all MCBs for the Heat Tracing. Ensure the indicator on the MCB shows RED position.

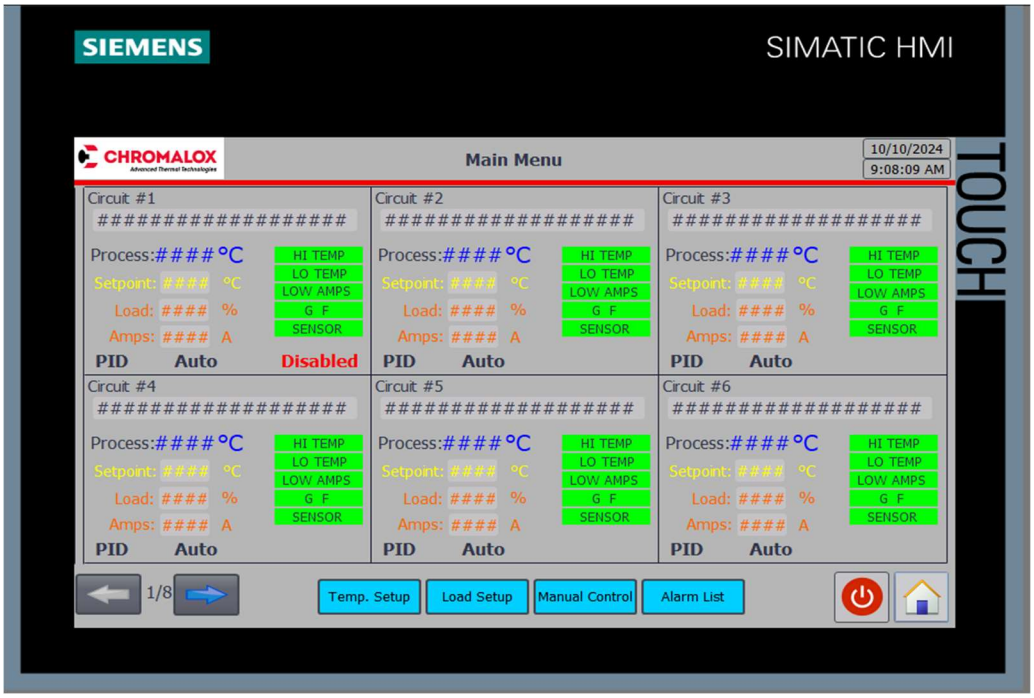
HMI operation procedure

The system itself will be controlled automatically via a PLC. line maintains temperature and alarm temperature can be set at the HMI (human machine interface) and will be presented with default parameters during the FAT.

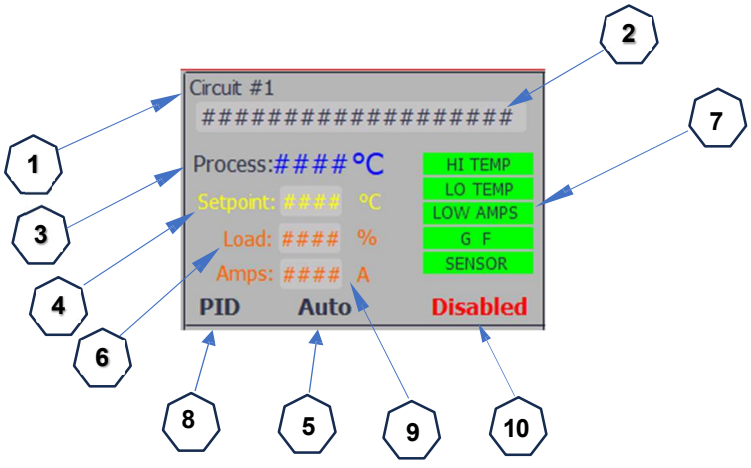
The monitoring and setting interface shown as below.

Main Menu

Offered Control panels provide users with an easy-to-use touchscreen interface. In the Main Menu, the user can choose from several function buttons including Temperature setup, Load Setup, Alarm List, Manual Control. Main menu displays.



The main menu also allows the user to view Circuit name, Circuit number, Process and Set point temperatures, Displays of alarm status, Load status (On/ Off/ Inactive), Control state (Manual or Auto).



(1) Circuit # – Displays the circuit number.

(2) #### - Displays the Circuit Name set by the operator. Can be set/ changed in “Temperature Setup Menu”.

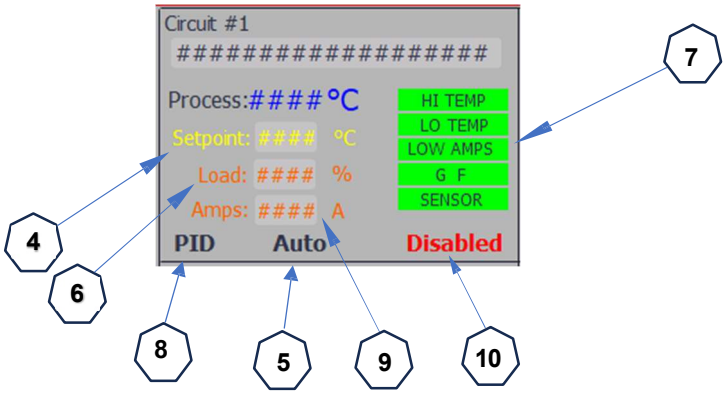
(3) Process – Displays the real-time pipeline surface temperature sensed from the field mounted RTD sensors.

(4) Setpoint – Set point temperature is the control temperature to be maintained throughout the process and is set by the operator. The setpoint temperature value for individual circuit will be set by the operator by pressing the “Temp. Setup” button on the Main Menu.

(5) Auto/ Manual – Displays the mode of operation i.e. Auto or Manual. The setpoint temperature chosen will be used if/when the system is in auto mode. The Controller will turn the heating circuit On or Off based on the set point.

In Manual mode a Circuit can be set to be either in ON or OFF condition irrespective of process temperature readings.

The mode of operation can be set by the operator by pressing the “Manual Control” button on the Manual Control screen.



(6) Load – Displays the Load output percentage.

(7) Alarm Status – Displays the Alarm status. In case of any alarms (High Temperature, Low Temperature, Low amperage, Ground Fault, Open Sensor) the respective Alarm button will turn to RED.

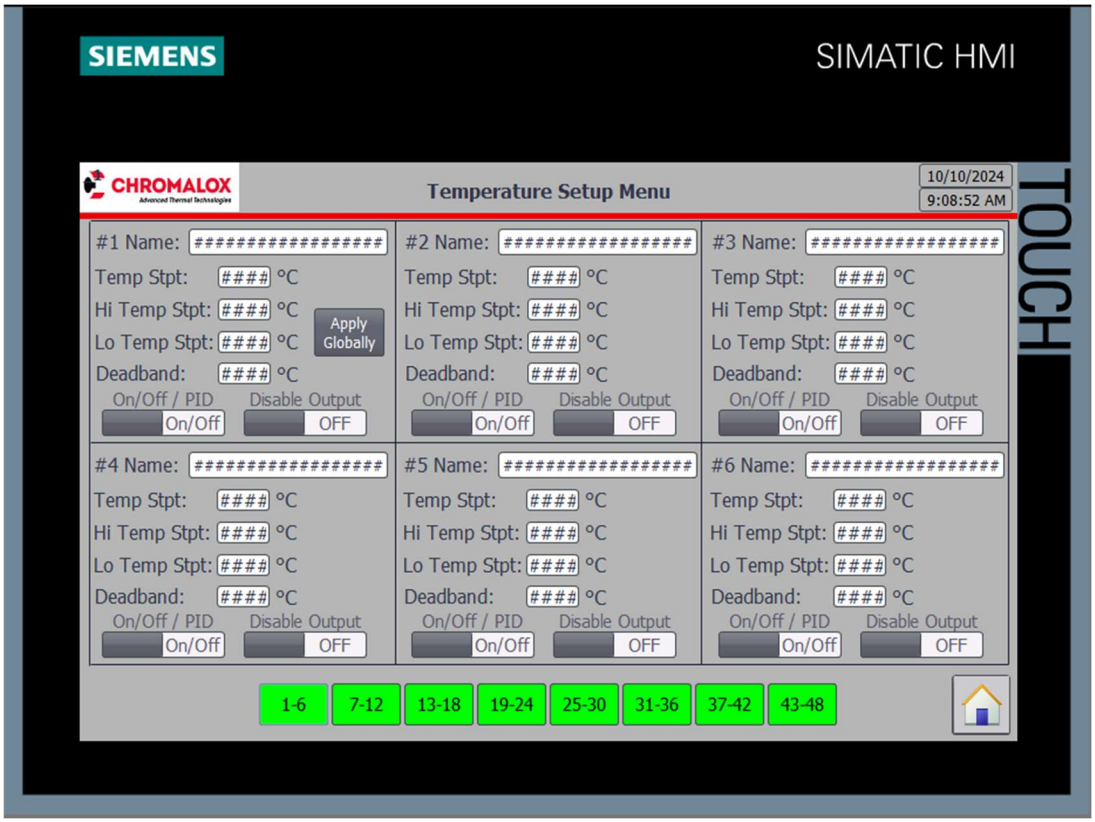
(8) On/Off or PID – To display the current working mode, On/Off control or PID control, the working mode can be set by the operator by pressing the “Temp. Setup” button on the Main Menu.

(9) Amps – Displays the operating current of the current loop.

(10) Disabled – If selected, the circuit will not work in any circumstances.

I. Temperature Setup Menu

The Temperature Setup Menu panel establishes setpoint, deadband, high and low temperatures, Low Amperage, and Control mode. Settings made on the Temperature Setup Menu screens provide operating ranges for the entire system and define the parameters in which the system will operate.



Applying Temperature Setpoint

Set point temperature is the control temperature to be maintained throughout the process and is set by the operator. In the On/Off Control mode the controller will keep the Circuit ON (100% Output) as long as the Process temperature is below the Setpoint value. Once the process temperature exceeds the Setpoint value, the controller will Turn the respective Circuit OFF (0% Output). In the PID Control mode, the output will keep a suit percentage to keep the process temperature same as the setpoint temperature.

High/ Low temperature setpoint defines the values for the high and low temperature that the system will work within. Controller will generate the High temperature alarm when Process temperature exceeds the High temperature set point value and a Low temperature alarm when Process temperature drops below the Low temperature setpoint.

In case of a High temperature alarm, the Circuit will remain OFF while the controller will produce a visual alert on the "Main Menu".

In case of a Low temperature alarm, the Circuit will remain ON while the controller will produce a visual alert on the "Main Menu". The low amp alarm actuates when the current is equal to or less than the alarm setpoint. The low amp setpoint can be

programmed to any value based on the real load amps.

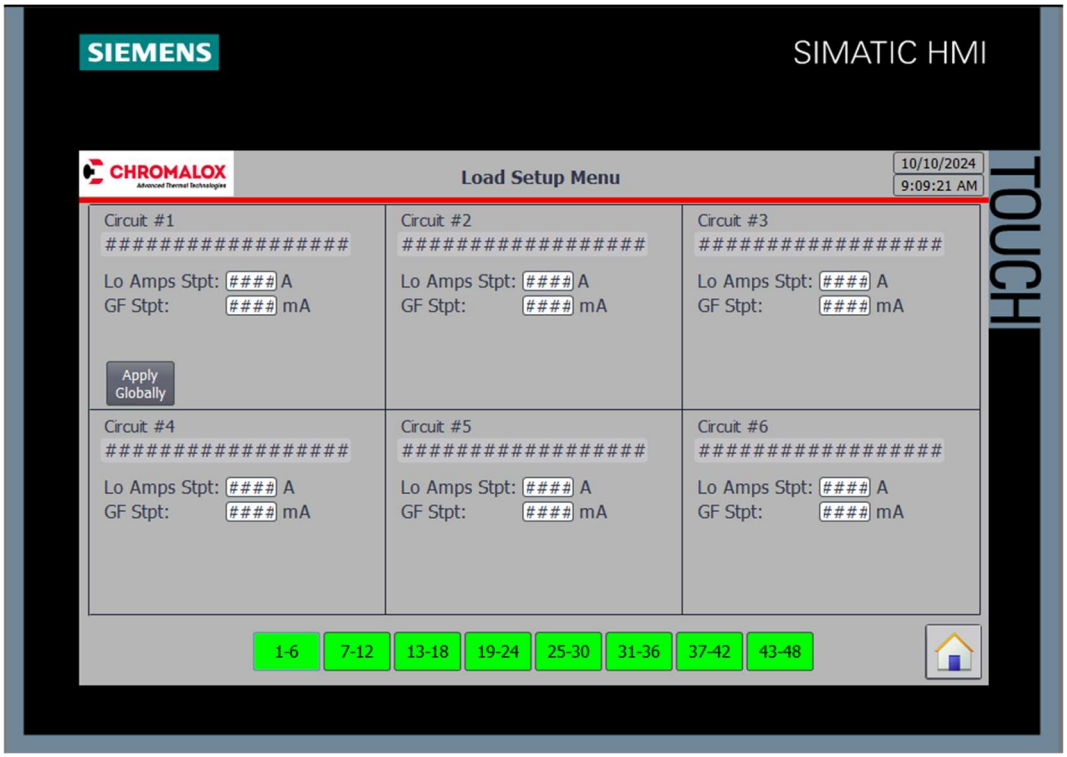
Deadband

Dead band settings allow for a small area of fluctuation between the points when the system activates and when the system reaches the setpoint temperature. It is a range of the variable in which no corrective action is taken by the system. For example, if the setpoint temperature is at 50, and deadband is set at 2, the heat output will activate when the temperature drops below 48 and deactivate when the temperature reaches 50. Dead band is measured in units ranging from 1-10.

Disable Output

Allows user to override all settings and keep the selected circuit Disabled. The controller completely skips the Disabled circuit.

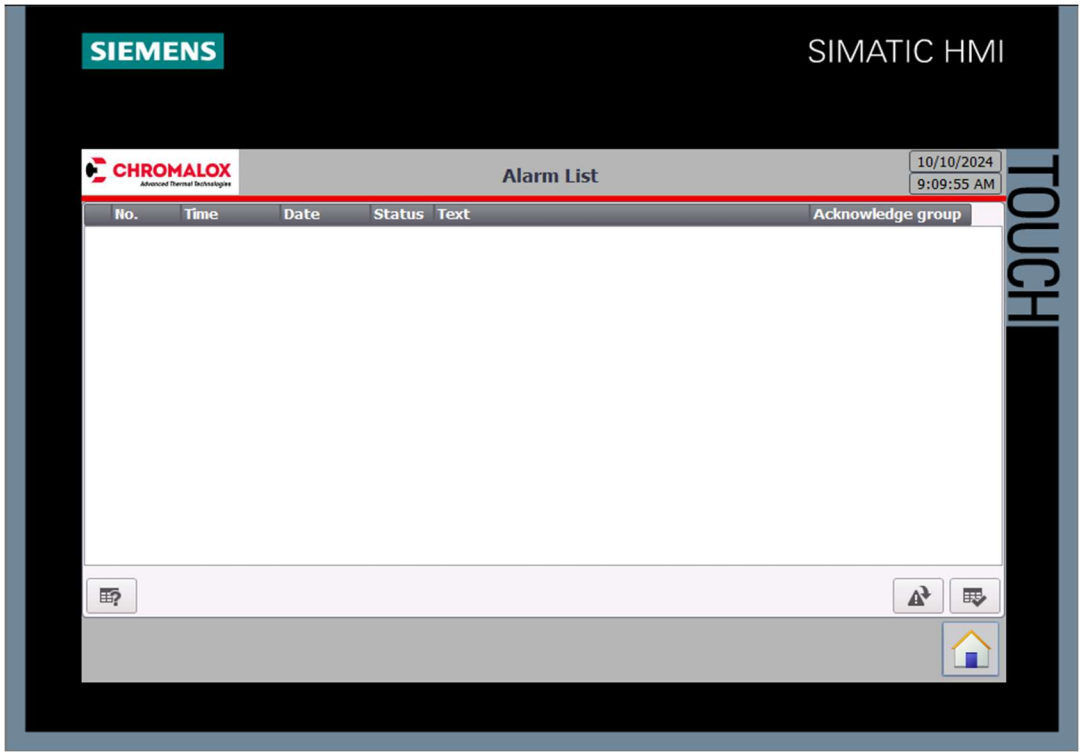
II. Load Setup Menu



Allows the operator to set a Low amperage setpoint and Earth leakage current setpoint. In case the current drawn by a particular circuit reaches or drops below the Low Amp. Setpoint, the Controller will generate an Alarm (Visual). In case the Earth leakage current reaches or above the Setpoint, the Controller will generate an Alarm (Visual). The Load Setup Menu shows a total of 6 circuits in one screen. User can selection the desired circuit by using circuit navigation buttons 1-6, 7-12, 13-18, 19-24 and 43-48. For example, to access the Load setup menu for Circuit 8, User will have to press button 7-12.

An option to apply the setting globally is also provided. User can apply the setting globally to all active circuits without individually going through all screens.

III. Alarms Menu



This Alarm list for monitoring and managing system alarms. Here is a detailed description of its functions.

1. Alarm Display: The alarm list clearly presents all active alarms in an organized manner. Each alarm entry includes essential information such as alarm time, alarm description, and alarm severity.

2. Severity Indication: Different alarm severities are indicated by colors or symbols, allowing operators to quickly identify critical alarms that require immediate attention.

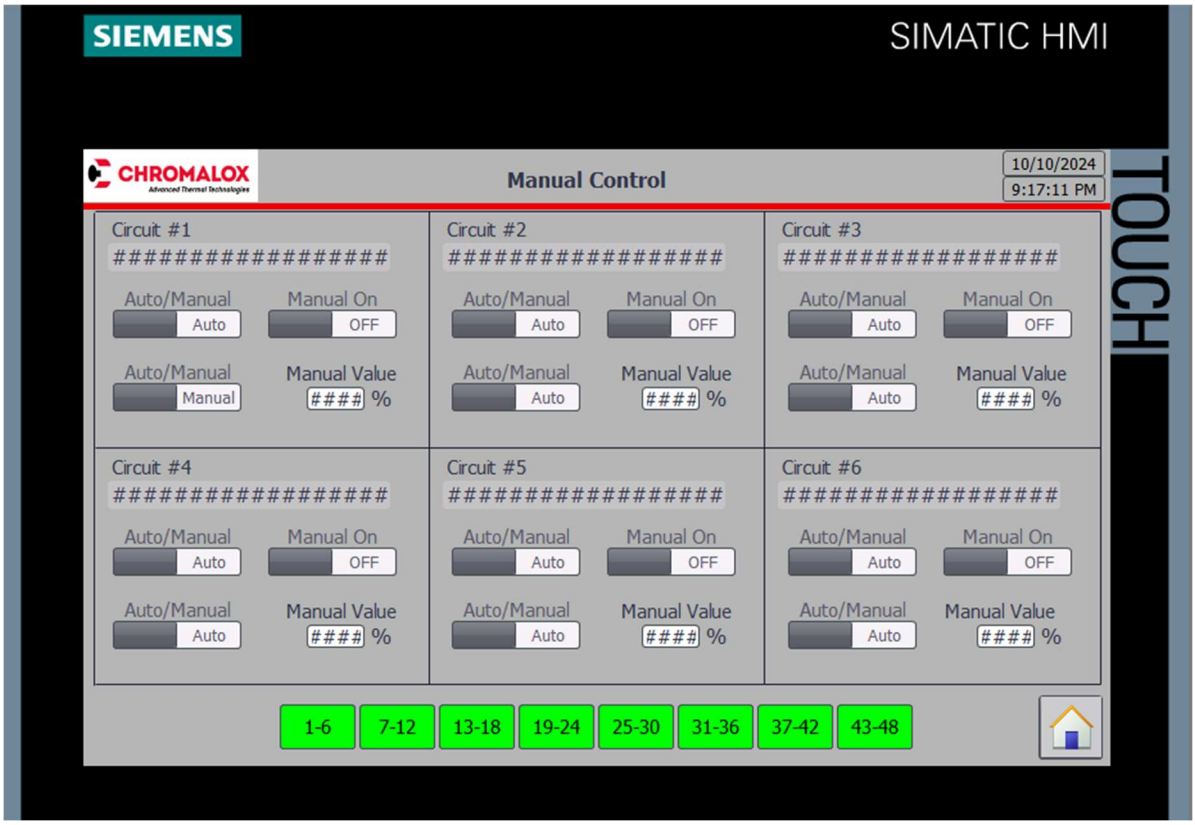
3. Filtering Options: Users can filter the alarm list based on various criteria such as alarm type, severity level, or time period. This helps in focusing on specific alarms and reducing clutter.

4. Acknowledgment: Operators can acknowledge alarms to indicate that they are aware of the issue. Acknowledged alarms are often displayed differently to distinguish them from unacknowledged ones.

5. History Logging: The alarm list keeps a record of past alarms, providing a historical view for troubleshooting and analysis. This log can be exported for further review if needed.

IV. Manual Control

In this screen, User can Manually force ON and force OFF each circuit. There are two different control mode for Manual Control On/Off and PID.



Auto/ Manual

Gives the Operator the choice between two options: Automatic and Manual.

ON/OFF control

When the control mode is selected as ON/OFF control on the "Temperature Setup Menu". When Automatic, the controller acts on the logic based on the setpoint. When Manual, allows the user to override individual settings and keep the Circuit either ON or OFF by the button" Manual On".

PID control

When the control mode is selected as PID control on the "Temperature Setup Menu". The operator can choose manual control, meanwhile the output percentage will be corresponding to the input value "Manual Value".