

CHAPTER 4

ILLUSTRATIONS

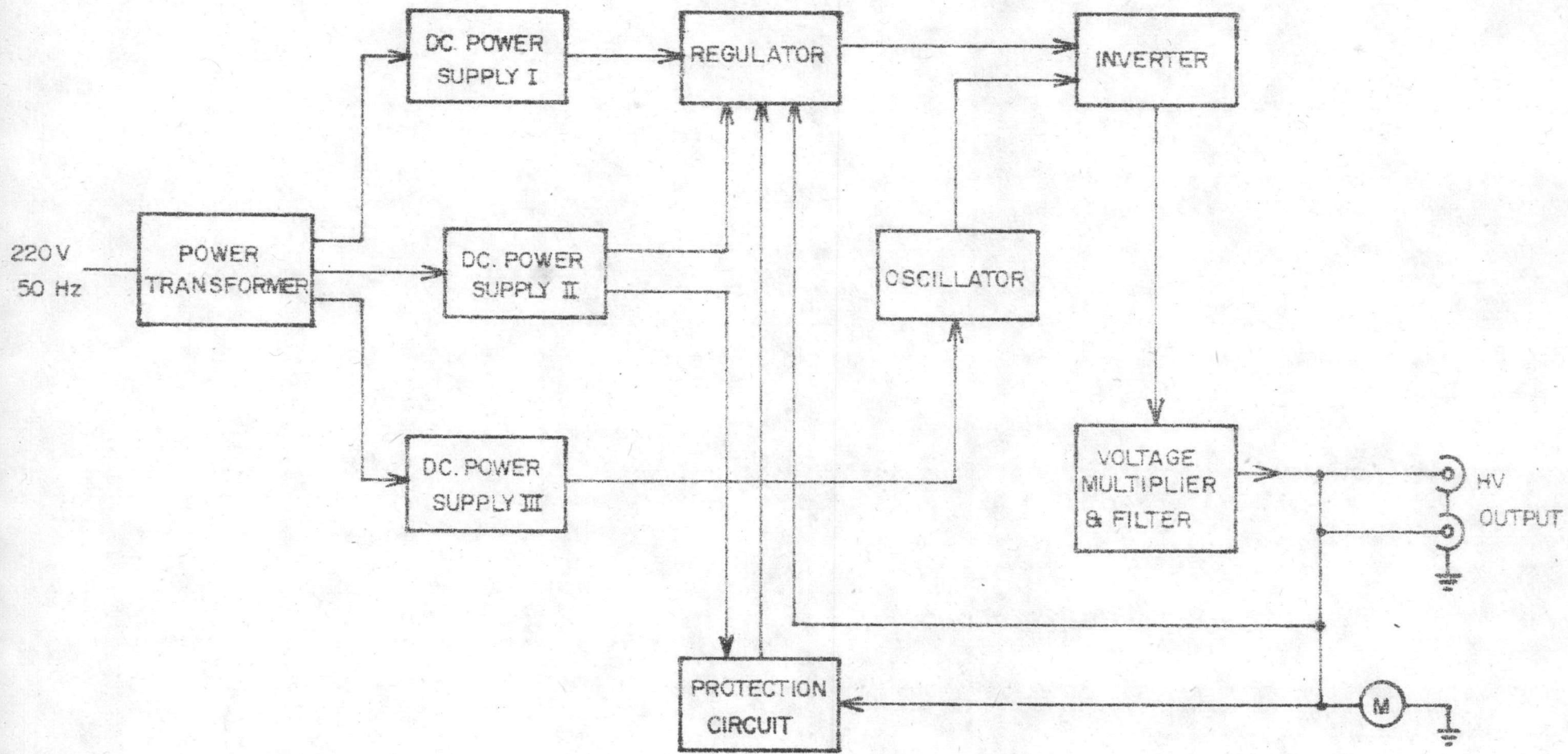


Fig.1 Simplified Block Diagram of High Voltage Power Supply

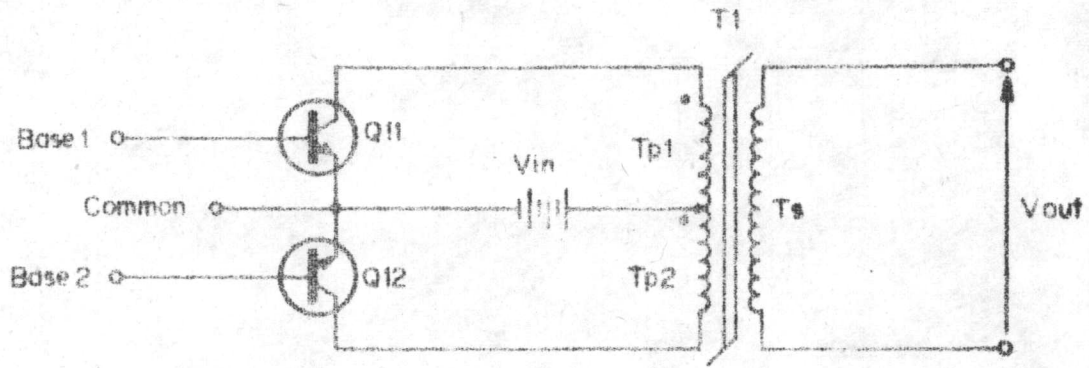


Fig. 2 Driven type inverter

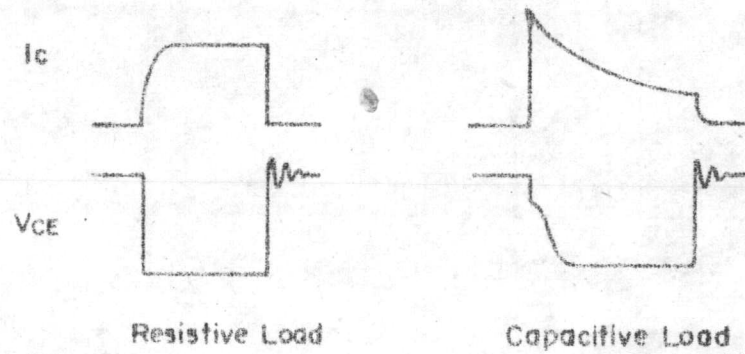


Fig. 3 Collector waveforms for resistive, and capacitive loading.

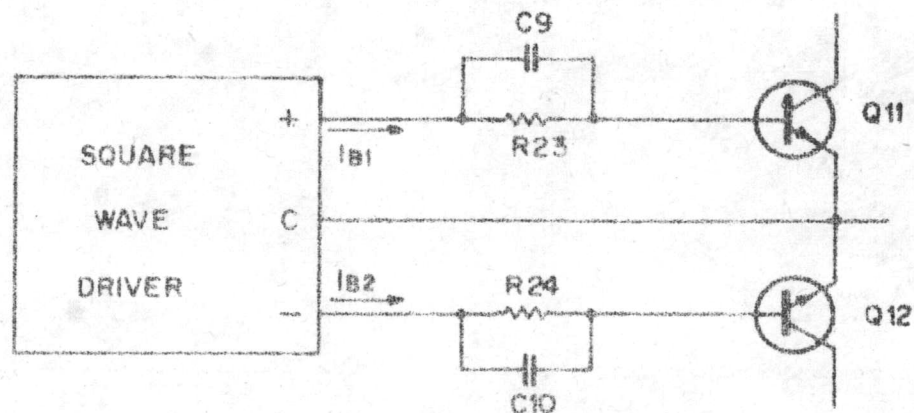


Fig. 4 Base circuit modification for inverter driver

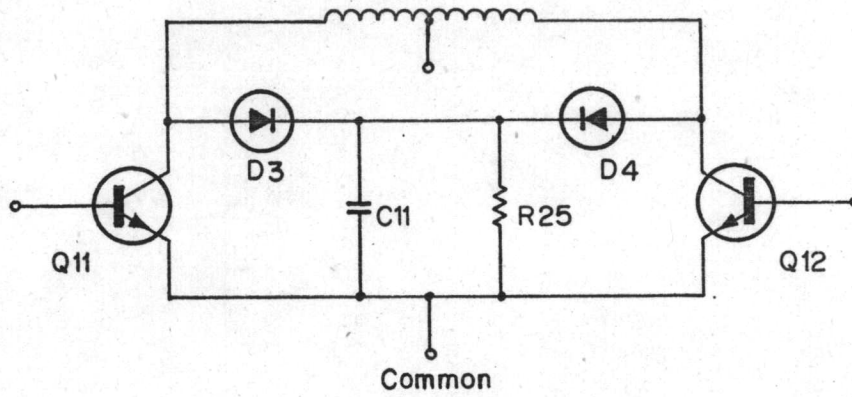


Fig.5 Clamp circuit for collector - emitter breakdown protection

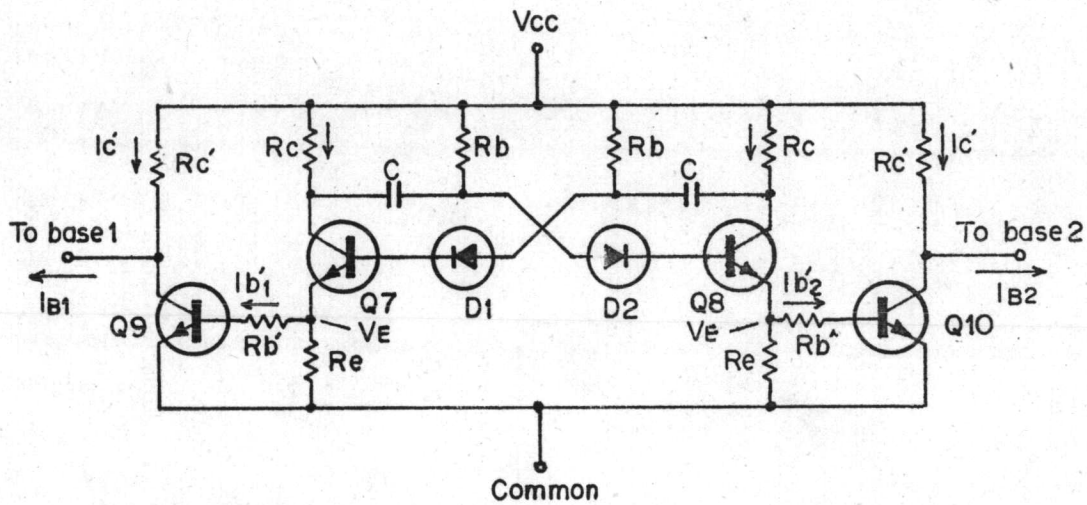


Fig.6 Driver circuit for driven inverter

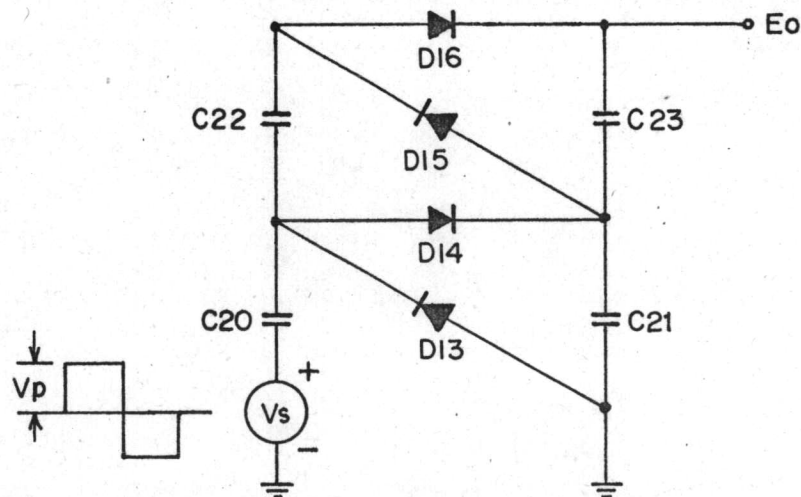


Fig.7 A two-stage voltage multiplier.

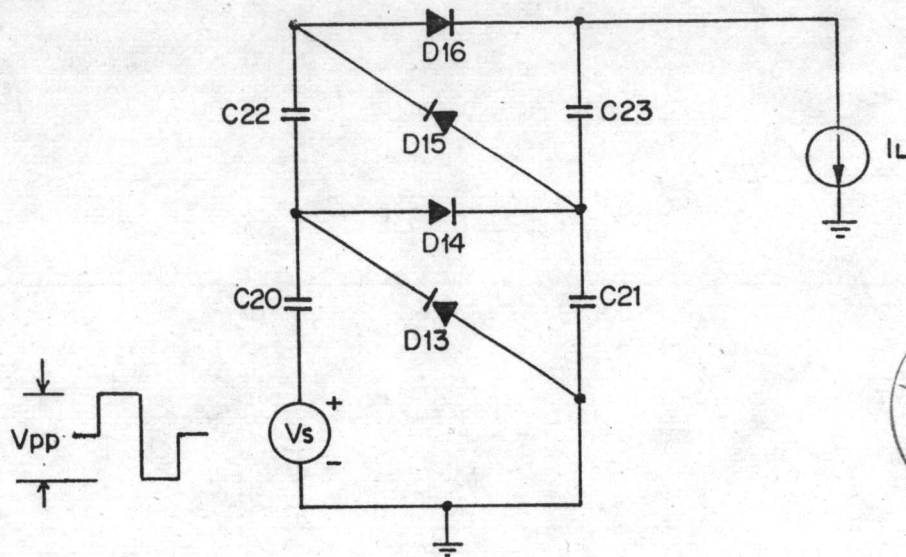


Fig.8 A two-stage voltage multiplier with a finite load.

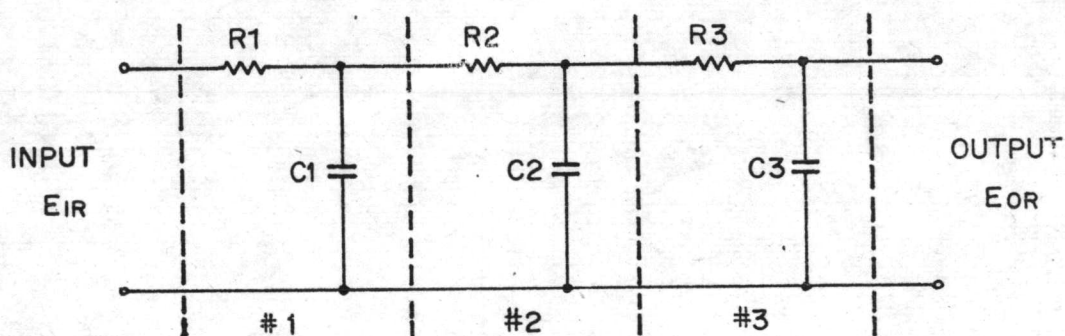


Fig.9 The three-stage R - C input filter.

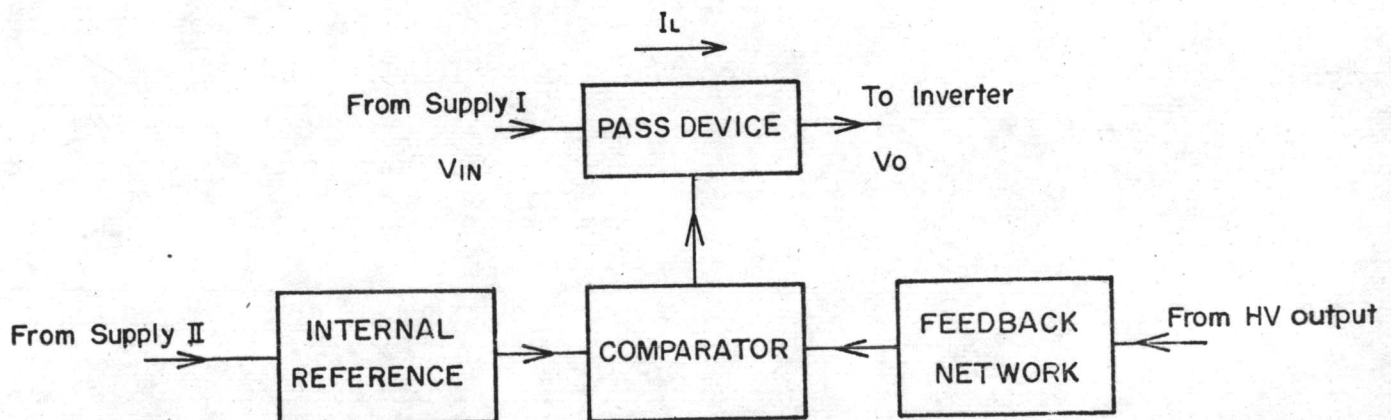


Fig.10 Basic voltage regulator block diagram.

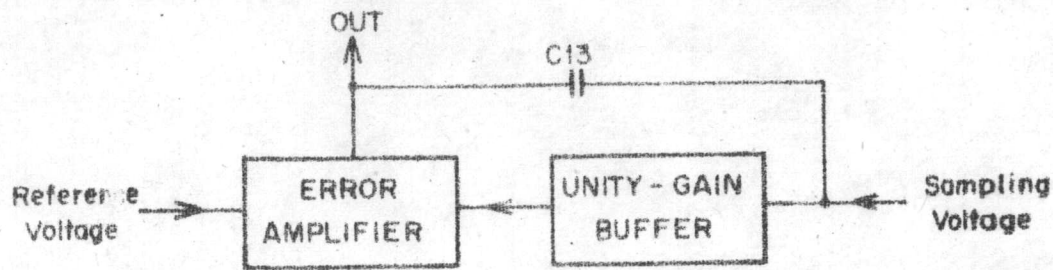


Fig.11 Block diagram of voltage comparator.

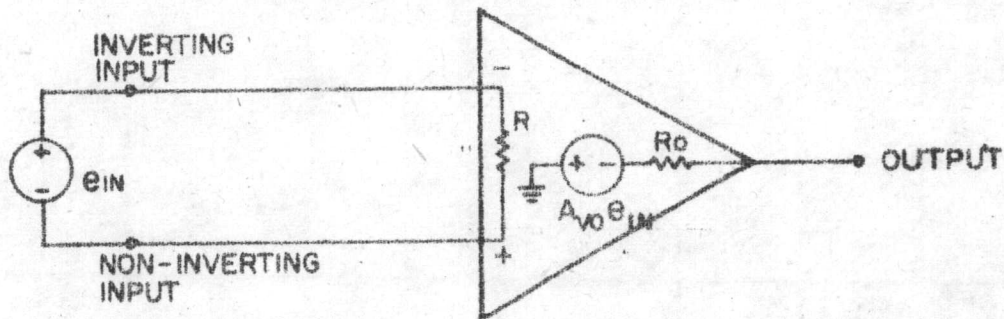


Fig.12 Equivalent circuit for basic operational amplifier.

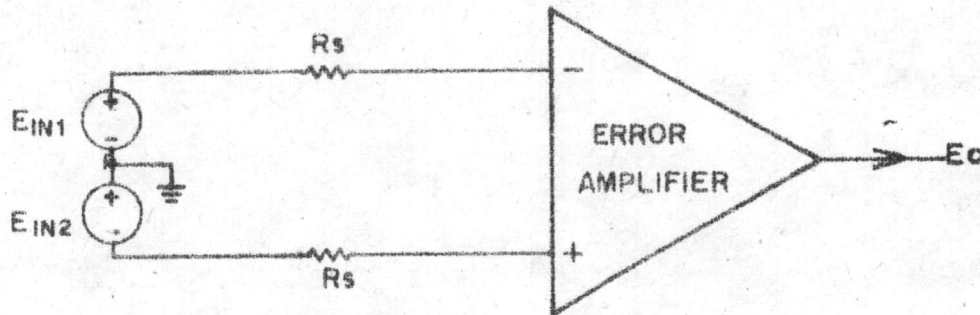


Fig.13 An error amplifier

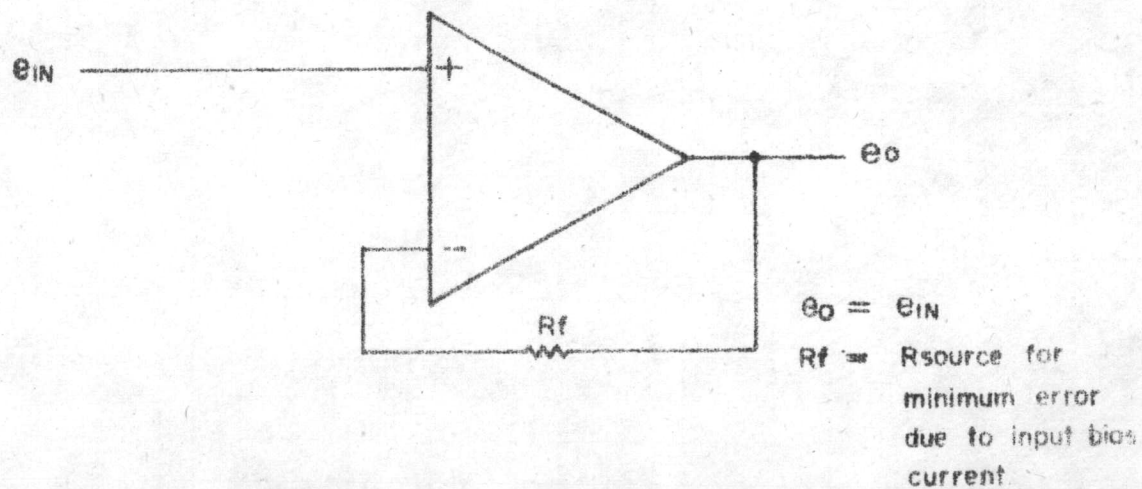


Fig.14 A unity gain buffer

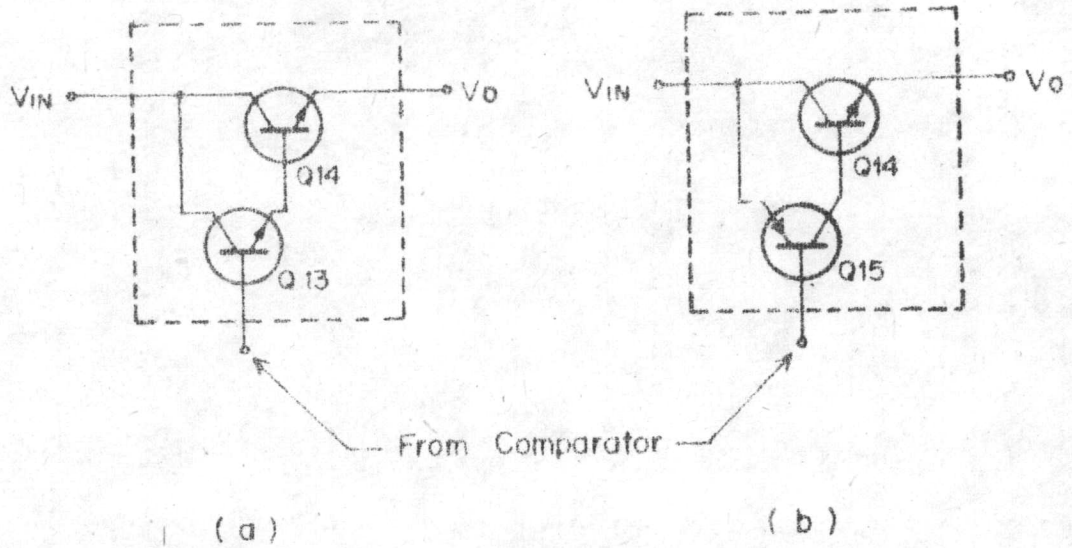


Fig. 15 Pass device circuit
 (a) for positive HV output.
 (b) for negative HV output.

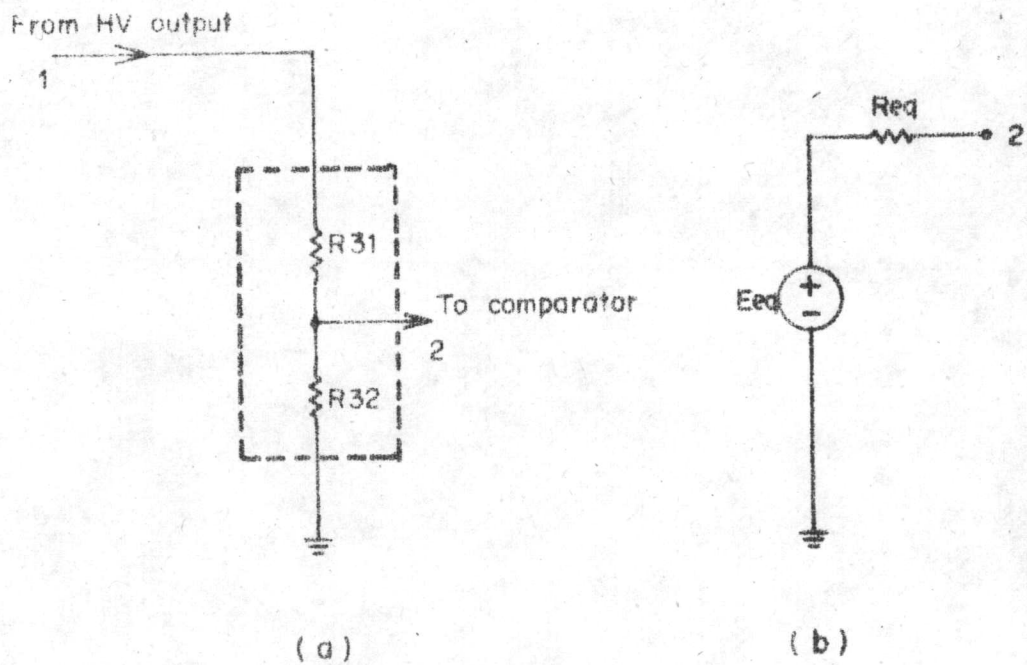


Fig. 16 Typical feedback network
 (a) circuit diagram
 (b) equivalent circuit

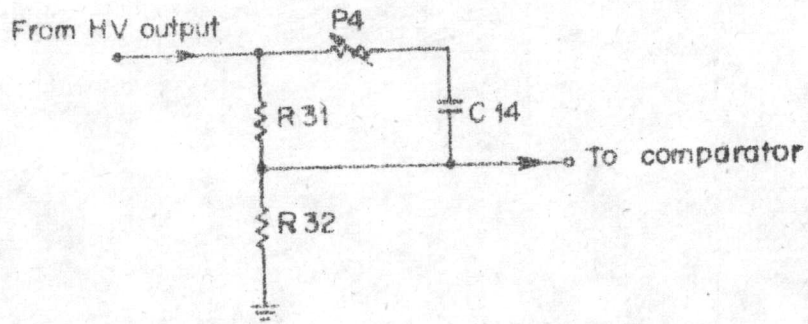


Fig. 17 Modified circuit of feedback network.

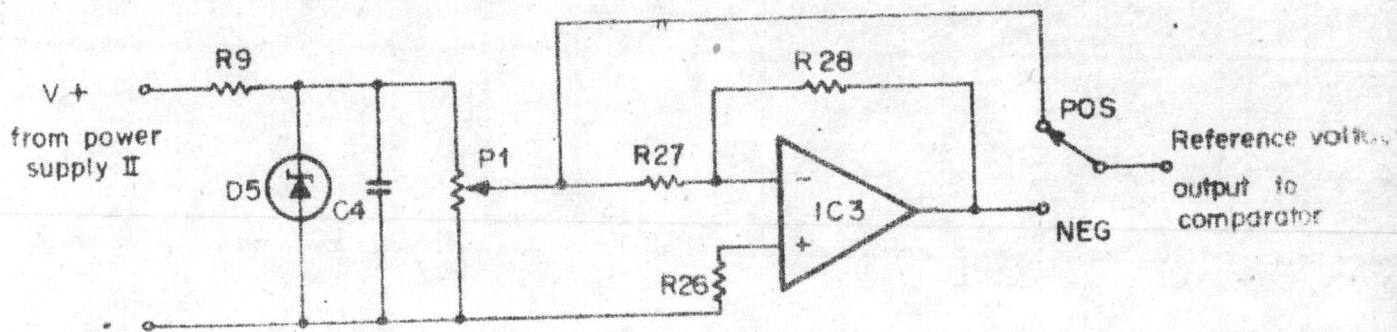


Fig. 18' Schematic diagram of internal reference.

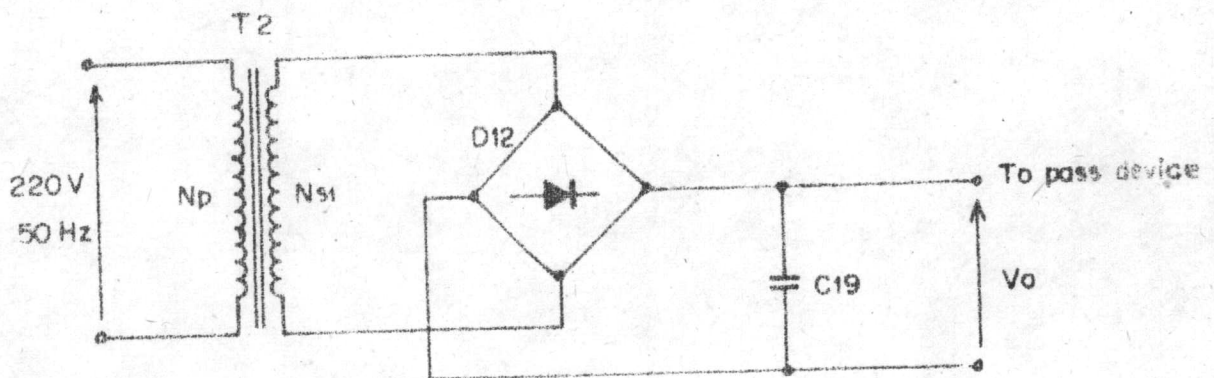


Fig. 19 Schematic diagram of DC power supply I

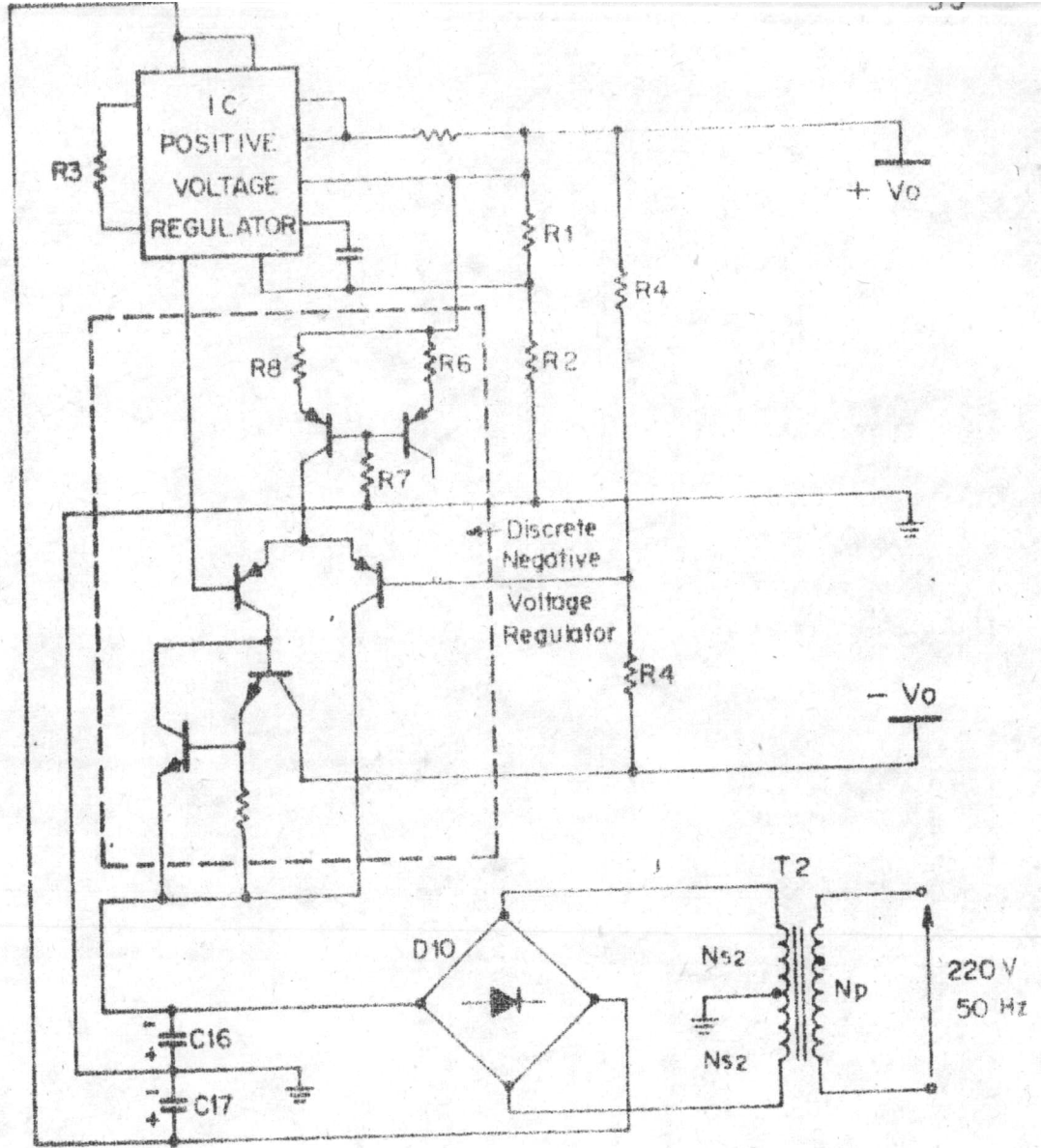
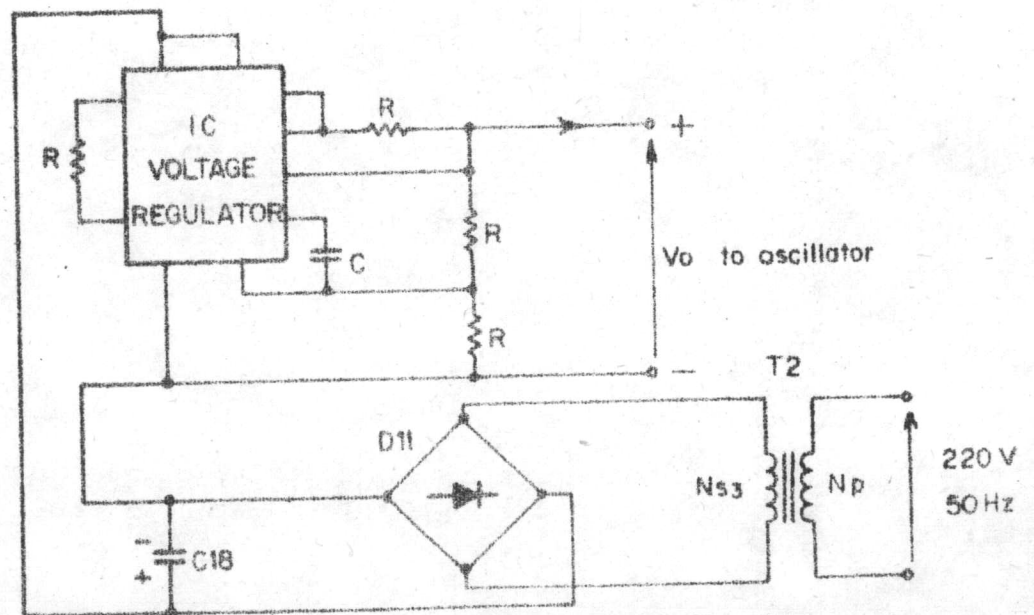


Fig. 20 Schematic diagram of DC power supply II



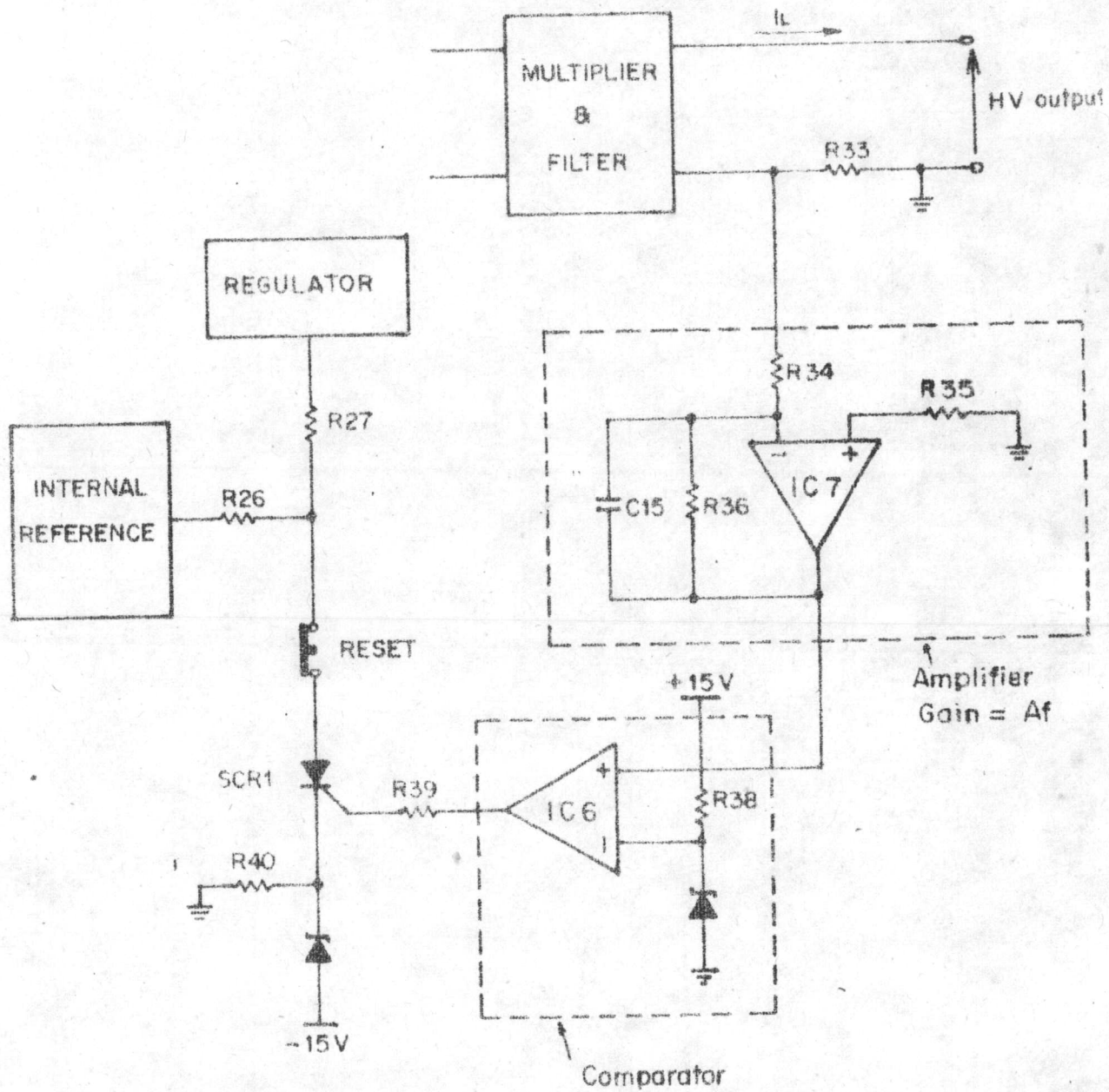
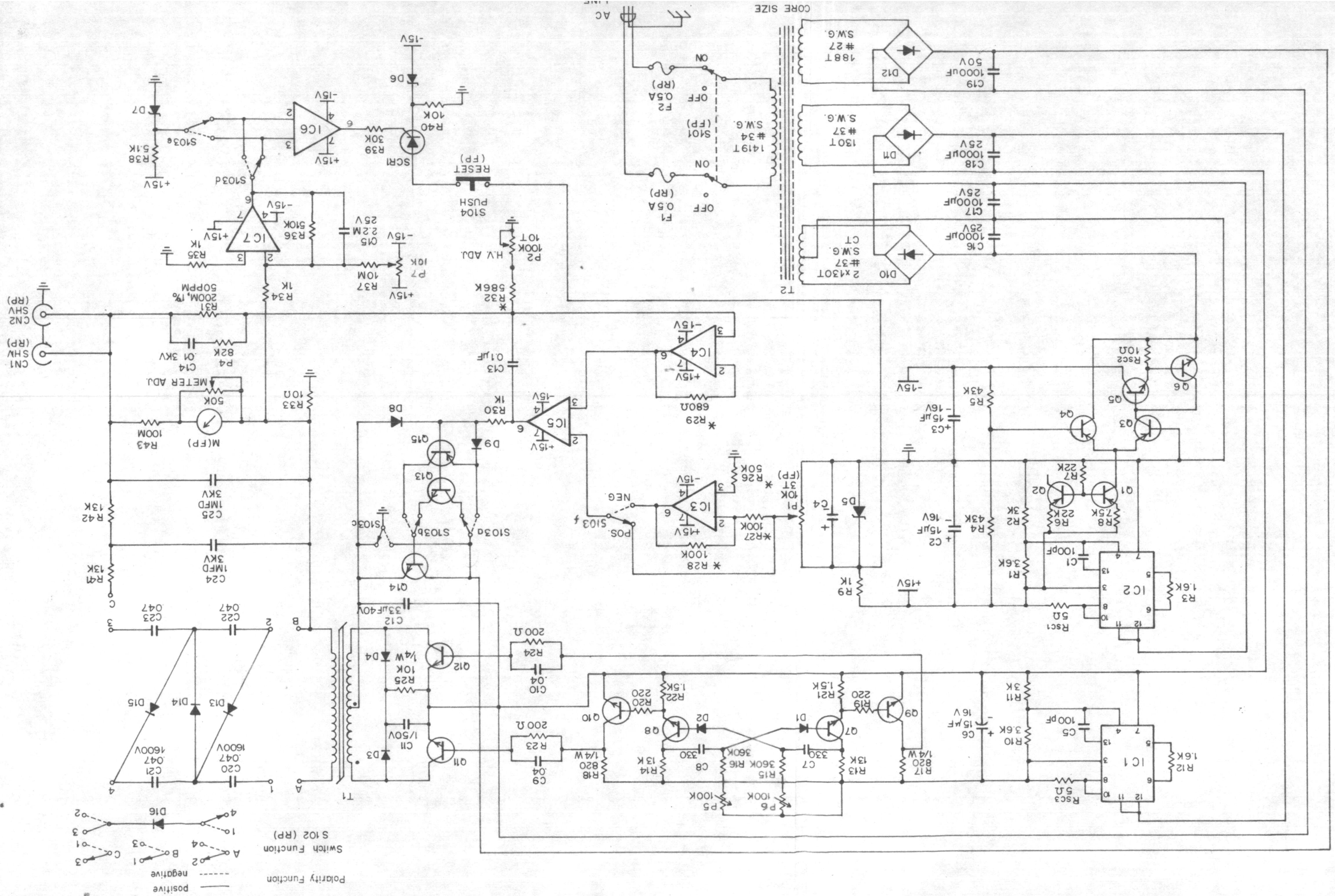


Fig. 22 Schematic diagram of protection circuit



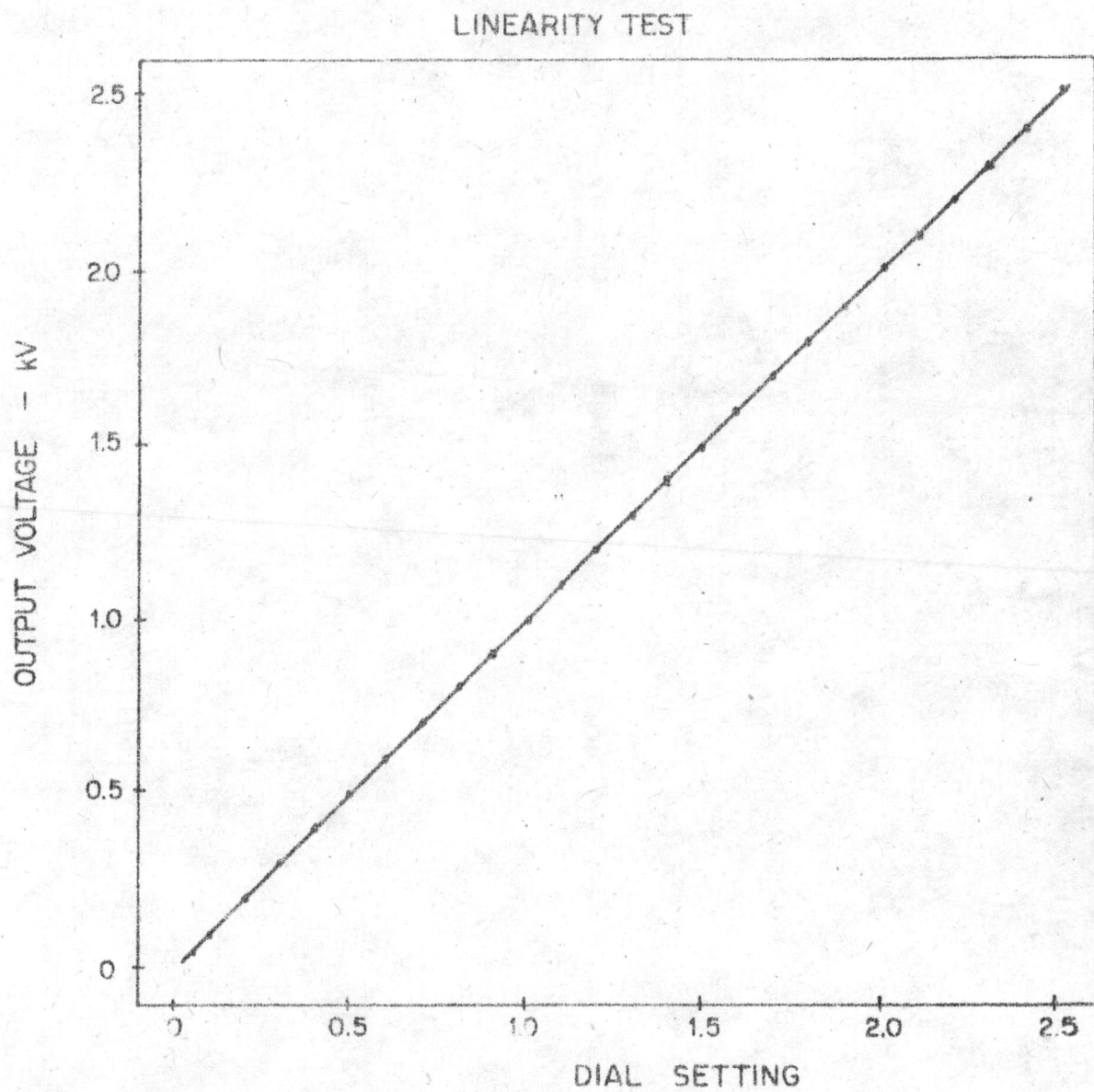


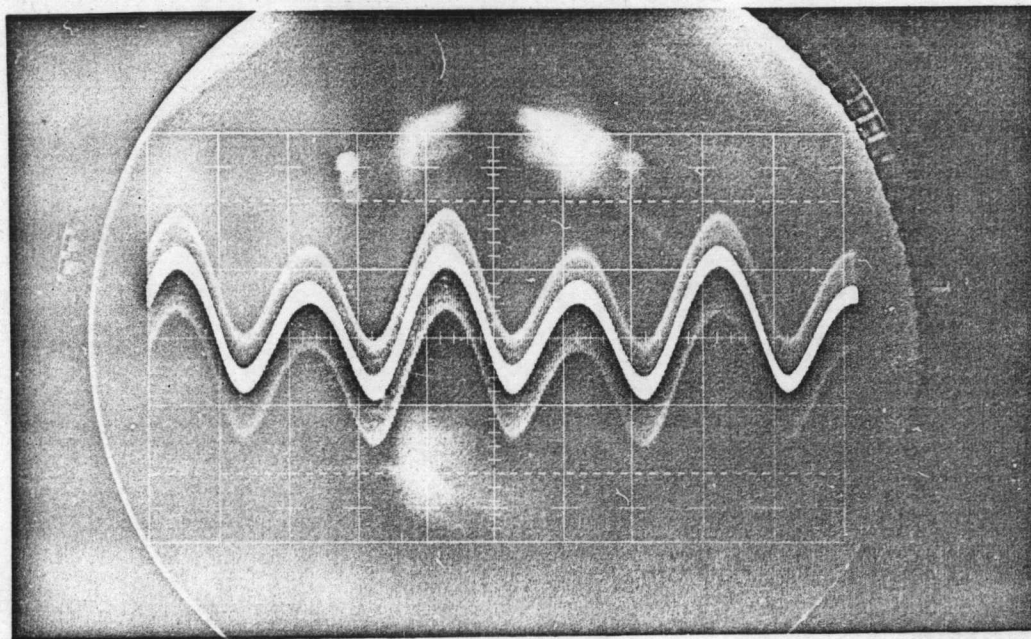
Fig. 24 Linearity and accuracy of HV power supply

Linearity Test

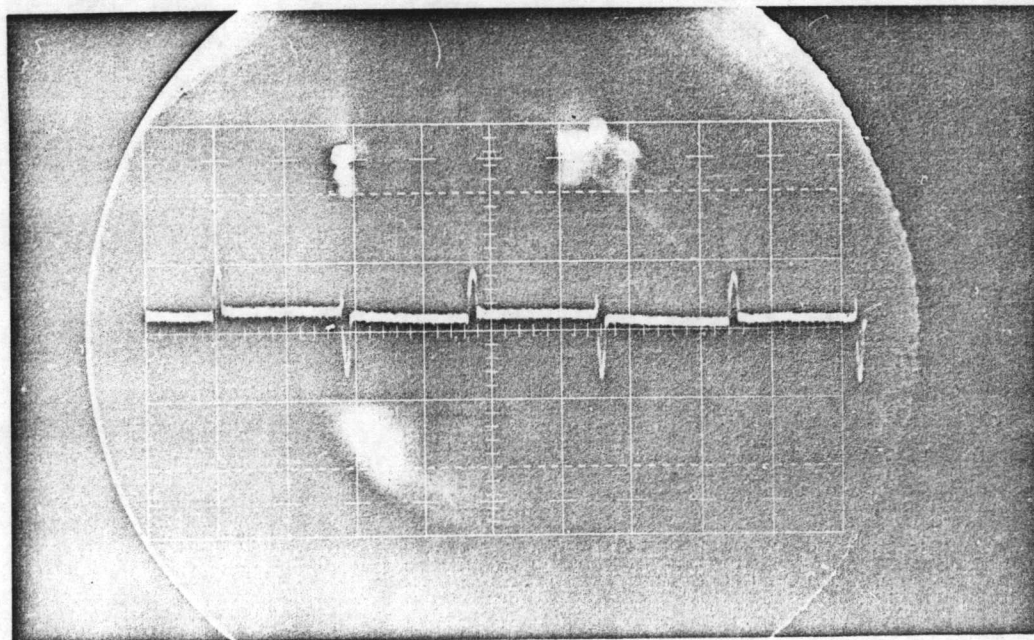
DIAL SETTING	OUTPUT VOLTAGE-kV
2.5	2.53
2.4	2.43
2.3	2.32
2.2	2.22
2.1	2.12
2.0	2.02
1.9	1.914
1.8	1.810
1.7	1.710
1.6	1.610
1.5	1.508
1.4	1.411
1.3	1.308
1.2	1.208
1.1	1.104
1.0	1.008
0.9	0.901
0.8	0.801
0.7	0.700
0.6	0.598
0.5	0.496
0.4	0.394
0.3	0.291

Linearity Test

DIAL SETTING	OUTPUT VOLTAGE-kV
0.2	0.188
0.1	0.091
0.05	0.044

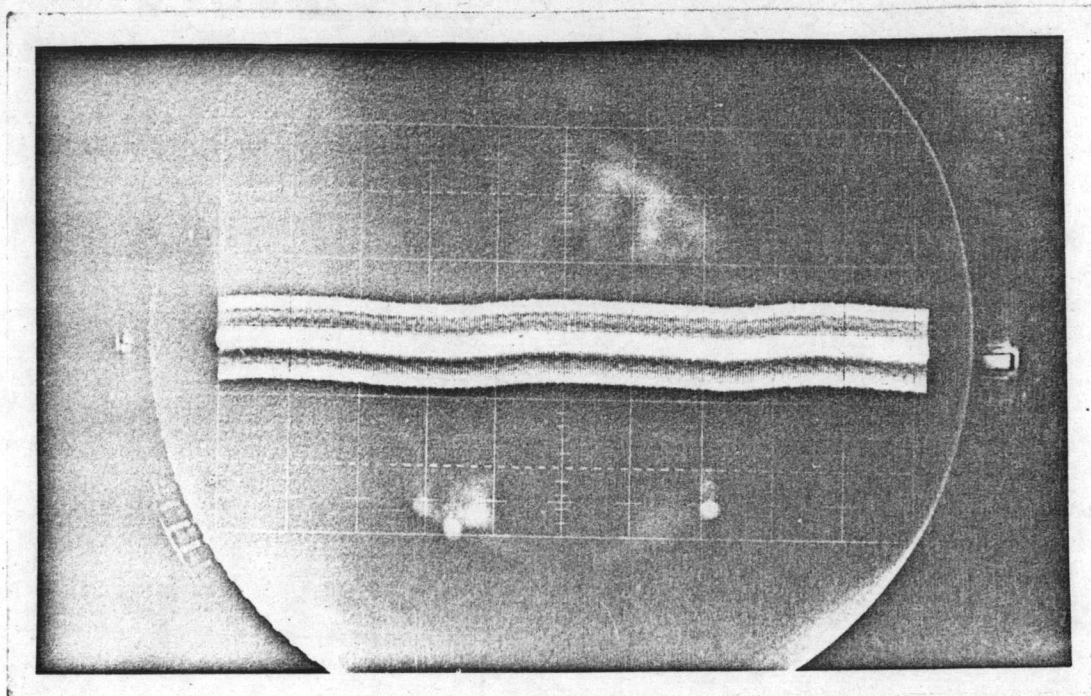


(a) Scale: Ver. 5mV/div., Hor. 5ms/div.

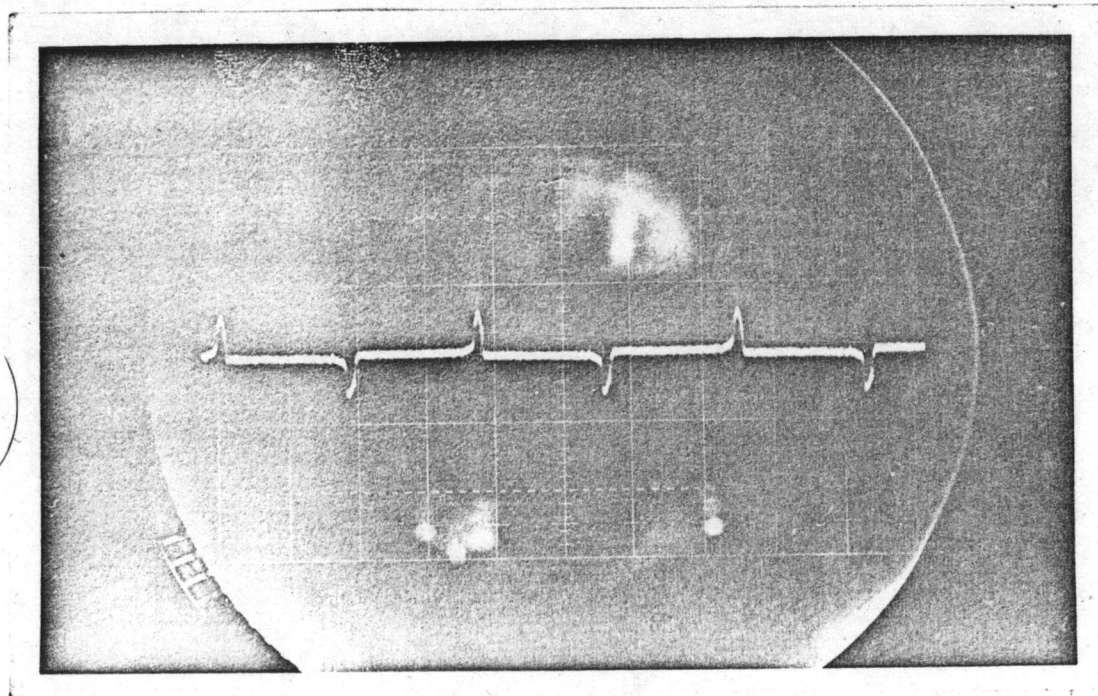


(b) Scale: Ver. 5mV/div., Hor. 50µs/div.

Fig. 25 Output Hum and Ripple at Full Load.



(a) Scale: Ver. 5 mV/div., Hor. 5 ms/div.



(b) Scale: Ver. 5mV/div., Hor. 50 μ s/div.

Fig. 26 Output Hum and Ripple at No Load.

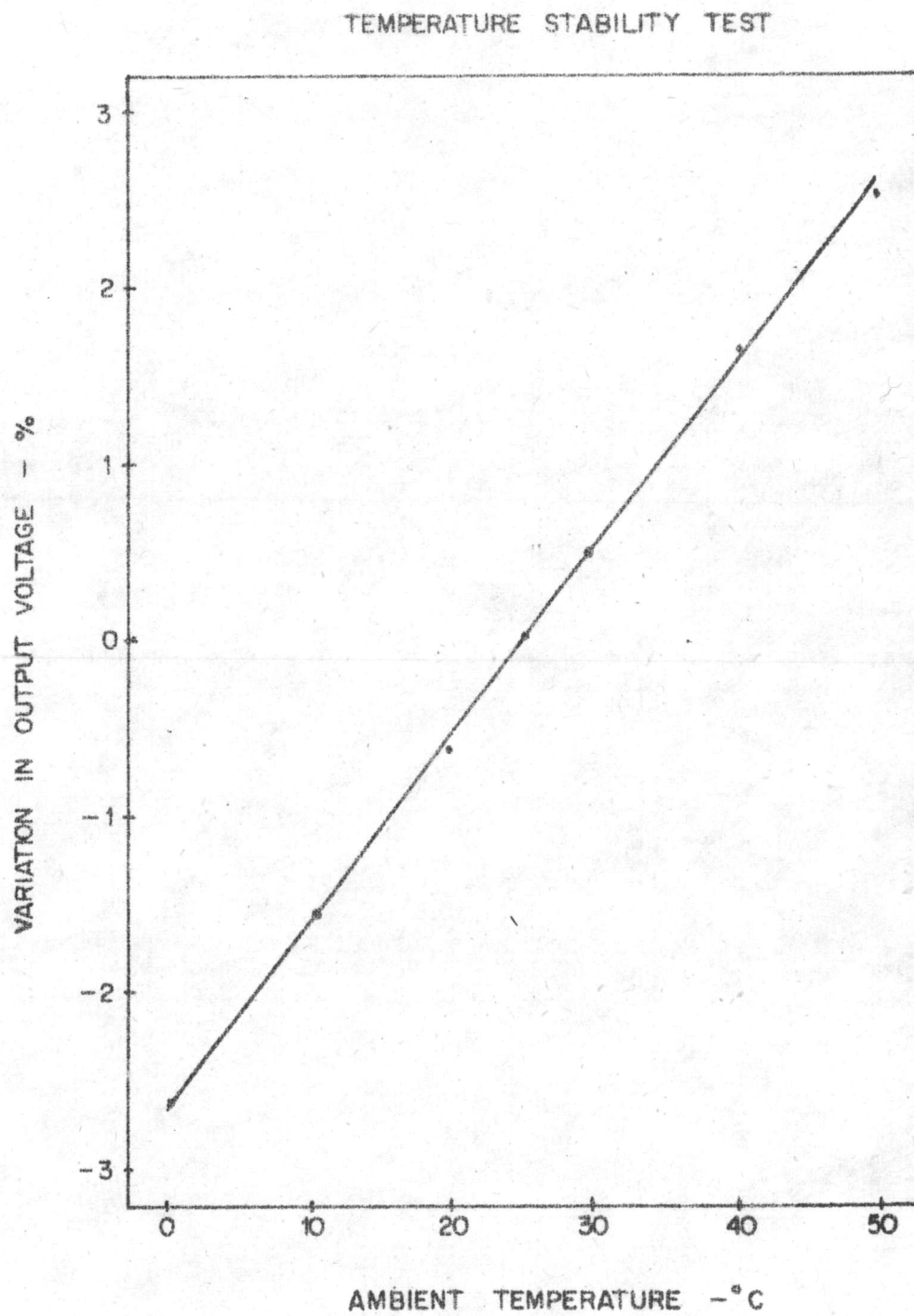


Fig. 28 Temperature stability of HV power supply.

REGULATION TEST

REGULATION $< 0.01\%$ variation in output voltage for line variation from 200 to 240 V at constant ambient temperature, and load.

SCALE

VERTICAL : Time 10 min/div.
HORIZONTAL : Variation 0.1%/div.

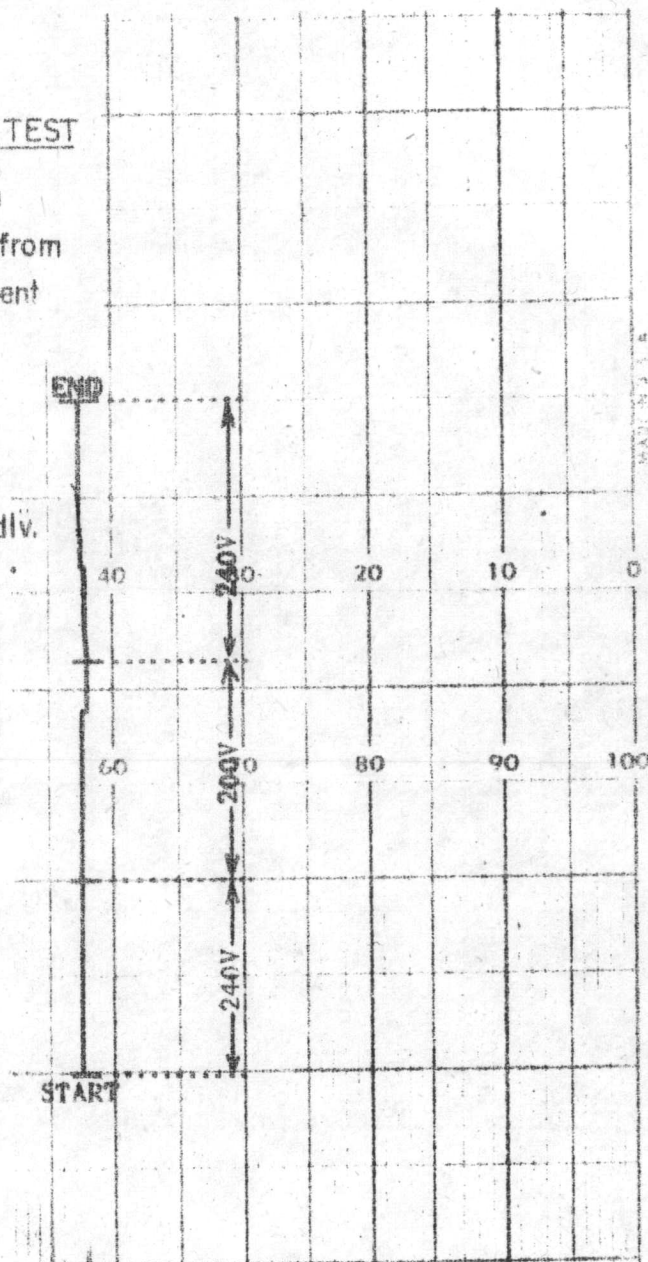


Fig. 29 Regulation of HV power supply.

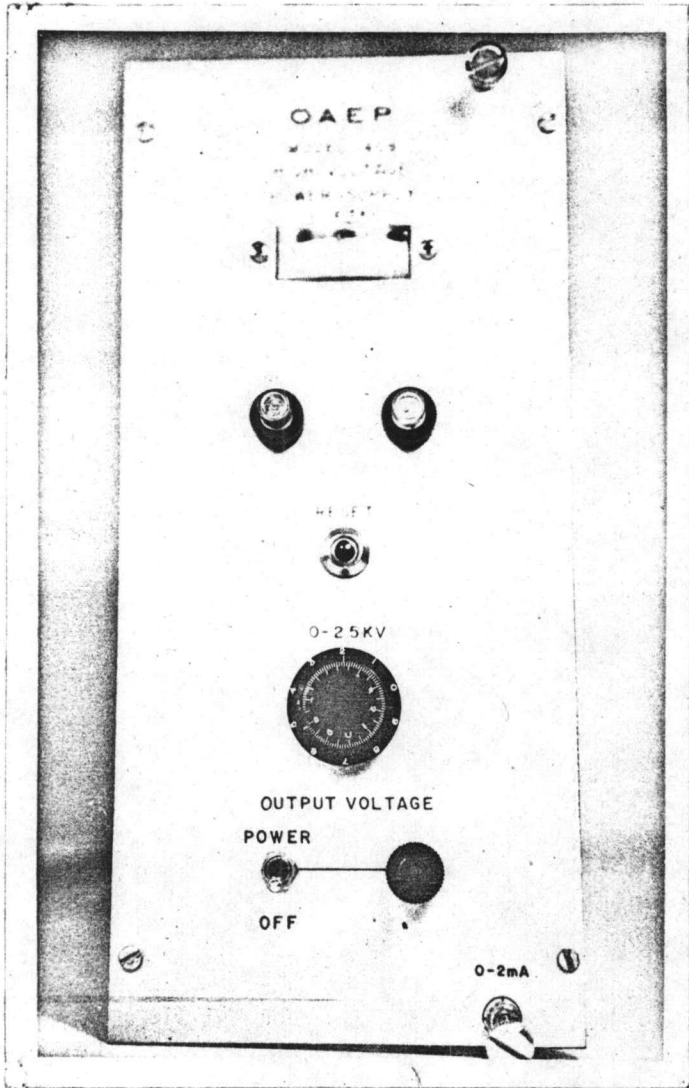


Fig. 30 Front panel of H.V. Power Supply

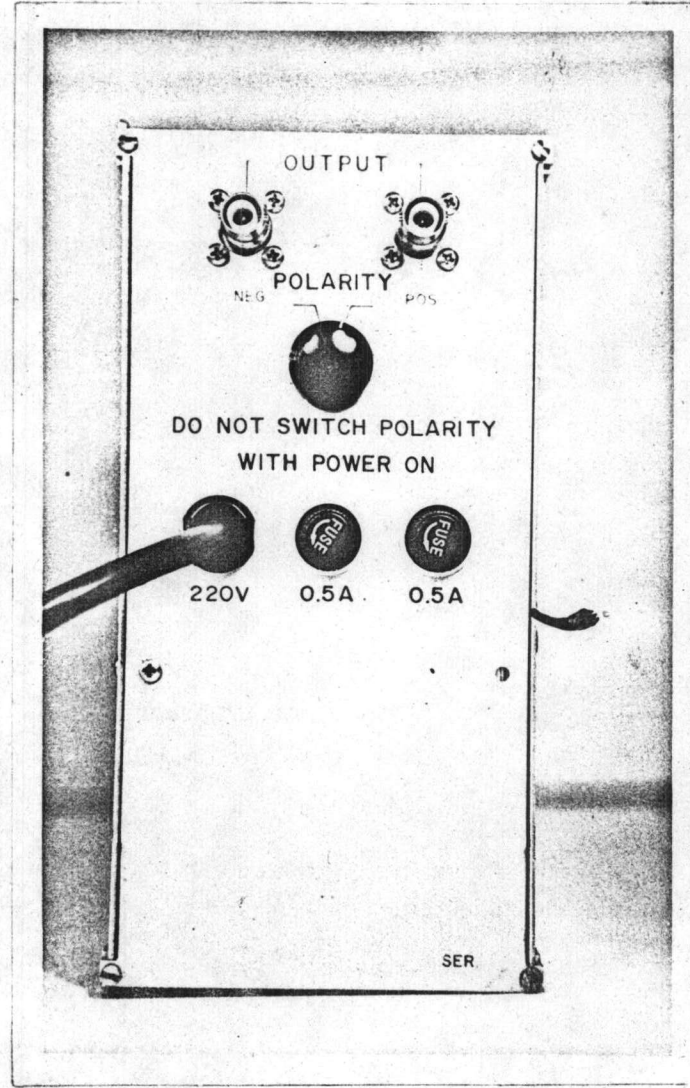


Fig. 31 Rear panel of H.V. Power Supply

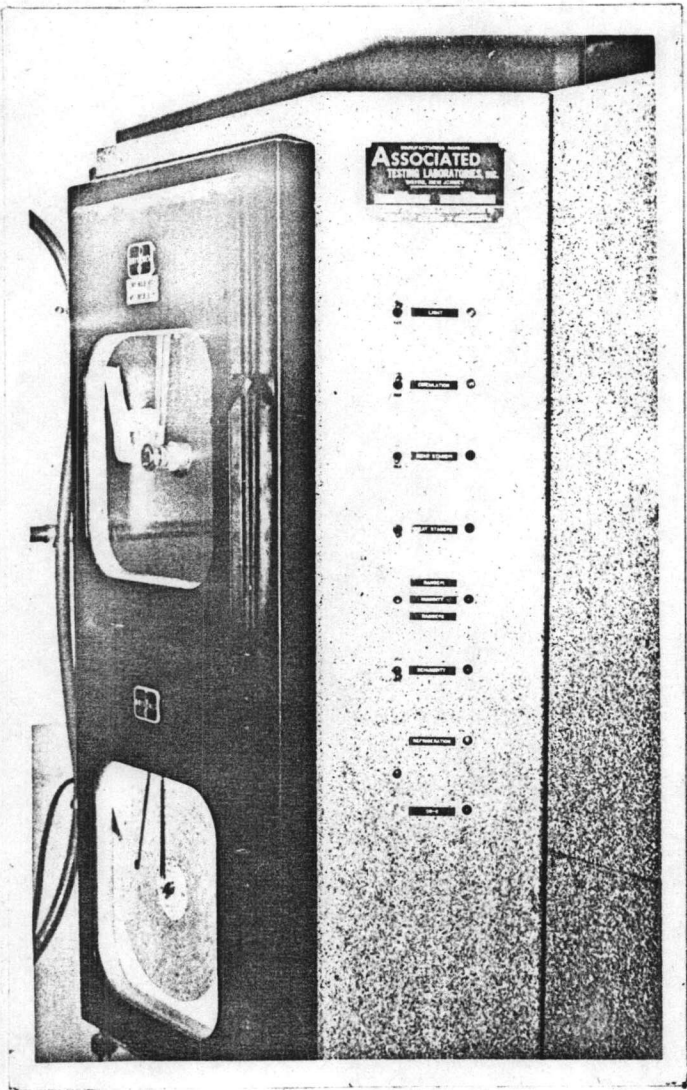


Fig. 32 Environmental Test Chamber for Temperature and Humidity Effect Testing.

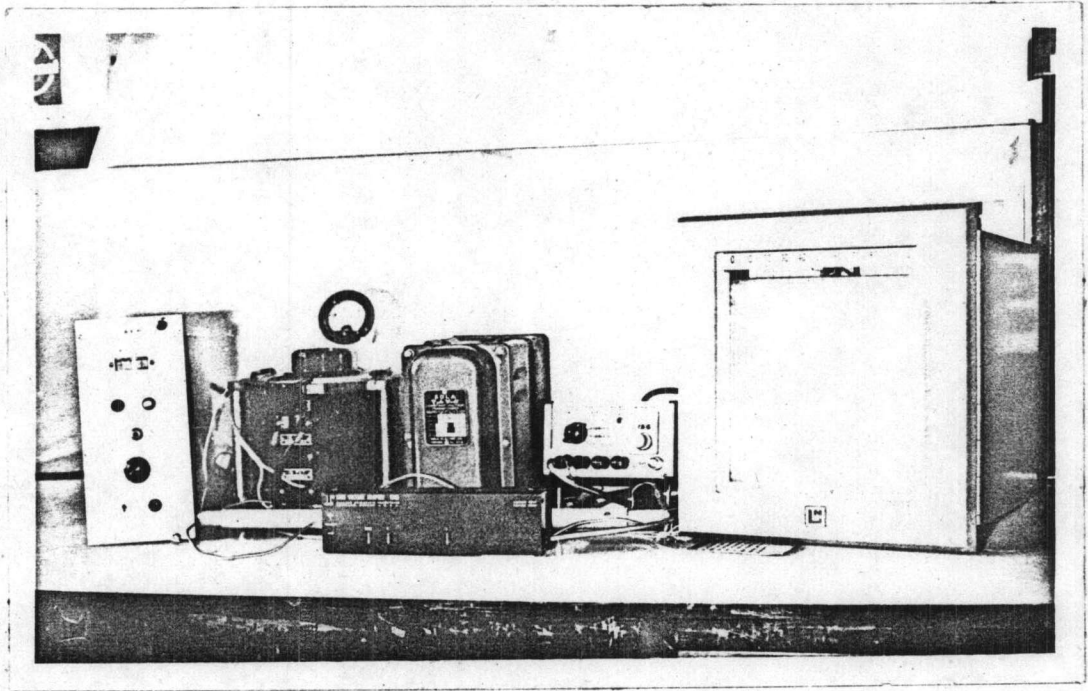


Fig. 33 The Performance Test set of H.V. Power Supply.