APPLICATION		REVISIONS			
NEXT ASSY	FINAL ASSY	LTR	DESCRIPTION	DATE	APPROVED
		—	PRODUCTION RELEASE EO 6815	7-21-72	
		A	SEE EO/7124	7-19-72	
		B	SEE EO 7214		
		C	SEE EO7236, 7601	3-9-73	

® SPECIFICATION
nimo ANODE POWER SUPPLY

TABULATION

-01 Figure 1
-02 Figure 2

REV	C	C	C	C	C	C																							
SHEET	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29

REVISION STATUS

PROJ NO. 127	CONTRACT	IEE INDUSTRIAL ELECTRONIC ENGINEERS, INC. VAN NUYS, CALIFORNIA
	DRAWN RWY 7-21-72	POWER SUPPLY - nimo ANODE
	CHECK	
	APPROVED	SIZE A / CODE IDENT NO. 05464 / S 06700
	APPROVED	SCALE / SHEET 1 OF 7

1.0 SCOPE

This specification describes a miniature power supply designed to provide anode voltage to the nimo cathode ray display tube.

2.0 NOMENCLATURE

IEE PART NUMBER 06700-01 or -02 - Power Supply, nimo anode.

3.0 APPLICATION

These power supplies will deliver sufficient anode power to operate nimo Tube Displays. Filament power is not provided. The supply operates from low voltage DC and delivers anode voltage in the range of 1 to 3K VDC, roughly proportional to the DC input voltage.

4.0 ELECTRICAL CHARACTERISTICS

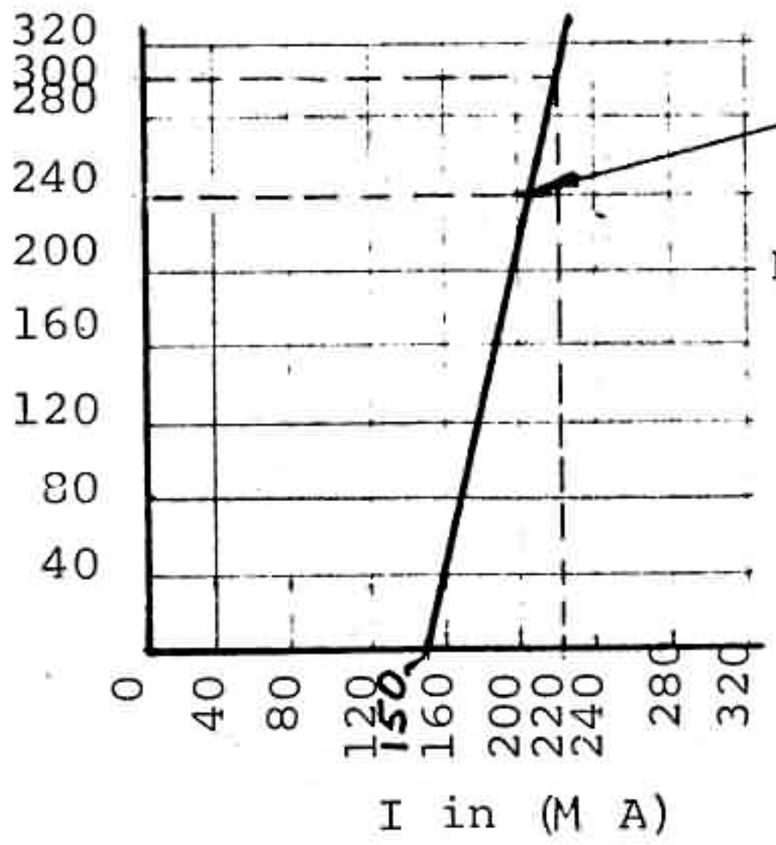
All electrical characteristics are specified at a nominal ambient temperature of +25°C unless otherwise stated.

4.1 Input (Primary) Characteristics:

4.1.1 Input Power Requirements:

MAXIMUM VOLTAGE
+16.0 VDC

MAXIMUM CURRENTS
@ 15 VDC ± 1% input
see graph



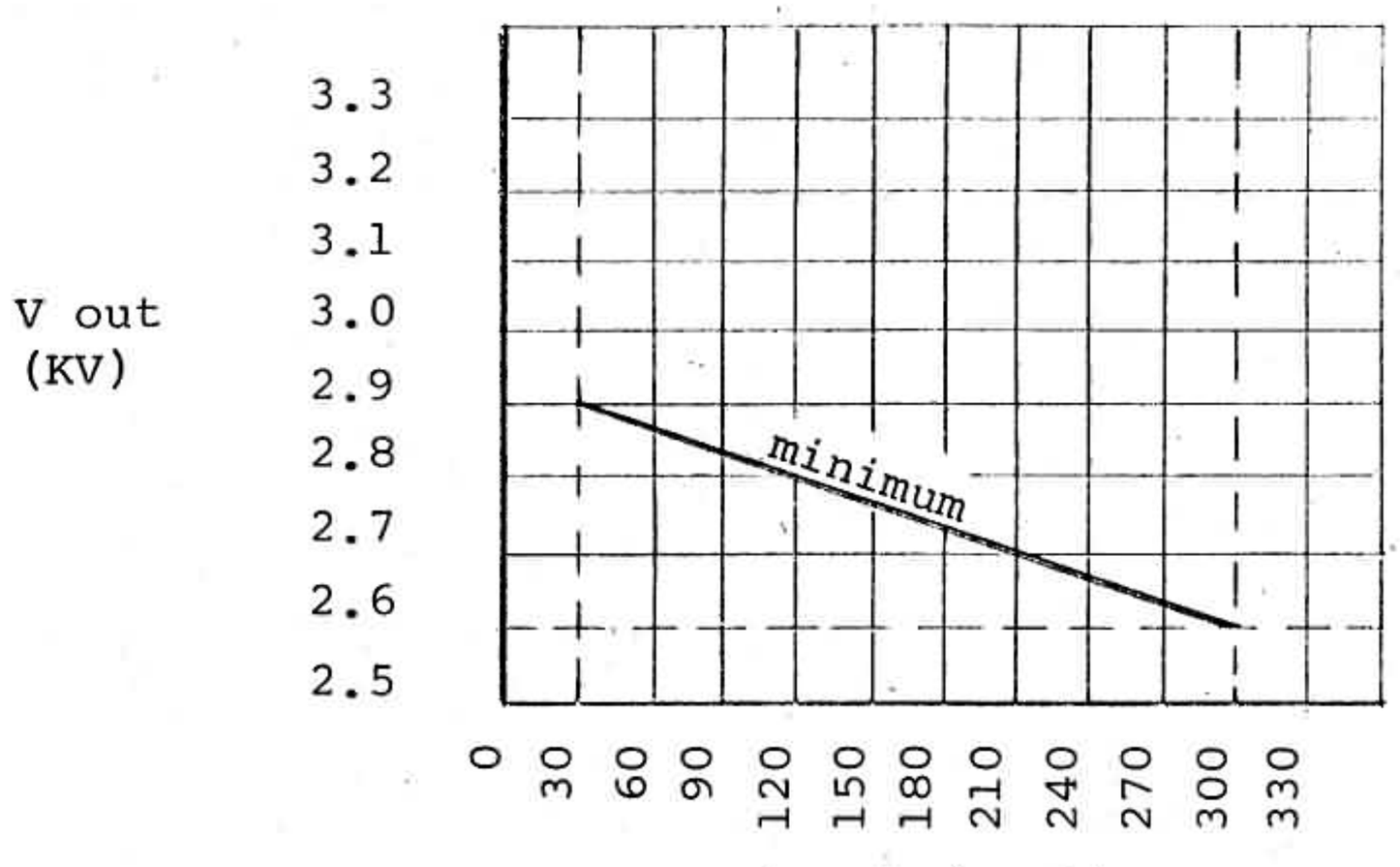
Note:
Due to the nature of the inverter circuit used, a large amount of current is needed at one time, and this causes a voltage drop (negative spike) on the input power line. If these spikes cannot be tolerated they can be filtered by using a large capacitor on the input power line.

4.1.2 Line Regulation:

These power supplies are, in effect, DC transformers. Variations in input voltage are proportionately reflected in output voltage.

4.2 Output Load Characteristics
@ + 15.0 VDC ± 1% input

Maximum Ripple:
100 V P-P (resistive load) at roughly 20 KH_z basic frequency



5.0 PHYSICAL CHARACTERISTICS

5.1 Mechanical: The IEE #06700-01 and -02 power supplies are an encapsulated, non-repairable assembly. Ref. Figure 1 and 2.

CONFIGURATION

See Figures 1 and 2
Weight: 60 grams maximum.

MOUNTING: The -01 supply is designed to mount to the rear of the IEE nimo tube socket, as the nimo tube assembly kit provides. A stranded wire lead is provided for input voltage.

The -02 supply is designed to mount on a flat surface with two No. 6 faste ners and provides standard quick disconnect tabs for all connections.

5.2 Environmental:

5.2.1 Ambient temperature (operating):
0°C to 70°C

5.2.2 Ambient temperature (storage):
-54°C to +85°C

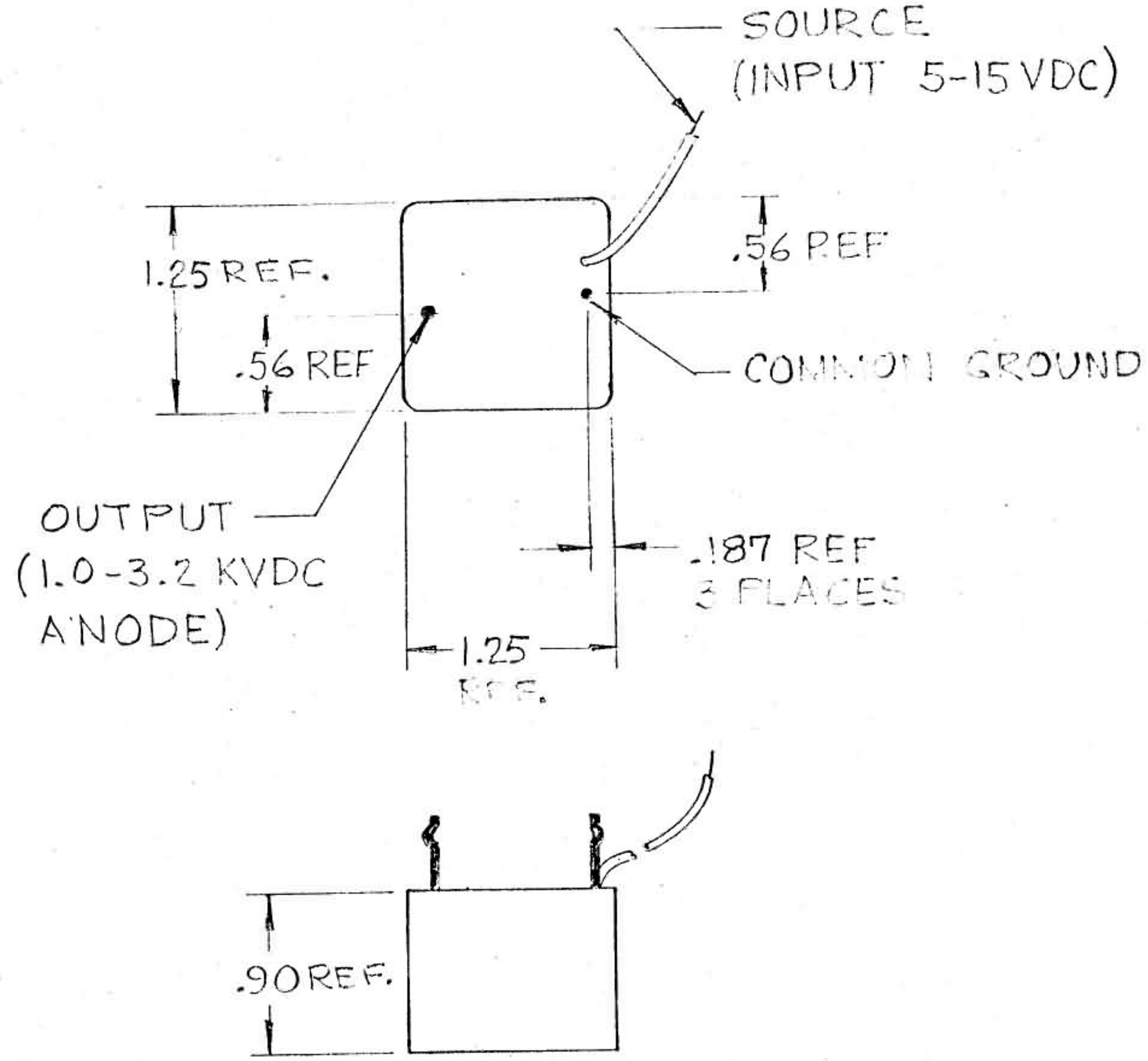
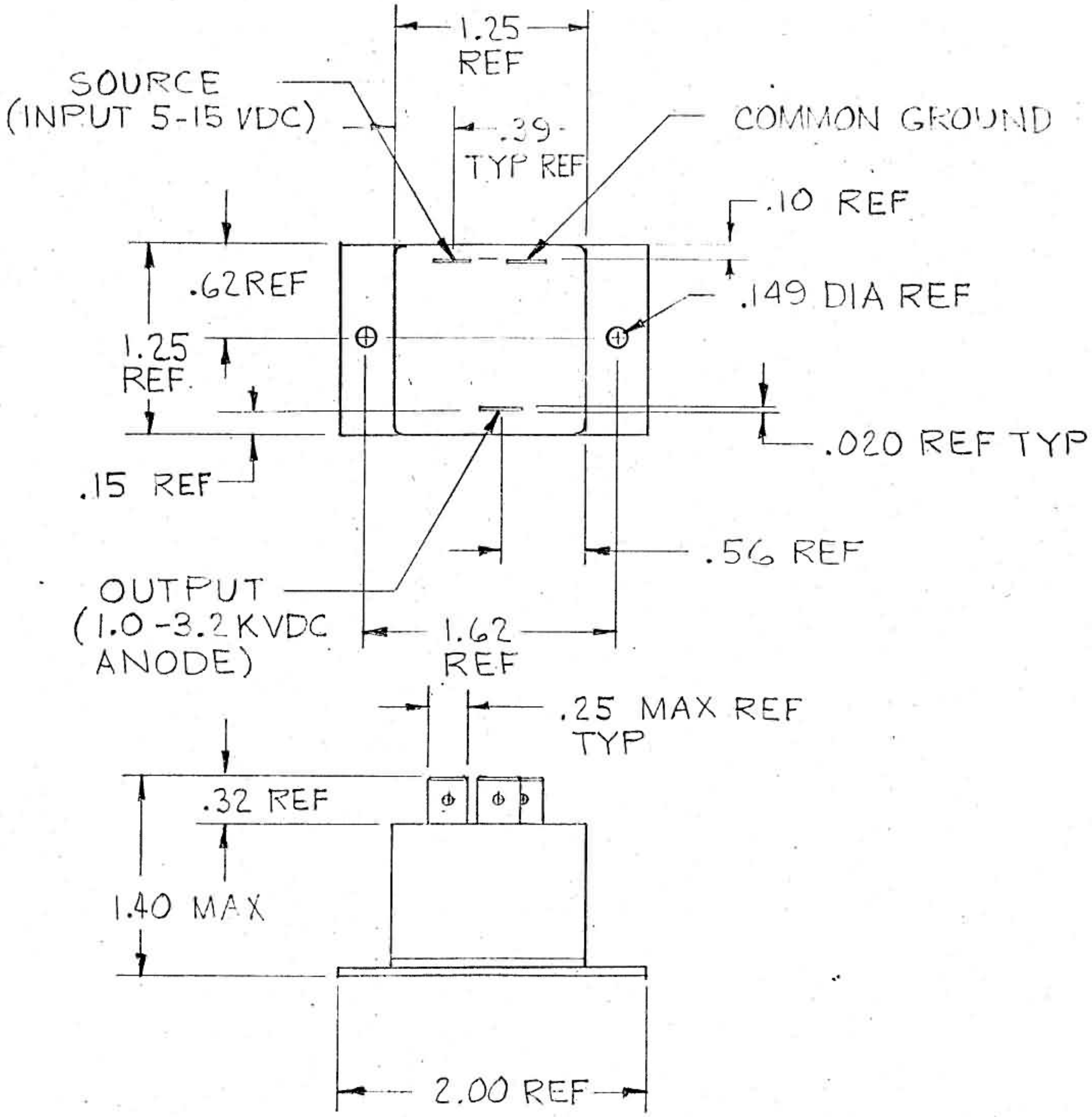


FIGURE 1.

-01

INDUSTRIAL ELECTRONIC ENGINEERS, INC. VAN NUYS, CALIFORNIA	SIZE A	CODE IDENT NO 05464	S 06700
	SCALE	REV	SHEET 4



-02

FIGURE 2

INDUSTRIAL ELECTRONIC ENGINEERS, INC. VAN NUYS. CALIFORNIA	SIZE A	CODE IDENT NO 05464	S06700
	SCALE	REV C	SHEET 5

In order to compensate for the difference between supplies, the input voltage must be adjustable over at least a small range, and a larger range may be desirable for brightness control, etc.. There are many ways to control or vary the input voltage to this supply. A few of these are described below along with advantages and disadvantages associated with each.

A variable series resistor is the simplest method of control, but it requires a relatively large pot (250Ω 2W has been found to be satisfactory) to pass the necessary input current. An additional disadvantage is the lack of load regulation. That is to say, when a supply has been adjusted to give the desired output voltage at one load, the output voltage increases as the load is reduced. This is caused by a reduced current through the variable resistor, which allows more voltage to be applied to the input of the supply. A less expensive and smaller method which has the same lack of load regulation is achieved by the use of a fixed series resistor (of slightly larger value than would ever be required) paralleled by a fixed trimmer selected at a later stage of assembly. This method significantly reduces the effect of the negative voltage spikes (mentioned in Section 4.1.1) on the driven (source) side of the resistor.

A simple transistorized control can greatly improve the load regulation lacking in the previous description. This is accomplished as shown in Figure A1, where the transistor is acting as an emitter follower and the pot (acting as a voltage divider) applies a

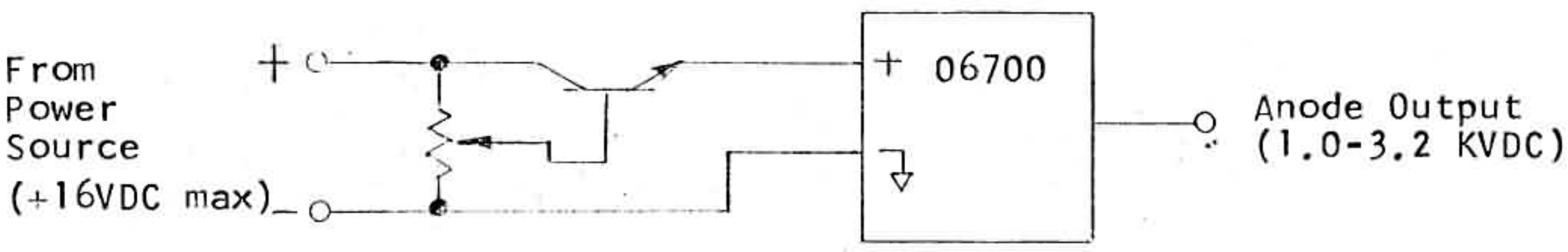


FIGURE A1.

selectable and nominally constant voltage to its base. This voltage in fact, is not constant since the current supplied to the base of the transistor changes proportionably to the current through the collector, causing the currents in the voltage divider to be upset. This upset may be reduced even further by increasing the gain of the transistor

portion of the control, such as by the use of a darlington configuration. The value of the pot depends on the degree of load regulation required and on the gain of the transistor(s) used. A disadvantage of this control method is that it does not reduce the effects of the negative voltage spikes as much as the purely resistive control does, since the transistor tries to give the 6700 as much current as it wants. And since it does, the transistor should be capable of handling an 800 milliamp spike of 1 to 3 microsecond duration and approximately 20KHz repetition rate, typical of the negative voltage spike.

A logical extension of the last method of voltage control is the use of a variable power supply dedicated to driving a 6700 alone. This control would probably produce the ultimate performance, but it is also the most expensive of the methods suggested here.

In concluding this appendix a word should be said concerning the source of power for the 6700 power supply. It was designed to be an anode supply for the 6500 nimo tube, whose grids require 12.5 to 15 VDC potential difference (+2.5 to -10, or +3 to - 12, etc.,). 15VDC was selected as the maximum input voltage with the intent that a 12.5 or 15 volt supply would be used for grid bias, and the center tap on the filament supply would be biased at +10 or +12VDC. This mode of operation also renders the negative voltage spike that is mentioned in Section 4.1.1, inconsequential, since it cannot be seen in the tube's display and it will not harm the tube. However, the spike must still be dealt with if solid state logic other than "open collector" type is used to drive the grids.