

## Power Control Panel Options

### Air Filter Kits

This option provides filters to cover the intake and exhaust ports in conjunction with any louvers or fans required. Filters are constructed of aluminum, are washable and provide good arrestance of airborne particles with minor pressure drop. The exhaust port filters are removed from their slide racks inside the enclosure and the intake filter and grill are removed via thumb screws outside the enclosure.

### Ammeter, Single Phase

A current transformer, integrator board and door mounted ammeter reads the average load current.

### Ammeter, Three Phase

A set of three current transformers, an integrator board, a door mounted ammeter and a four position switch permits the customer to read the average line current on any one of the three phases. The four position switch provides "OFF"/"Phase One"/"Phase Two"/"Phase Three" positions.

### Annunciation, Audible Horn

This option provides an audible horn to alarm on shutdown or any other alarm condition specified. An acknowledge pushbutton is provided. The horn has NEMA 7 classification, is mounted on the outside of the box and provides approximately 112 dBA at 4 feet. (This option is for the horn only. The alarm signal must be provided by another option or by the controller.)

### Annunciation, Flashing Beacon

This option provides a flashing light to alarm on shutdown or any other alarm condition specified. An acknowledge pushbutton is provided. The beacon has NEMA 4 classification and is mounted on the outside of the box. (This option is for the flashing light only. The alarm signal must be provided by another option or by the controller.)

### Calibration, Firing Package

This option applies to any special firing package calibration using the standard control signal input range of 4-20mA, 1-5Vdc, etc. For Calibration outside the standard range, consult the factory.

### Cascade Control

This option includes two 2104 controllers for heater applications having response lags. The "upper" 2104 is the master controller and receives the setpoint selection for the process. The lower 2104 is the slave controller and controls the actual sheath temperature of the heater, with one alarm setpoint functioning to provide hi-limit shutdown function.

### Circuit Breaker

This option replaces our standard mechanical disconnect with a circuit breaker to provide automatic overcurrent protection. A variety of circuit breaker sizes are available. (NOTE: The solid state devices are protected by sub-cycle fuses and, therefore, circuit breakers are usually not necessary.)

### Continuous Control Power

This option applies to control panels with shunt trip mechanisms (panels rated at 125 amperes and above), and can also apply to panels of 125 ampacity or less which have shutdown contactors. It provides circuitry to allow instrument power to remain on when the disconnect or shutdown contactor is tripped. An internal switch is provided to turn the instrument power off when desired and a protective shield is provided around the control transformer. Warning signs are also included.

### Control Relay, DPDT

This option provides a 10A, 120 Vac DPDT relay with 120 Vac coil leads and all contact leads (both NO and NC) wired to a terminal block for customer use. (NOTE: AC power is customer provided.)

### Disconnect Trip, Undervoltage

This option provides a trip to disconnect the voltage from the load when the line voltage falls approximately 40-60% of the coil rating. The panel would then have to be manually reset after the voltage level reaches 80% of the coil rating. Option applies only to models over 125 amperes.

### Drawings, Approval

This option applies when the customer requires approval drawings prior to release for manufacturing. (Record documents are normally shipped with each unit.) With this option, we provide one reproducible and three copies of the proposed layout and electrical schematic for customer approval. The production process does not begin until after the Approval Drawings have been returned by the customer. If the approval documents requested are more extensive, consult the factory for pricing.

### Floor Stand

This option provides a 12" stand kit for any wall mounted enclosure, making it a free standing floor model.

### Fusing, Sub-Circuit

Standard fusing is designed for internal component protection (i.e., SCRs, diodes, firing package and control transformer). This option applies when the customer wants the panels to include fuses for load protection. To perform this task, we must know the number of circuits involved and the ampere rating for each. Therefore, the factory must be consulted on a case-by-case basis. In most cases, the Power Distribution Blocks Option will also be required.

### Ground Fault Interrupt

The ground fault interrupt option monitors for ground faults adjustable from 5mA to 100mA. The option consists of a ground fault detector and a current transformer (CT). When the circuit detects a ground fault greater than the set level, the circuit will shutdown the panel.

### Heaters, Internal Panel

This option provides for a strip heater and a thermostat to maintain the panel's internal temperature, thus preventing condensation, freezing of water-cooled components and protection of electronic components. For severe environmental conditions, consult the factory.

# Power Control Panel Options *(cont'd.)*

## Indicator Lights

Standard panels have an amber power "ON" lamp which indicates that the disconnect mechanism is in the ON position and main power is applied to the panel. This option applies to other lights desired on the panel. The application of the lamp and the color of the lens desired must be defined by the customer. Some of the applications could be: contactor "ON" indication, alarm shutdown lamp, overtemperature lamp, pump "ON" lamp, etc. Standard lens colors are as follows:

Lens Color	Indicator Status
Amber	Caution or Equipment ON
Green	Safe or Normal
Red	Emergency Condition
Blue	Condition Indication
White/Clear	Normal Operation or Condition Indication

## Instruction Manuals

One set of instruction manuals and drawing is shipped with each piece of equipment. This option covers extra copies of instruction manuals and drawings that may be desired. Extra instruction manuals can be shipped either with the units or separately to another location. Depending upon the model, standard instruction manuals include some combination of: a drawing of the power panel, an electrical schematic, an instruction manual on each electronic temperature controller, an instruction manual on the power controller and a one or two page addendum which describes the options included and the overall operation of the panel. Instruction manuals more extensive than this will require consultation with the factory.

## Interlocks, Remote Shutdown

The shutdown circuitry on the overtemperature controller will be routed to and from a pair of jumpered terminal point connections. To interlock a remote shutdown device with the power panel, the customer must install a normally closed contact device which will open upon intent to shut down the panel. For panels rated at 125 amperes and less, the design will be via interruption of

power to the shutdown contactor. For power panels rated at 200 ampere capacity and greater, the design will be via interruption of the power to the control relay which engages power to the shunt trip unit, tripping out the disconnect. As many of these interrupt connections can be provided as desired.

## Light, Internal Panel Utility

This option provides an 18 inch, 15 watt fluorescent light in the power panel with an ON/OFF switch. The light is positioned toward the front top of the enclosure. The 120 Vac power for the light must be supplied by the customer to a terminal strip. If the panel is to supply the power for the light, the factory should be consulted for sizing the control transformer.

## Meter, Kilowatt Hour (Power Consumption)

This option provides a cumulative kilowatt hour meter for monitoring power consumption. It includes a watt transducer, power supply, current transformers (if required), integrator board and a resettable display meter. If the customer desires to maintain readings when the disconnect is in the OFF position, the Continuous Control Power option should be selected.

## Operation Voltage, 380 Vac

This option provides for operation at 380 Vac 3 phase.

## Operation Voltage, 415 Vac

This option provides for operation at 415 Vac 3 phase.

## Operation Voltage, 600 Vac

This option provides for operation at 600 Vac 3 phase.

## Partial Load Failure

The Partial Load Failure Detection Option will detect a heater failure in single or three phase circuits. This product is essential for processes where the loss of more than one heating element can cause loss of product or expensive unscheduled maintenance.

The option consists of PLF (Partial Load Failure Boards), current transformers, and indication on the panel of a heater failure.

## Power Distribution Blocks

This option provides external connections for six circuits instead of the standard three. The power distribution block to load wiring must exit from the top of the enclosure. If this is not satisfactory, consult the factory.

## Reset Pushbutton

This option is necessary when a latching alarm function is desired in a NEMA 3R cabinet, and permits the resetting of the alarm circuit without opening the integrally hinged window.

## Shutdown, Phase Loss

This option provides for panel shutdown upon loss of any phase of a 3 phase system. A phase loss relay is wired phase-to-phase on the load side of the I<sup>2</sup>T fuses with the output of the relay powering the coil of a 10A, 115 Vac SPDT relay wired to shut down the panel. The unused relay contacts are wired to a terminal block for customer use. On shunt trip models, a normally closed contact is available.

## Stock Product Modification

This option enables the removal of prefabricated equipment from stock for customer required modification, when deemed feasible and necessary for fast delivery.

## Switch, Auto/OFF/Manual Potentiometer

This option provides a rotary switch to select either automatic control (temperature controller), an OFF position or a manual potentiometer which permits manual control of the heater load from full OFF to full ON.

## Switch, Local/OFF/Remote

This option provides switching control from a self-contained panel controller to a remote source, such as an external controller or computer. A door mounted rotary switch is used.

## Switch ON/OFF Door Mounted

A door mounted, rotary ON/OFF switch can be connected to allow manual shut down of the panel. For panels with up to 125 ampere capacity, the switch will interrupt the shutdown contactor holding coil, allowing the panel to automatically re-engage once the rotary switch is returned to the "ON" position. This option is not available for panels of 200 amperes or above.

## Power Control Panel Options *(cont'd.)*

### Tagging, Instrument and Panel

Instrument and Panel Tagging can apply to either individual electronic instruments within a power panel or to the power panel as a complete unit. The Instrument Tag is an adhesive backed, thin film aluminum tag approximately 1" x 3-1/2" that allows two lines of 35 characters each and a purchase order number space for 12 characters. The tagging information should be submitted with the initial purchase order.

### Tagging, Internal Parts

When desired, internal parts (i.e., transformer, fuses, disconnect, etc.) can be identified by a tag. Internal tags are made from pressure sensitive tape with parts nomenclature as depicted on the drawings. The tags will be attached to the subpanel near the respective part.

### Tags, Engraved

Engraved phenolic tags are either white letters on black background or black letters on white background. Overall individual tag size is 3/4" x 4". Letter size is 5/16" high and approximately 14 letters per line with two lines allowed.

### Tags, Stainless Steel

This option provides 1-1/2" x 3" tags made of 20 gauge stainless steel capable of up to two lines of 20 character spaces each. The characters are electro-etched and the tags are attached to the front center of the panel with stainless steel screws.

### Thermostats, Heat Sink

This option provides heat sink thermostats on each of the three heat sinks. No circuitry or wiring is included with this option.

### Utility Outlet

This option provides for a 120 Vac utility outlet for maintenance instruments with the 120 Vac supplied by the customer to a terminal strip. If the panel is to supply the power for this outlet, the factory should be consulted for the proper size control transformer.

### Window, Door Mounted

This option provides a window approximately 5" x 9" to view the electronic instruments in the cabinet, usually a NEMA 3R type.

### Wiring, SIS Control (Switchboard)

This option provides for SIS control circuit wiring (sometimes called switchboard wiring). Control wiring of 14 gauge or smaller only is included in this option. Internal instrument wiring is not included.