

INSTRUCTION MANUAL

FOR

1 Ø / 2 Ø, Economy Version,

A. C. POWER CONTROLLER

Manufactured by :

SUDARSHAN ELECTRONICS

Registered Office & Works

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THE AC POWER CONTROLLER IS A COMPACT, OPEN EXECUTION, CHASSIS-MOUNTED MODULE. IT CONSISTS OF MAINLY TWO SECTIONS – **POWER SECTION AND CONTROL SECTION**. THE **POWER SECTION** COMPRISES OF LAVISHLY RATED ANTI-PARALLEL CONNECTED SCRs MOUNTED ON ELECTRICALLY ISOLATED HEAT-SINK (UPTO 500 AMPS), RC SNUBBER CIRCUIT (MOV) AND CT. THE **CONTROL SECTION** CONSISTS OF POWER SUPPLY TRANSFORMER / GATE FIRING AND TRIGGER CONTROL / SOFT STARTING AND SOFT STOPPING / SYNCHRONIZATION CIRCUITS.

THE CONTROL CARD IS USED FOR PHASE ANGLE FIRING CONTROL, WHICH ALLOWS A SMOOTH VARIATION OF THE POWER THROUGHOUT THE CONTROL RANGE. IT MAINTAINS CONSTANT POWER AT THE PRE-SELECTED VALUE (SET BY THE USER) IRRESPECTIVE OF THE LOAD, TEMPERATURE OR SUPPLY VOLTAGE VARIATION.

IT CAN BE USED IN TWO MODES – **AUTO MODE & MANUAL MODE**. IN AUTO MODE, THIS CARD CAN ACCEPT INPUT SIGNALS FROM ANY OF THE AUTOMATION SYSTEMS, VIZ. : PLC, PID, DCS, COMPUTER INTERFACE SYSTEM, etc., AND THE SIGNAL CAN BE 4 TO 20 mA OR 0 TO 10 V DC. IN MANUAL MODE, THIS CARD CAN ACCEPT 0 TO 10 V FROM AN EXTERNAL 10k, 3W POTENTIOMETER.

A HIGH RATE OF CHANGE OF VOLTAGE (dV/dt) CAN CAUSE AN SCR TO TURN ON. MOVs ARE CONNECTED ACROSS SCRs OF ALL POWER CONTROL UNITS FOR dV/dt PROTECTION.

CONTROL CARD DESCRIPTION :

1. SOFT STARTING :

THE POWER CONTROLLER UNIT HAS A FACILITY OF SOFT STARTING. WHEN AC POWER IS APPLIED TO THE POWER CONTROL UNIT, THE SCRs ARE RAMPED ON TO THE LEVEL DETERMINED BY THE CONTROL SIGNAL. THIS CIRCUITRY PREVENTS EXCESSIVE INRUSH CURRENT TO THE HEATERS OR TRANSFORMERS.

2. SYNCHRONIZATION CIRCUIT :

THE MAINS SIGNAL REQUIRED FOR SYNCHRONIZING THE FIRING IS DERIVED FROM THE SECONDARY OF THE MAINS POWER SUPPLY TRANSFORMER. THIS SIGNAL IS FILTERED TO PREVENT LINE DISTURBANCES FROM AFFECTING THE RAMP. THIS FILTER IS FREQUENCY COMPENSATED FOR 50 Hz.

TESTING CHART FOR CONTROL CARD

NOTE : ALL THE TEST POINTS ARE WITH RESPECT TO ELECTRONIC GROUND, I. E. TERMINAL No. 6 OF TB 1.

<u>Sl. No.</u>	<u>IC/TR No.</u>	<u>IC/TR. DES.</u>	<u>PIN No(s).</u>	<u>DESIRED RESULT</u>	<u>REPL -ACE</u>
01.	U 03	LM 358	02	0 to -10V DC, Var.(4-20mA DC I/P Signal Foll.)	R 18
02.	U 03	LM 358	07	0 to -10V DC, Variable (Ramp O/P, I/P to U 04)	U 03
03.	U 04	LM 339	06	0 to -10V DC, Variable (O/P of U 03)	R 27
04.	U 04	LM 339	14	-7.6V DC	U 04
05.	U 04	LM 339	01	-12V to +4V DC, Variable (Invrtd. I/P Sig. Foll.)	U 04
06.	Q 01	TIP 122	Collector	+19V DC to +18V DC, Variable (I/P Sig. Foll.)	Q 01
07.	TB2-2 w.r.t. TB2-1 (R')			0 to +0.3V DC (max.), Var. (corres. to I/P Sig.)	PT 1
08.	TB2-4 w.r.t. TB2-3 (R)			0 to +0.3V DC (max.), Var. (corres. to I/P Sig.)	PT 1

TECHNICAL SPECIFICATIONS & FEATURES OF A.C. POWER CONTROLLER :

FEATURES :

- 01. Can accept 0–10V DC or 4–20mA DC as the Input Signal.
- 02. Can take 10% Overload for 2 Hours.
- 03. Output Voltage linear to the Input Signal.
- 04. Type of Control : Phase Angle Firing.
- 05. Conservatively designed Heat Sink with Heat Sink Over Temperature Protection for Force–Cooled Units.

SPECIFICATIONS :

- 01. Voltage Rating : 110V/230V/380V/415V/440V/460V/480V, 50Hz / 60Hz.
- 02. Supply System : 1 Phase or 2 Phase.
- 03. Current Rating : From 15Amps upto 300Amps, Higher Ratings on request.
- 04. Control Signal : 4–20mA DC, 0–10V DC or through a 10k Potentiometer.
- 05. Control Method : P, PI, PD or PID.

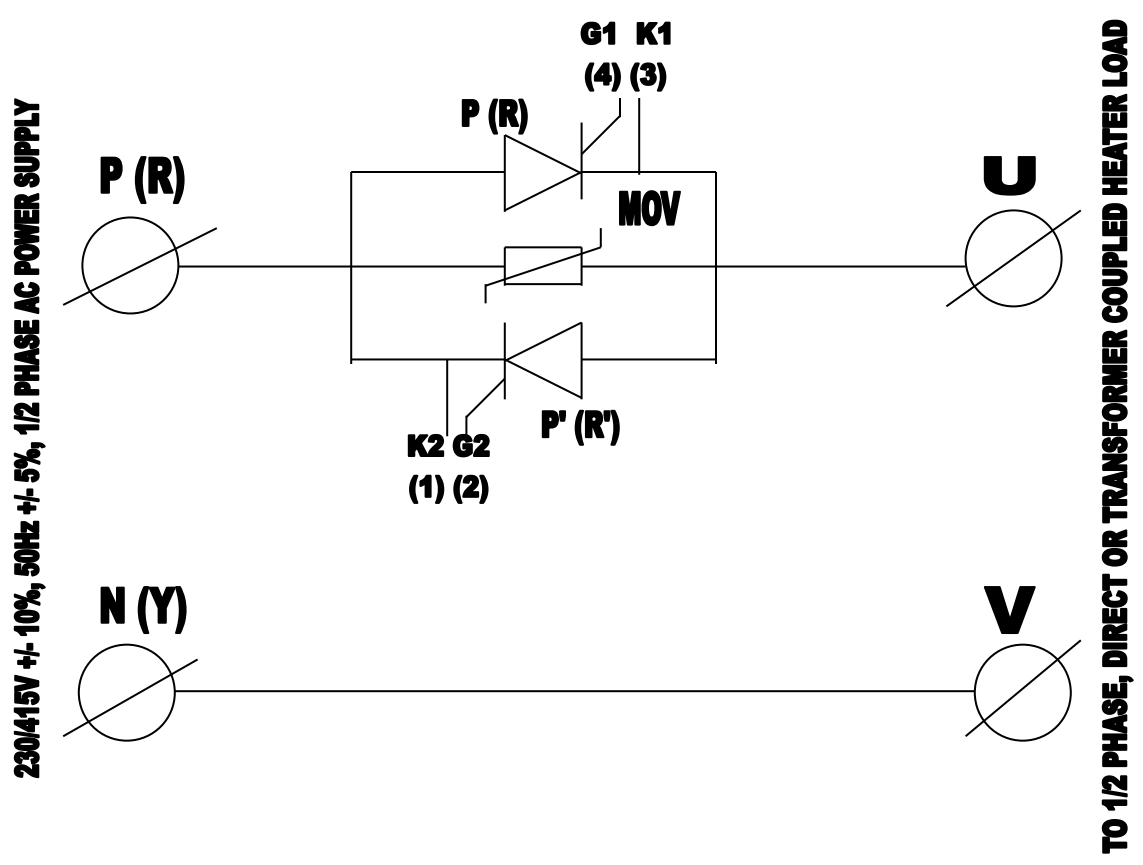
ENVIRONMENT :

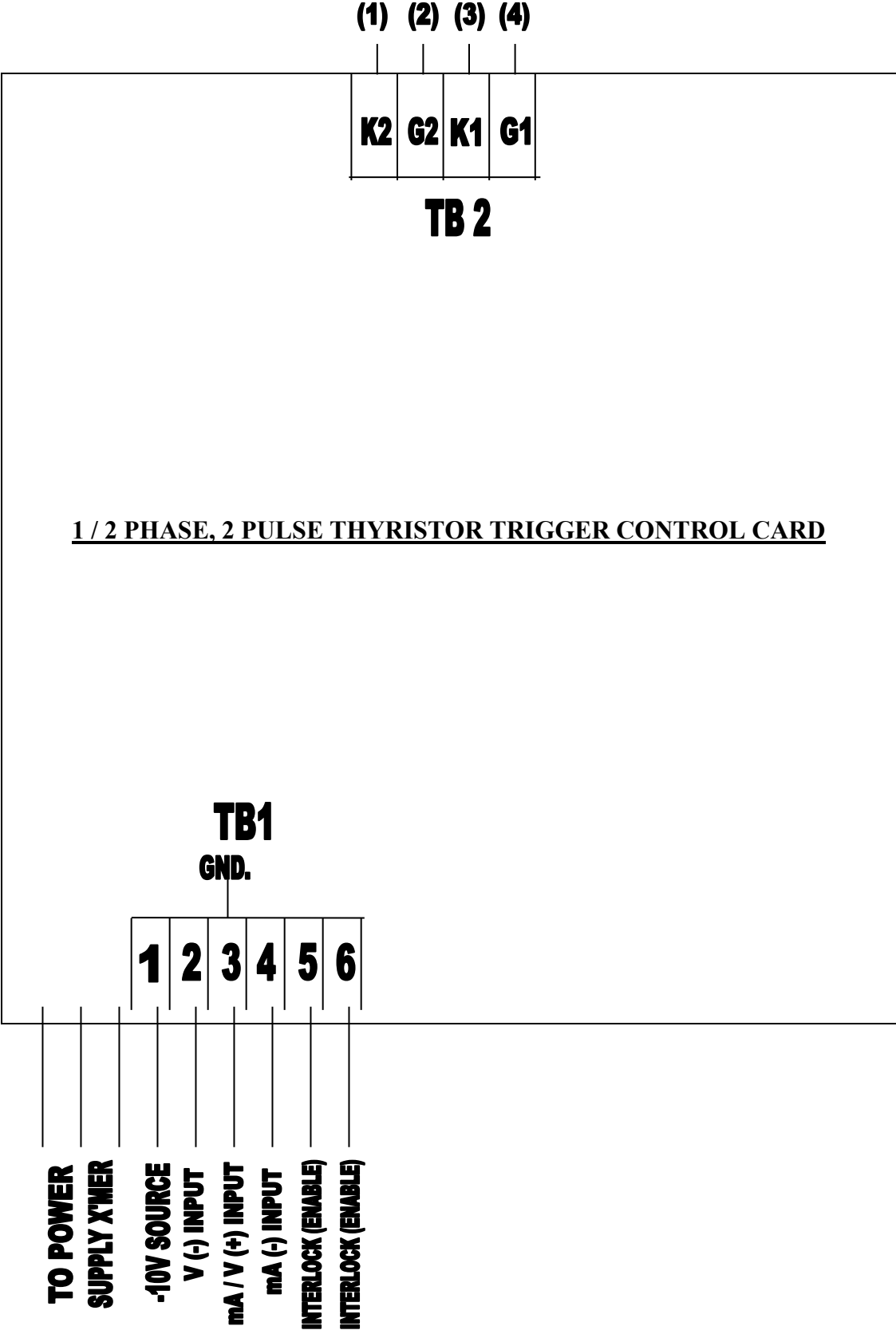
- 01. Operating Temperature : 0 °C to +50 °C
- 02. Storage Temperature : –25 °C to +55 °C
- 03. Shipping Temperature : –25 °C to +70 °C
- 04. Enclosure Rating : IP 20, Panel Mounting.
- 05. Humidity : Max. 90% RH at 40 °C, Non Dripping.
- 06. Altitude : Upto 1000 metres above MSL. Above 1000 metres, derate by 1% per 10 metres.

TROUBLE SHOOTING CHART

<u>Sl. No.</u>	<u>FAULT</u>	<u>POSSIBLE CAUSE</u>	<u>REMEDIAL MEASURE</u>
01.	NO OUTPUT	Blown Fuse at Input Faulty Thyristor Control Card Failure	Check & Replace Fuse Replace with New Thyristor Change Card or Consult Factory
02.	ERRATIC OUTPUT	Faulty Control Signal RC Card/MOV Failure One Thyristor in TT Block faulty Control Card Failure	Check & Rectify Control Signal Replace RC Card/MOV Replace with New TT Block Change Card or Consult Factory
03.	ALWAYS FULL OUTPUT	Faulty Control Signal Shorted/Faulty RC Card/MOV Shorted TT Block Control Card Failure	Check & Rectify Control Signal Replace RC Card/MOV Replace with New TT Block Change Card or Consult Factory

1 (2) PHASE AC – AC CONVERTOR POWER CIRCUIT DIAGRAM





POWER TERMINAL DETAILS

L	N	O/P
230V/415V, 1/2 PHASE INPUT		OUTPUT TO HEATER LOAD