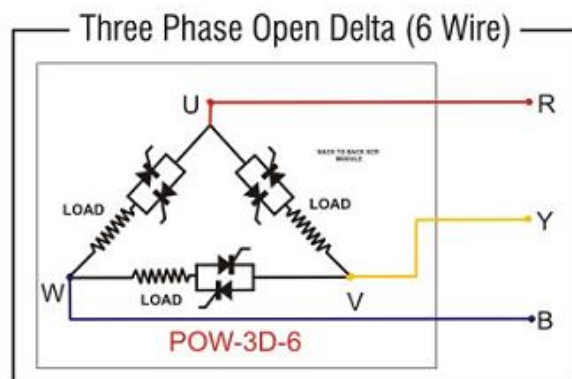
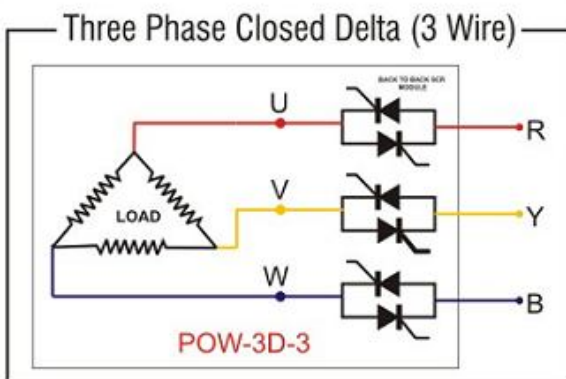
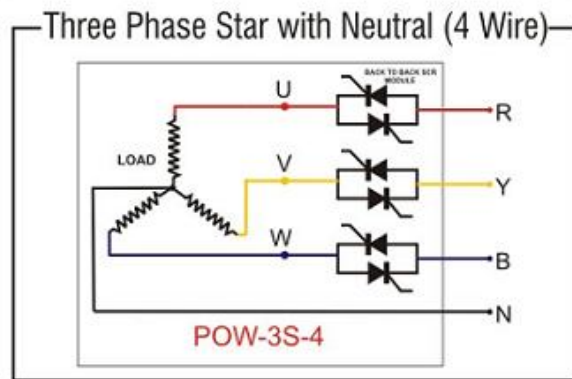
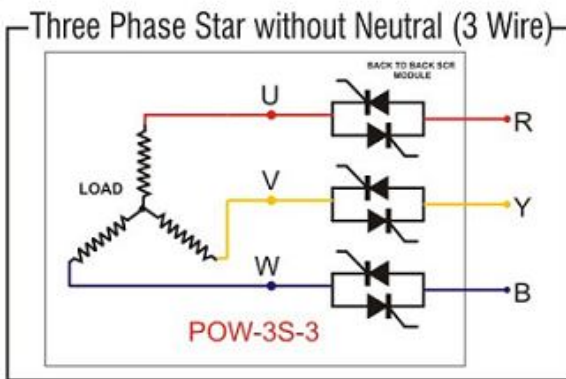
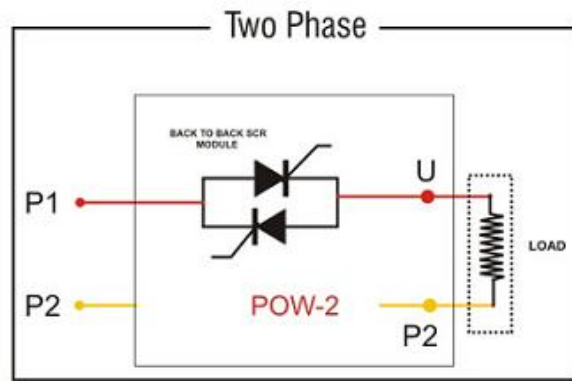
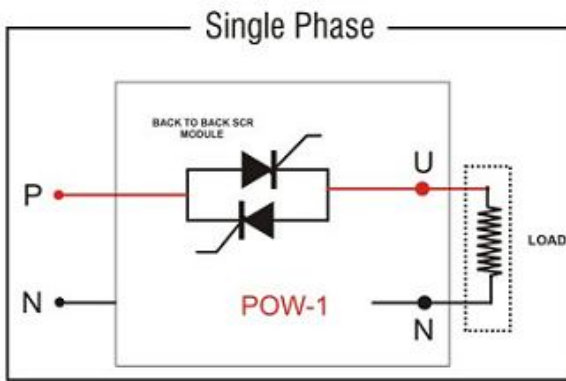
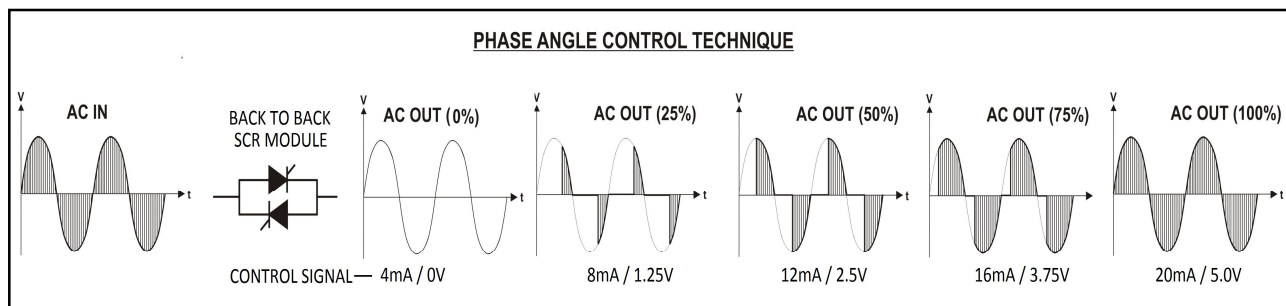


## Thyristor Power Controllers for Resistive and Inductive loads (Product Code 21.3)





### Model Wise Descriptions:

Sr. No	Model	Product Description
21.3.1	<b>POW-1</b>	Single Phase SCR Power Controller for single phase heaters
21.3.2	<b>POW-1-CL</b>	Single Phase SCR Power Controller for single phase heaters with current limit and current trip features.
21.3.3	<b>POW-2</b>	Two Phase SCR Power Controller for two phase heaters
21.3.4	<b>POW-2-CL</b>	Two Phase SCR Power Controller for 2 phase heaters - with current limit and current trip features.
21.3.5	<b>POW-3S-4</b>	Three Phase SCR Power Controller – suitable for 3 phase heaters connected in 4 wire <b>Star</b> with neutral configuration.
21.3.6	<b>POW-3S-3</b>	Three Phase SCR Power Controller – suitable for 3 phase heaters connected in 3 wire <b>Star</b> without neutral configuration.
21.3.7	<b>POW-3S-4 - CL</b>	Three Phase SCR Power Controller – suitable for 3 phase heaters connected in 4 wire <b>Star</b> with neutral configuration with current limit and current trip features.
21.3.8	<b>POW-3S-3 -CL</b>	Three Phase SCR Power Controller – suitable for 3 phase heaters connected in 3 wire <b>Star</b> without neutral configuration with current limit and current trip features.
21.3.9	<b>POW-3D-6</b>	Three Phase SCR Power Controller – suitable for 3 phase heaters connected in open <b>Delta</b> 6 wire configuration
21.3.10	<b>POW-3D-6 -CL</b>	Three Phase SCR Power Controller – suitable for 3 phase heaters connected in open <b>Delta</b> 6 wire configuration with current limit and current trip features.
21.3.11	<b>POW-3D-3</b>	Three Phase SCR Power Controller – suitable for 3 phase heaters connected in close <b>Delta</b> 3 wire configuration
21.3.12	<b>POW-3D-3 - CL</b>	Three Phase SCR Power Controller – suitable for 3 phase heaters connected in close <b>Delta</b> 3 wire configuration with current limit and current trip features.

- Note: 1) For single phase heaters for 4 to 8 KW – our low cost model LTC-16 can be considered.  
 2) For three phase heaters for 9 to 12 KW – our low cost model POW-12 can be considered.  
 3) For physical dimension of specific model, please contact us for mechanical drawing and mounting Dimension.

## Features:

- ❖ 5 Amps to 500 Amps capacity (1KW to 360KW).
- ❖ Single phase / 2 phase / 3 phase versions.
- ❖ Suitable for 3 or 4 wire star configuration / 3 or 6 wire delta configuration.
- ❖ Auto / Manual operation.
- ❖ Accepts (4-20)mA/ (0-5)VDC / (0-10)VDC control input (user selectable)
- ❖ Soft start and step less smooth control.
- ❖ Adjustable power and current limit.
- ❖ Isolated heat sink for safety.
- ❖ Simple and Modular design for easy servicing of firing cards and thyristors.
- ❖ Ideally suitable for resistive, transformer, inductive or heating loads like Silicone Carbide and Molybdenum which exhibits significant changes of resistance with increase in temperature.

## Applications:

Thyristor Power Controller has a varied application and can be used with heating elements like nichrome, Kanthal, Super Kanthal, Silicon Carbide, Molybdenum, Infra Red, etc. where precise and accurate power and temperature control is required. There is a significant electrical power savings with respect to conventional contactor type temperature control system. Thyristors have many direct and indirect advantages compared to electro - mechanical contactor.

## Description of Thyristor Power Controller:

Libratherm offers ready to use SCR power controller for electrical heating loads ranging from 3 KW/Single phase to 360KW/3-phase. This power controller module comprises of suitable triggering card model LTC-12 or LTC-13 or LTC-15 or LTC-18, suitably rated back to back connected SCR modules (with electrically isolated base, mounted on the heat sink, input and output clip-on type heavy duty connectors or copper bus bars, semiconductor fuses and thermal cutouts. The entire assembly is mounted on MS powder coated enclosure, which in turn can be easily mounted inside the closed control panel as desired. Complete ready to use control panel with suitable PID / Program temperature controller can also be supplied as per the user's specifications and requirement.

## Technical Specifications:

<b>Available Ratings</b>	1KW Single phase to 360KW Three phase
<b>Available Configuration</b>	Single phase, Two phase, Three phase (3 or 4 wire star and 3 or 6 wire delta)
<b>Control Action</b>	Phase angle control (self synchronized)
<b>Control Signal</b>	(4-20)mA / (0-5)VDC / (0-10)VDC / Potentiometer – user selectable
<b>Output</b>	0 to 230VAC or 0 to 415VAC variable voltage proportional to the control signal.
<b>Smooth Control</b>	Adjustable Ramp Up and Ramp Down Time for soft increase and decrease of output voltage. (Settable in the range of 2 to 20 seconds)
<b>Current Control</b>	Using on card Current Limit and Trip settings. (LTC-13 and LTC-18)

<b>Settings</b>	For adjusting voltage and current per phase using on card presets
<b>Load Type</b>	Suitable for both resistive and inductive / transformer load
<b>Aux. Supply Voltage</b>	230VAC +/- 10%, 50/60 Hz
<b>Available Models</b>	As given in the above table (Under Model wise description)
<b>Other accessories provided with each power controller</b>	a) RC snubbers / MOV across the SCRs to protect against voltage transients dv/dt b) Thermal cut out switch on the heat sink – to protect thyristors against over heating. c) Cooling fan on heat sinks for all power controllers. d) Heavy duty input/output terminals or Copper or Aluminum Bus bars for supply and heater Connections.
<b>Size (Power Controller)</b>	As per Std. (Sizes can be given on request – based on the model)
<b>Mounting</b>	Power controller can be mounted on the base plate of the control panel

### KW (Kilowatt) wise selection table for resistive or inductive loads:

Load Current per phase to Neutral or Phase1 to Phase 2 AMPS	<b>POW-1</b> @230VAC (V X I) KW	<b>POW-2</b> @ 415VAC (V X I) KW	<b>POW-3S</b> <b>POW-3D</b> @415VAC (V X I X 1.732) KW	<b>POW-3D-6</b> @415VAC (V X I X 3) KW
<b>25A</b> (27A SCR module)	1 - 5 KW	2 - 10 KW	3 - 15 KW	6 - 30 KW
<b>50A</b> (57A SCR module)	6 - 10 KW	11- 20 KW	16 - 35 KW	31 - 62 KW
<b>100A</b> (106A SCR module)	19 – 20 KW	37 - 40KW	36 - 60 KW	63 - 124 KW
<b>150A</b> (162A SCR module)	21 – 30 KW	41 - 60 KW	61 - 107KW	125 - 186KW
<b>200A</b> (250A SCR module)	31 - 40 KW	61 - 80 KW	108 - 142 KW	187 - 249 KW
<b>250A</b> (250A SCR module)	41 - 50 KW	81 - 100 KW	143 - 180 KW	250 - 311 KW
<b>300A</b> (330A SCR module)	51- 60 KW	101 - 120 KW	181 - 215 KW	312 - 373 KW
<b>400A</b> (500A SCR module)	61 - 80 KW	121 - 160 KW	216 - 287 KW	374 - 498 KW
<b>500A</b> (573A SCR module)	81-100 KW	161 - 200 KW	288 - 360 KW	499 - 622 KW

- User can select the required power controller – either by actual current through the heaters or by KW of the heaters.
- Single phase, two phase or three phase selection can be done by selecting appropriate model based on the desired configuration, from the table given above.
- If the heaters are designed at different voltage other than 230VAC or 415VAC, still the selection can be made, based on the actual current flowing through the heaters at the desired voltage level.
- For inductive / transformer load, the desired KW can be selected as per the requirement.
- User must use suitable ratings of semiconductor fuse in series with the thyristors.

### Ordering Information:

MODEL	A- INPUT CONTROL SIGNAL	B- CURRENT (Phase to Neutral) or (Phase1 to Phase2)
POW-1	A1- ( 0-5 VDC ) A2- (0-10 VDC) A3- (4-20 mA) A4- All above but user selectable using DIP switch selection  Variable signal through external potentiometer is available in all models.	B1-25A
POW-1-CL		B2-50A
POW-2		B3-100A
POW-2-CL		B4-150A
POW-3S-4		B5-200A
POW-3S-3		B6-250A
POW-3S-4-CL		B7-300A
POW-3S-3-CL		B8-400A
POW-3D-6		B9-500A
POW-3D-3		
POW-3D-6-CL		
POW-3D-3-CL		

### Examples:

MODEL	A- INPUT CONTROL SIGNAL	B- CURRENT (Phase to Neutral) or (Phase1 to Phase2)
POW-1	A1	B2
POW-2-CL	A3	B5
POW-3S	A3	B3
POW-3D-3 -CL	A2	B6

Example	Ordering Code	Description
1	POW-1-A1-B2	This is single phase AC power controller with 0-5VDC control Signal suitable for maximum 10KW @ 230VAC, or max. 50A @ 230VAC, single phase heater load.
2	POW-2-CL-A3-B5	This is two phase AC power controller with 4-20mA control signal suitable for maximum 80KW @ 415VAC, or 200A @ 415VAC two phase heater loads.
3	POW-3S-4-A3-B3	This is three phase AC power controller with 4-20mA control signal suitable for maximum 60KW @ 415VAC, three phase heater load connected in 3 or 4 wire star configuration.
4	POW-3D-3-CL-A2-B6	This is three phase AC power controller with 0-10VDC control signal suitable for maximum 180KW @ 415VAC, three phase heater load connected in 3 wire close delta configuration.



Technical specifications are subject to change and revision, due to product up gradation.

**Note :**

Libratherm make three phase thyristors can be configured to operate from any line voltage ranging from 40VAC to 690VAC. The standard 3 phase RMS line voltage of 415VAC/440VAC or 200VAC can be used as incoming power lines or can be derived from the external step up or step down transformer, as per the customer requirement. As shown in the diagram below.

