



PHASECON

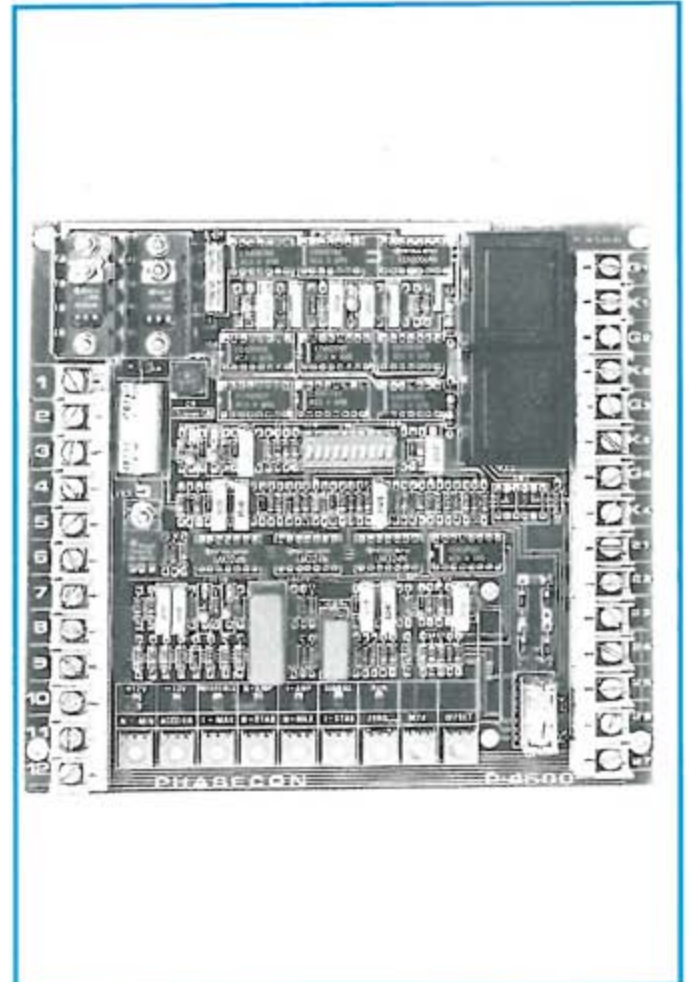
FOR THYRISTOR CONTROLLERS

P4500 PROGRAMMABLE MULTI-FUNCTION THYRISTOR CONTROL CARD

The P4500 Control card is used in single phase thyristor control applications. Ideal for replacement of existing obsolete thyristor control electronics and variacs.

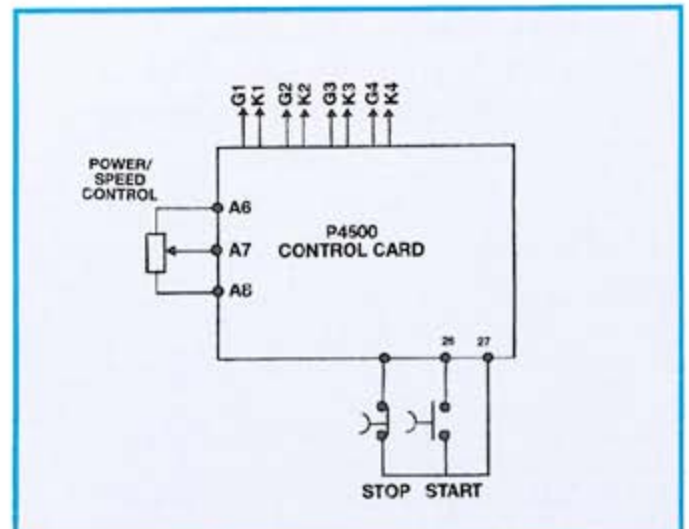
APPLICATIONS

- DC Variable speed drives
- AC Power controllers
- Furnace heat controllers
- Slipping motor control
- Transformer primary control
- Plating rectifier control
- DC motor field control
- Vibrator feeder control
- Battery chargers
- Magnet energisers



UNIQUE FEATURES

- Digital CMOS counters for accurate phase shift
- High frequency pulse trains to thyristors
- Switch programming for required applications
- Minimum and maximum clamp of phase shift
- Process instrumentation interface 4-20 mA
- Multi-plug for easy connection
- Through-hole plated PCB with solder mask and component layout silk-screen





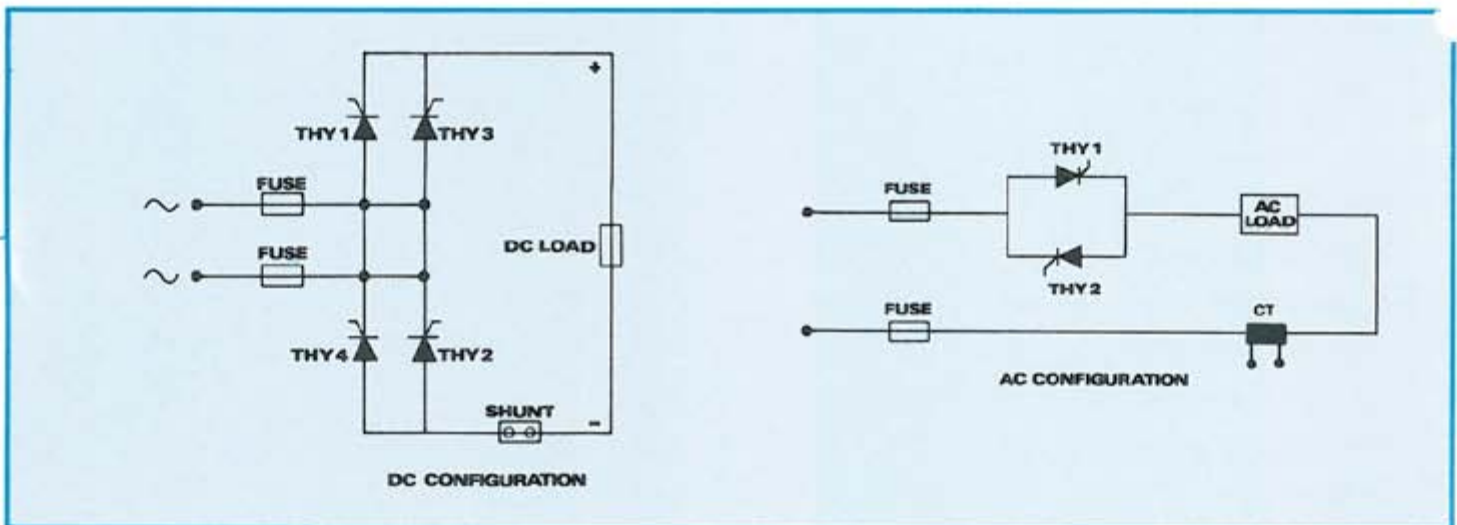
PHASECON

FOR THYRISTOR CONTROLLERS

SPECIFICATIONS

- Supply : 18 V – 0 V – 18 V from Phasecon supply transformer
- Thyristor gate pulses : 500 mA repetitive pulses generated over 1 ms. The first pulse being 200 μ s followed by 100 μ s pulses
- Speed/voltage reference : 0 to +5 V DC
- Torque/current reference : 0 to +5 V DC
- Process control input : 0 to +5 V DC or 0 – 20 mA
- Voltage/speed feedback : 0 to 100 V DC programmable
- Current feedback : From CT or DC shunt 50 mV or 60 mV

APPLICATION DETAILS



OUR MANUFACTURING PROGRAMME INCLUDES

- 1 phase and 3 phase variable speed drives
- 1 phase and 3 phase regenerative drives
- AC motor soft starters
- Furnace control panels
- Transformer primary power controllers
- DC injection braking of AC motors
- Welding equipment current ramp up and down controllers



PHASECON

FOR THYRISTOR CONTROLLERS

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info@phasecon.co.za
www.phasecon.co.za
28 Staal Street, Kya Sand
PO Box 28, Kya Sand 2163

We would like to introduce ourselves to your company with our manufacturing program. We manufacture single phase and three phase controllers for all kinds of applications. Listed below are a few applications that are the most common. We can supply these items in a chassis mount format or in boxes/panels; or with switch gear per your requirement.

- Primary / Secondary control of transformers
- Controlling of DC motors in single and bi-directional control
- Field controllers
- Controlled high voltage DC supplies
- Controlled low voltage supplies (with low ripple)
- Induction heaters (high frequency) i.e. hardening / melting
- Soft starters
- Slipping motor starters
- Furnaces controllers
- Battery charges
- Flying saw / shear croppers
- Controlling of tube mills
- Rectifiers
- Traction rectifiers
- Anodizing plants
- Vibrators
- Magnetizers



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K4500 SET UP PROCEDURE SINGLE PHASE DC DRIVE

1. CONNECTING PROCEDURE:

1.1 CONNECT SUPPLY:

- To the fuses marked with L1 and N or L2

1.2 CONNECT CONTROLS:

- Fan voltage is 220V AC
- Connect the control lines to the terminal on the motherboard (PCB closest to the heat sink) as per drawing P4500-MB P4500 MB-DC

1.3 CONNECT THE LOAD:

- Connect the load to the connections marked + and – or the bolts marked on the motherboard A+ and A-

2. SWITCH SETTING:

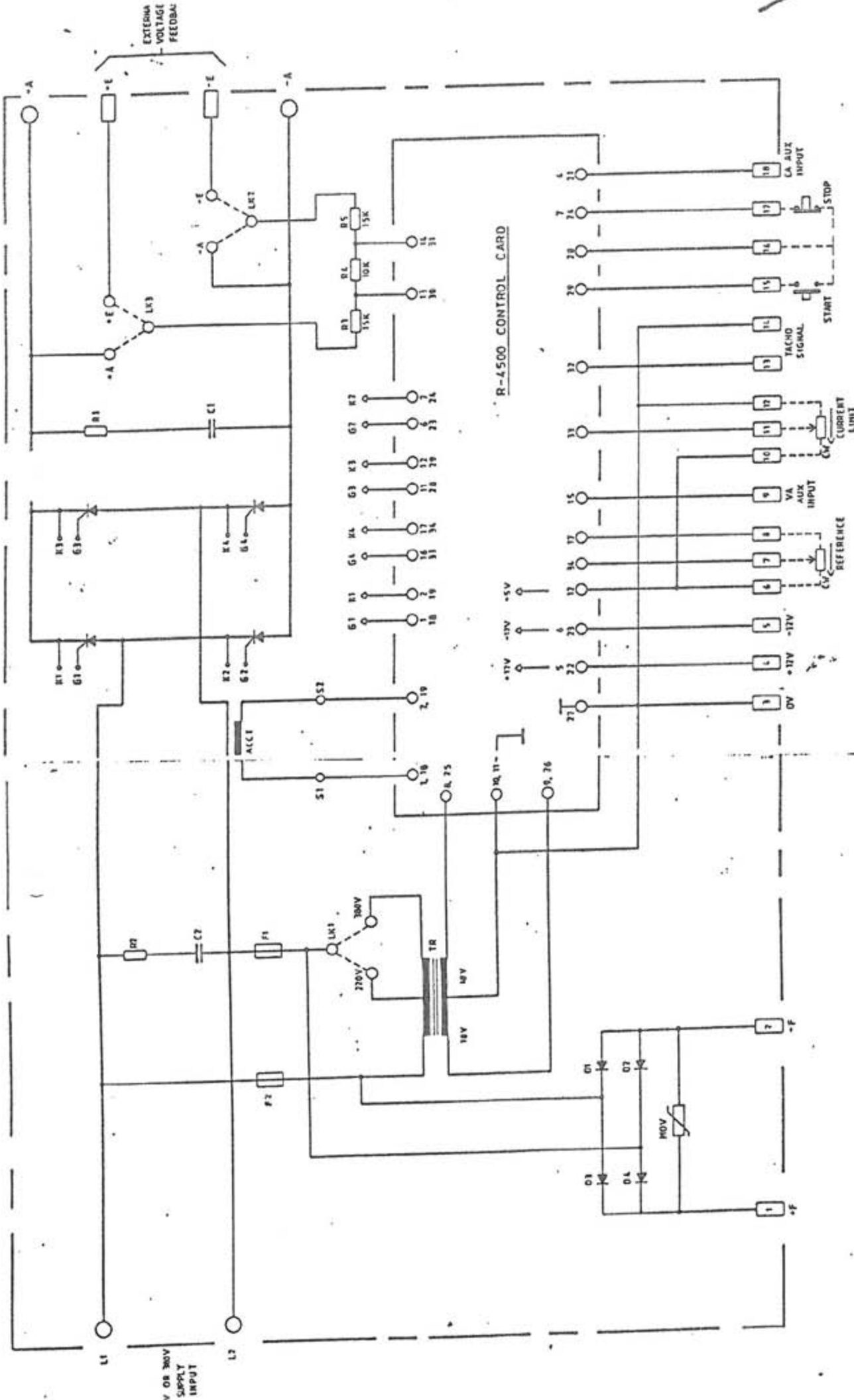
2.1 SWITCH DESCRIPTION

When the switch is up it is ON down is OFF. Here is a description of each switch:

- | | |
|----------|-----------------------------|
| • SW1-1 | Voltage feedback see note 1 |
| • SW1-2 | Voltage feedback see note 1 |
| • SW1-3 | Voltage feedback see note 1 |
| • SW1-4 | Voltage feedback see note 1 |
| • SW1-5 | AC configuration |
| • SW1-6 | DC configuration |
| • SW1-7 | Voltage amplifier loop |
| • SW1-8 | 4-20 mA loading |
| • SW1-9 | Current stability |
| • SW1-10 | Current amplifier loop |

Note 1: When using the mother board in the armature feedback mode from the card SW1-1, SW1-2, SW1-3 and SW1-4 must be in the configuration stated above. If however a tacho feedback is used or an external feedback is used the SW1-1, SW1-2, SW1-3 and SW1-4 must be set according to the maximum feedback. The maximum voltage used for feedback may not exceed 80 volts if greater than this then the resistor divider network must be used.

5



R-4500 CONTROL CARD

PHASECON (PTY) LTD		COPYRIGHT RESERVED
TITLE: SINGLE PHASE FULLY CONTROLLED DC DRIVE KIT		DRW NO : P-1500 MB
DRAWN : GURU A		SHEET : NO 2 OF 2
CHECKED : MH		DATE : 15/1/85

2.2 DEFAULT SWITCH SETTING

SW1	1	2	3	4	5	6	7	8	9	10
MODE	1	1	1	1	0	1	0	0	1	0

WHERE 1 = DOWN = OFF

3. POTENTIAL-METER SETTTINGS

- N-MIN Does not matter
- ACCELER Rate of acceleration
- N-MAX Described below
- I-STAB ½ way
- MINIMUM Described below
- SPAN Described below
- I-MAX Described below

4. SETUP PROCEDURE:

- After connecting the control signals to the drive and the power cables switch on, remember that when the lamps are on, they are
- Switch on
- Check that +12V, -12V lamps are on
- Set I-MAX pot anti-clockwise (min)
- Before starting the controller check that there is a field on the motor
- Start the card
- With the motor in the unloaded condition adjust the N-MAX pot on the control card to the maximum speed required for the motor/application. The controllers are set when leaving the factory at 340 V DC for 380 V AC or 180v DC for 220V AC
- At full reference (maximum speed demand) adjust I-MAX pot to maximum current demanded
- If you get a form of hunting effect adjust N-STAB and I-STAB

5. CURRENT CALCULATION

When using CT as a form of feedback instead of a 50 mV shunt, the following must be taken into consideration for the value of the resistor for the maximum current demand:

The resistor R178 (named BURDEN_RESISTOR, which is a 5 Watt resistor on the bottom right hand side of the control card) is fitted by the factory for current that has been requested if you wish to change the burden resistor you must follow the following procedure:

$$\text{CURRDEM} = \frac{\text{The BURDEN-RESISTOR}}{\text{CT_RATIO}}$$

$$\begin{aligned} \text{EXAMPLE: CURRDEM} &= \frac{45 \text{ amps}}{200/1} \\ &= 0.225 \end{aligned}$$

$$\text{BURDEN RESISTOR} = \frac{2,5 \text{ VOLTS}}{0.225}$$

$$\begin{aligned} \text{CURRDEM} &= \frac{2,5}{0.225} \\ &= 11\text{ohms} \end{aligned}$$

The BURDEN-RESISTOR needed to run is 11ohms or a resistor as close as possible. If the voltage of the burden is higher than 4.95 volts the electronic trip will trip the card off.



SET UP PROCEDURE SINGLE PHASE K4500 AC DRIVE

The P4500 control panel will be used with P4500 AC-MB

1. CONNECTING PROCEDURE

1.1 CONNECT SUPPLY:

- To the fuses marked L1 and N or (L2)

1.2 CONNECT CONTROL

- Fan voltage is 200V (wire colours black, brown)
- Connect the control lines to the terminals on the mother board (pcb closest to the heat sink) as per drawing P4500MB - AC

1.3 CONNECT LOAD

- To the connections marked 1.2 and 1.3 or the bolts marked on the mother board 1.2 and 1.3

2. SWITCH SETTING

2.1 SWITCH DESCRIPTION

When the switch is UP it is ON, DOWN it is OFF. Here the description of switch:

- SW1-1 voltage feedback
- SW1-2 voltage feedback
- SW1-3 voltage feedback
- SW1-4 voltage feedback
- SW1-5 AC configuration
- SW1-6 DC configuration
- SW1-7 voltage amplifier loop
- SW1-8 4-20 mA-amp loading
- SW1-9 current stability
- SW1-10 current amplifier loop

NOTE1: When using the mother boards all connections can be connected to the motherboard of the unit and all inter-connections have been done via the flat cable connecting the two boards together.

2.3 DEFAULT SWITCH SETTING

SW1 1, 2, 3, 4, 5, 6, 7, 8, 9, 10
MODE 1 1 1 1 1 0 0 0 1 0
WHERE 0=DOWN = OFF



3. POTENTIAL - METER SETTINGS

- N-MIN does not matter
- ACCELERATE rate of acceleration
- I-MAX described below
- N-STAB 1/2 way
- N-MAX described below
- I-STAB 1.2 way
- ZERO described below

4. SETUP PROCEDURE

- After connecting the control the signals to the drive and the power cables switch on
- Remeber that when the lamps are on they are in the healthy state
- Switch on power
- Check that +12V, -12 led's are on
- Start card
- With the thyristors connected to a lamp load adjust the N=MAX pot on control card to the maximum out coltage for the application
- Disable card stop
- Connect your load now
- Set I-MAX pot ant-clockwise (minimum demand) adjust I-MAX pot to maximum current required
- If you get a form of hunting efect adjust N-STAB and I-STAB

5. CURRENT CALCULATION

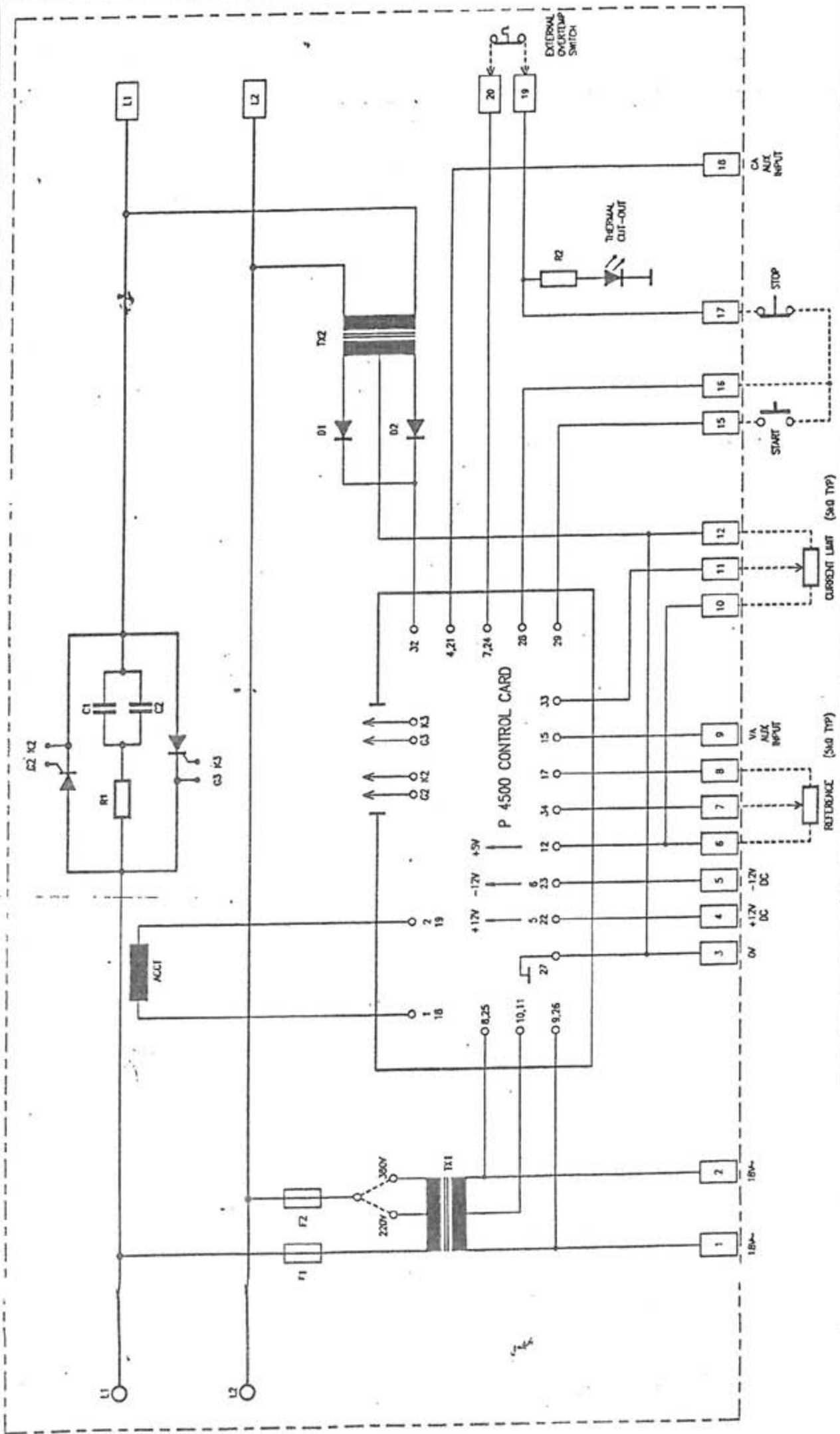
When using CT as a form of feedback instead of a 50 milli-volt shunt the following must be taken into consideration for the value of the resistor, for the maximum current demand. The resistor on R178 (named BURDEN RESISTOR which is a 5 watt resistor on the bottom left hand side of the control card) is fitted by the factory for current that has been requested if you wish to change the burden resistor upi follow the following procedure:

$$\text{CURRDEM} = \frac{\text{CURRENT REQUIRED}}{\text{CT_RATIO}}$$

$$\begin{aligned} \text{EXAMPLE: CURRDEM} &= 45 \text{ amps} \\ &= \frac{200/1}{0.225} \end{aligned}$$

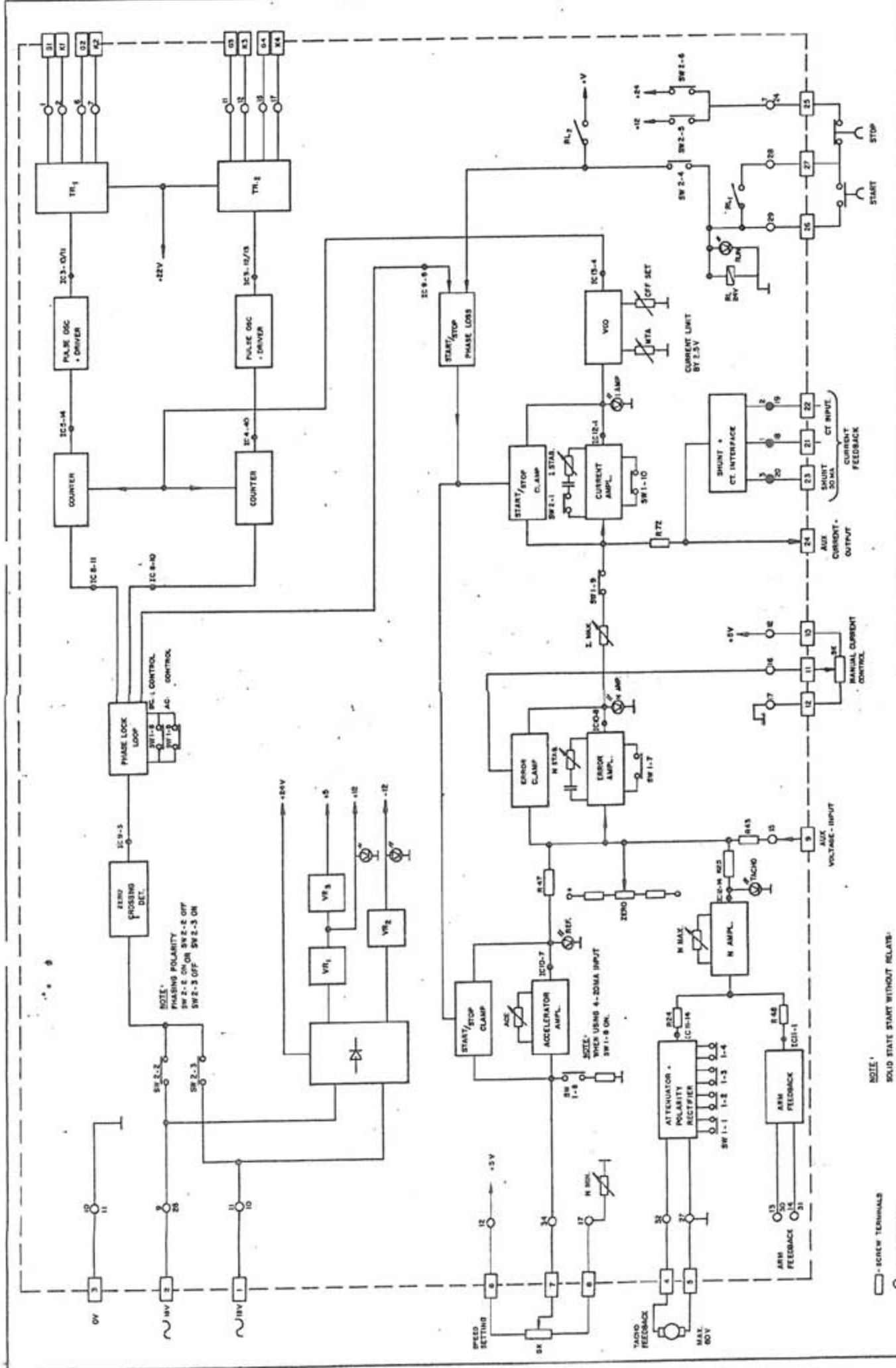
$$\begin{aligned} \text{BURDEN RESISTOR} &= 2,5 \text{ VOLTS} \\ \text{CURRDEM} &= \frac{2,5}{0.225} \\ &= 11 \text{ ohms} \end{aligned}$$

The BURDEN RESISTOR needed to run is 11 ohms or a RESISTOR as close as possible.
If the voltage of the burden is higher than 4,95 volts the electronic will trip the card off.



DRAWN: E.ZENTORAF		Po Box 124 Strubens Valley, 1735. 475-1692	
DESIGNED: P.R.R.	REVISIONS	DATE OKD	
APPROVED: M.P.			
SCALE			
DATE 09/06/90			
TITLE SINGLE PHASE FULLY CONTROLLED AC POWER CONTROL KIT			
DRAWING No. K 4500-AC	PO#0029	SHEET No. 1 OF 1	SIZE A3
Phasecon (PTY) LTD			
PO Box 35591, Northcliff, 2115. Tel.: 462-2100			
CUSTOMER			

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PHASECON (PTY) LTD.
 TITLE: SINGLE PHASE FULLY CONTROLLED

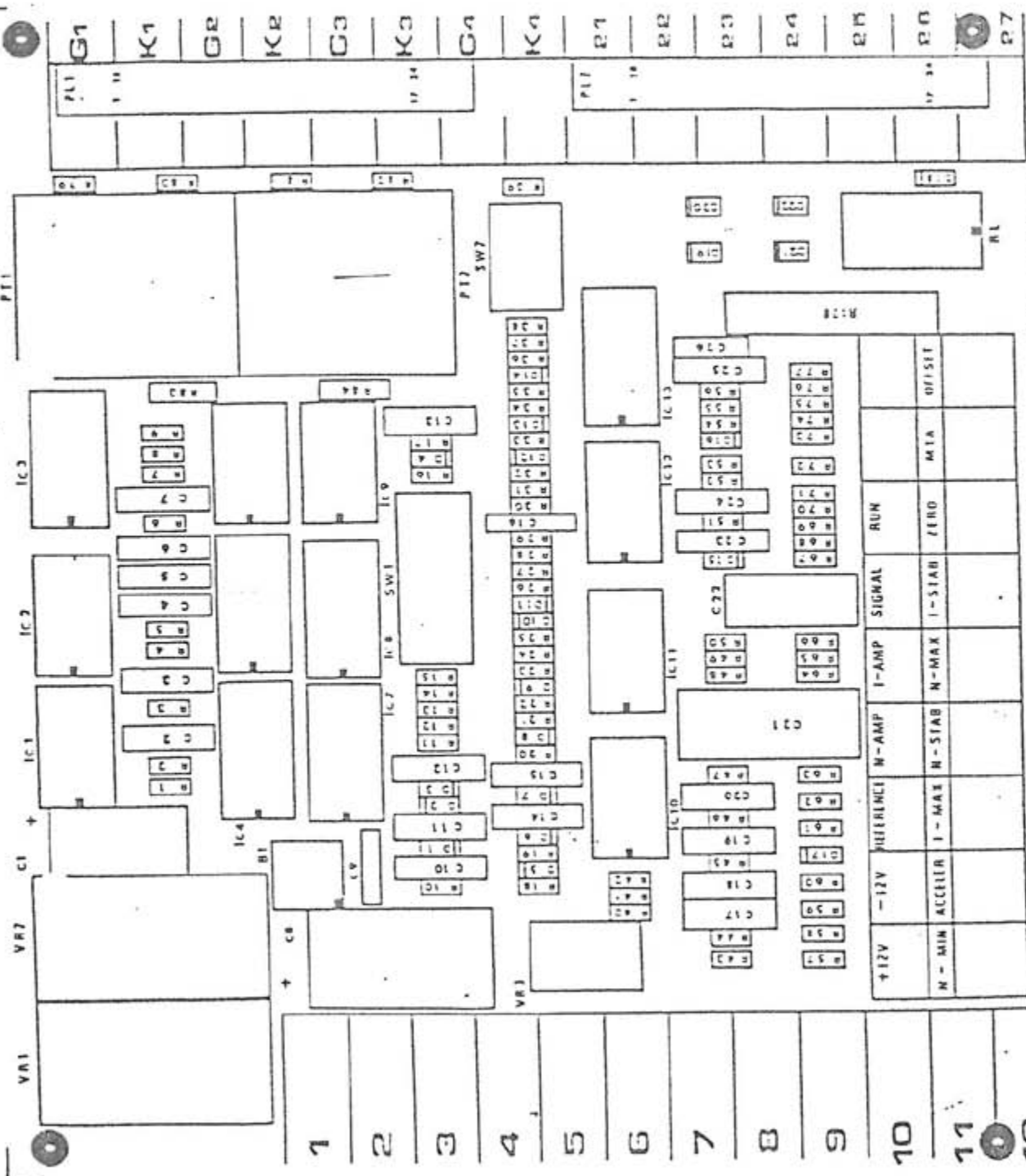
COPYRIGHT RESERVED
 DRG. NO. : P - 4500
 SHEET : No. 2 - 2

FUNCTIONAL BLOCK DIAGRAM
 DRAWN : H.N.G. P.d.w
 CHECKED : H.J.H.

NOTE 1
 SOLID STATE START WITHOUT RELAYS
 SW 2-6 OFF
 SW 2-5 ON
 SW 2-4 ON

NOTE 2
 NORMAL START WITH RELAYS
 SW 2-5 ON
 SW 2-4 OFF
 SW 2-3 OFF

□ - SCREW TERMINALS
 ○ - PLUS NUMBERS

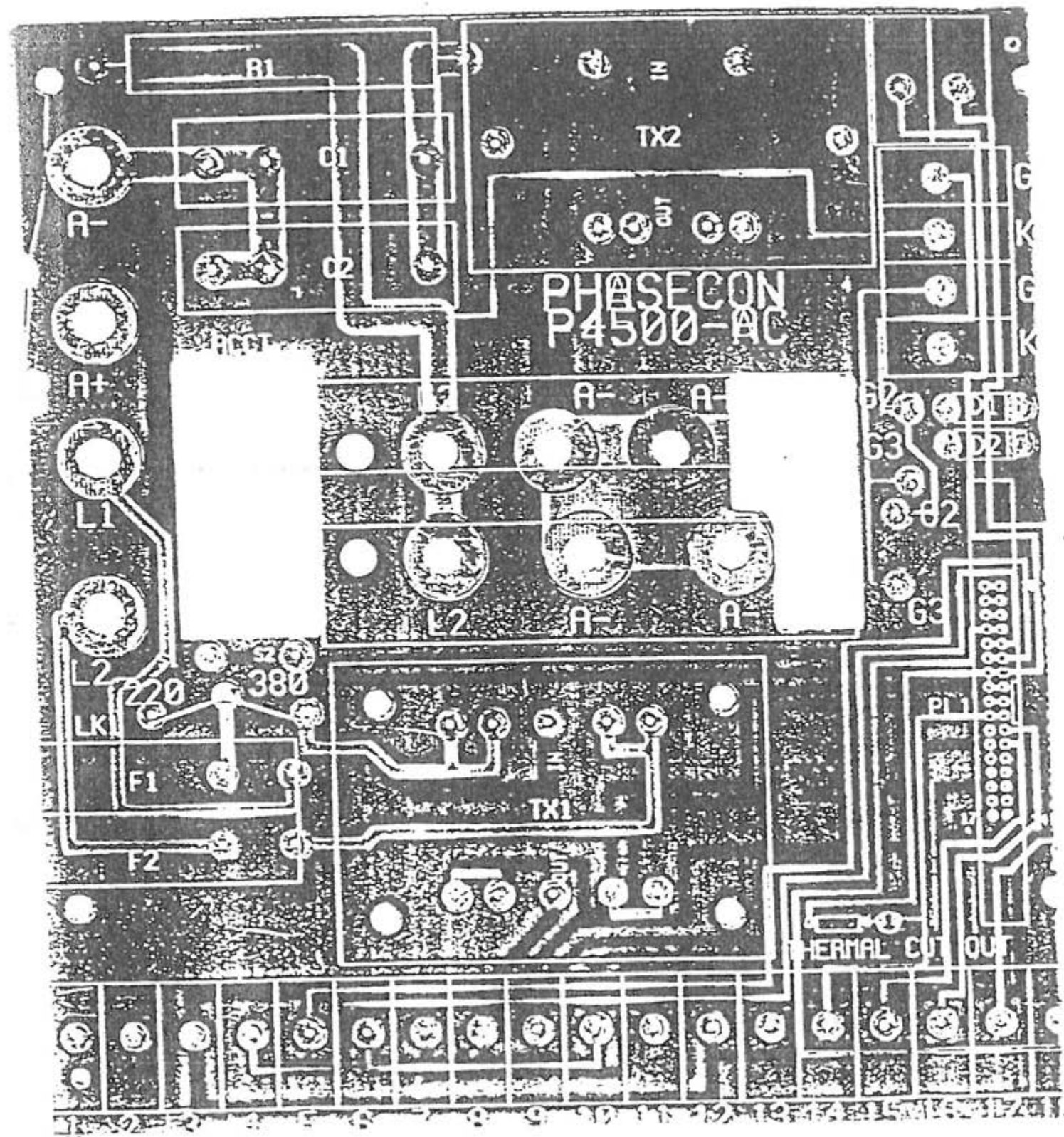


P.4500

PHASECON

+12V	-12V	REFERENCE	N-AMP	I-AMP	SIGNAL	RUN
N - MIN	ACCELER	I - MAX	N - STAB	N - MAX	I - STAB	ZERO
						MTA
						OFFSET

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12



PHASECON
P4500-AC

TX2

TX1

THERMAL CUT OUT

R1

C1

C2

C3

A-

A+

L1

L2

A-

A-

A-

A-

220

380

F1

F2

G2

G3

G2

G3

P11

1

2

3

4

5

6

7

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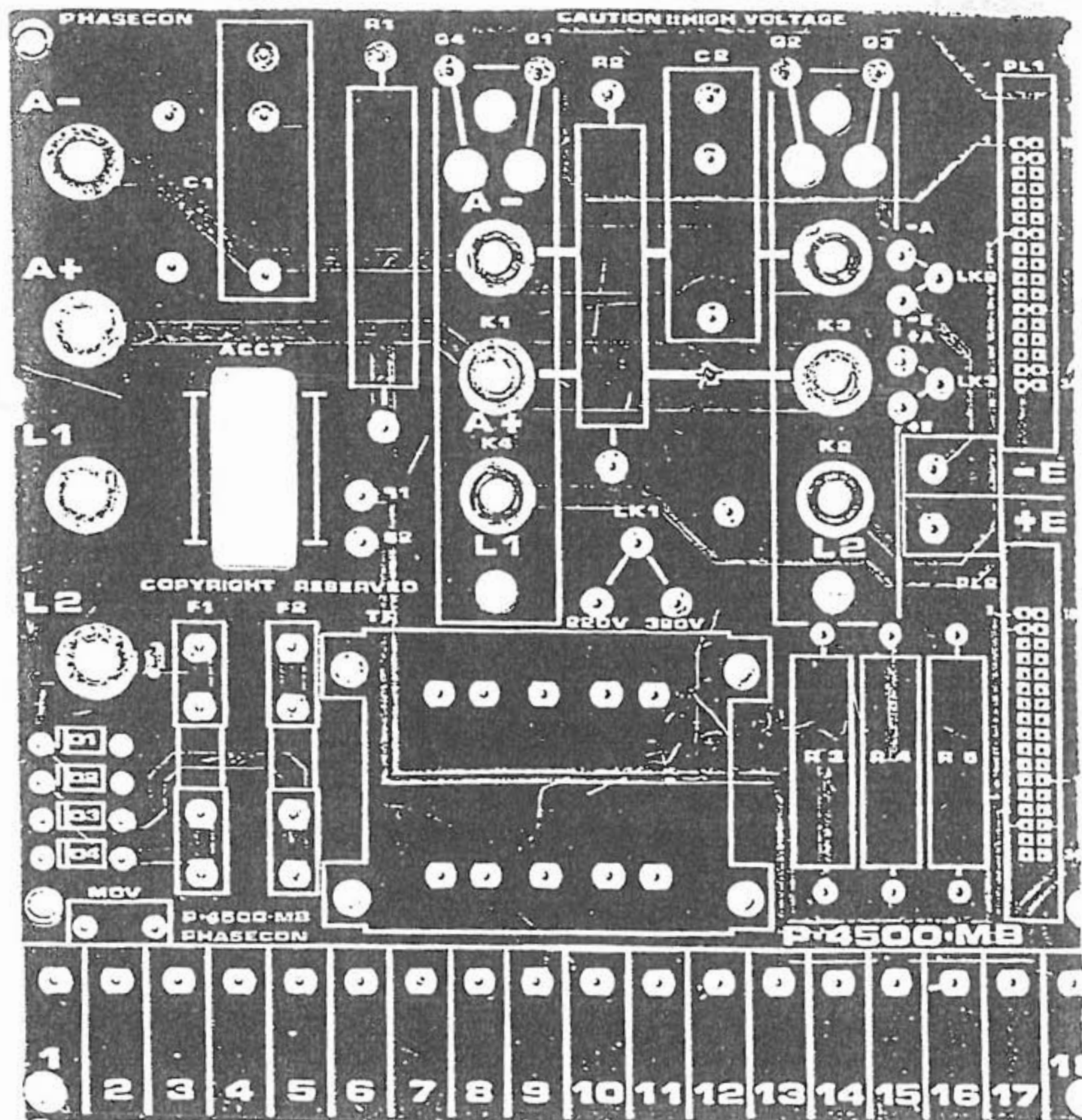
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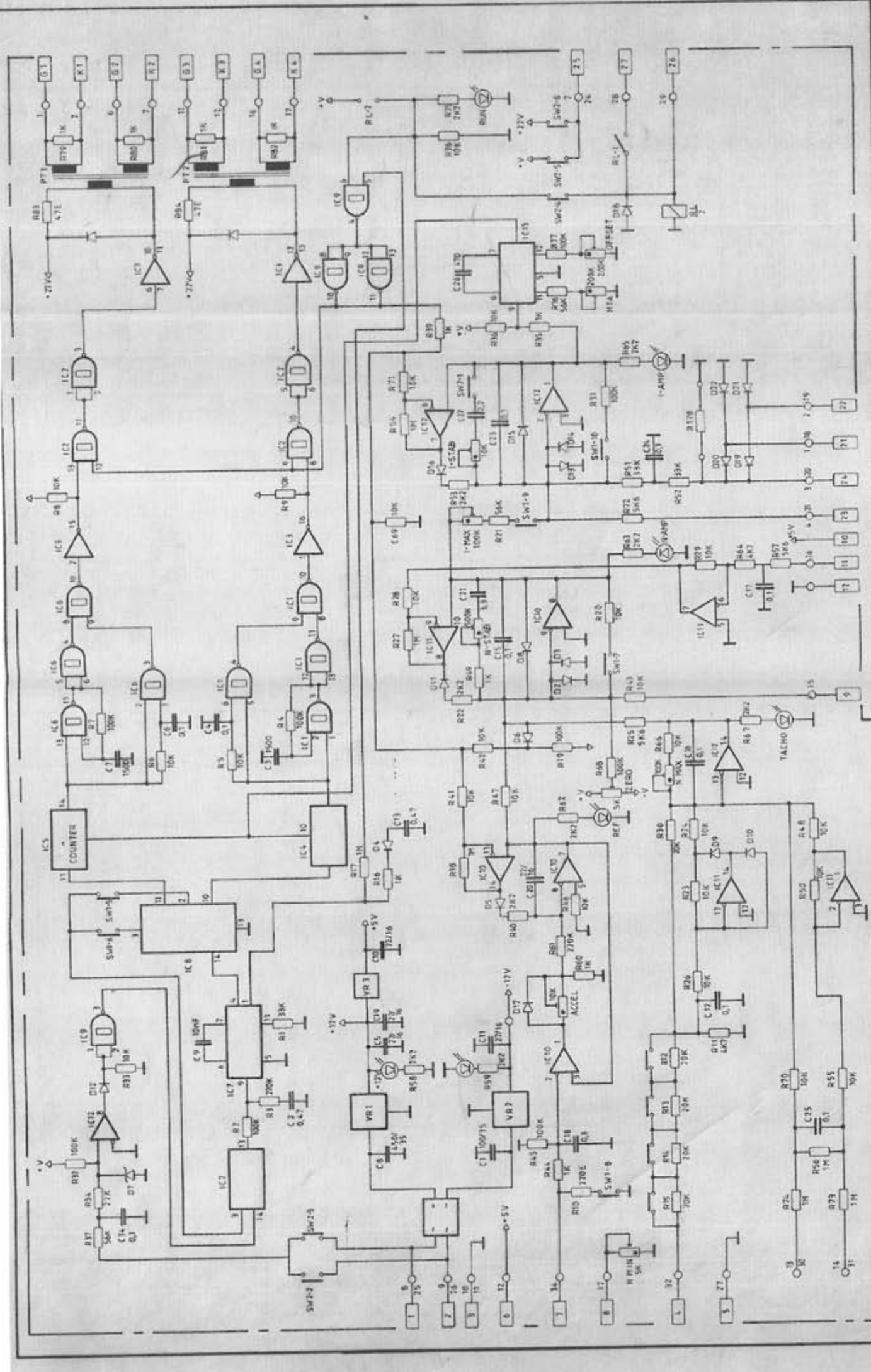
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PHASECON (PTY) LTD

TITLE: SINGLE PHASE CONTROL FULLY CONTROLLED
BRIDGE CONTROL CARD

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DESIGN NO: P-1500
SHEET NO: 1 OF 3
DATE: 16/1/85

MB DIAGRAM, CIRCUIT DIAGRAM,
BLOCK DIAGRAM
DRAWN: []
CHECKED: []
PH: []