



PLIOTRON

DESCRIPTION

The GL-5693 is a sharp cut-off five-electrode, high vacuum tube for use as a high-gain, resistance-coupled amplifier in industrial applications. A grid No. 1 resistor with a value as high as 40 megohms can be used with this tube depending upon the operating conditions as given on the curve

"Operational Characteristics." In addition, the 5693 is characterized by uniformity and stability of characteristic, resistance to shock and vibration, and long life features especially desirable in industrial service.

TECHNICAL INFORMATION

These data are for reference only. For design information refer to specifications.

Electrical Data

Cathode—Indirectly heated			
Heater voltage (a-c or d-c)			6.3 $\pm$ 5%* volts
Heater current			0.3 ampere
Direct interelectrode capacitances, with shell connected to cathode			
Grid to plate	4.8	5.3	0.005 uuf
Input	5.6	6.2	5.8 uuf
Output			6.8 uuf

Mechanical Data

Mounting position—Any
Net weight, approximate.....3 ounces

GENERAL  ELECTRIC


Electron
TUBE

TECHNICAL INFORMATION (CONT'D)

MAXIMUM RATINGS AND TYPICAL OPERATING CONDITIONS

Maximum ratings, absolute values

D-c plate voltage	300 max volts
D-c plate supply voltage	330 max volts
D-c grid No. 3 (suppressor) voltage	
Negative bias value	0 min -100 max volts
D-c grid No. 2 (screen) voltage	125** max volts
D-c grid No. 2 supply voltage	330 max volts
Grid No. 1 (control-grid) voltage	
Negative bias range	1*** min to -50 max volts
Negative peak value	-50 max volts
D-c cathode current	10 max milliamperes
Plate dissipation	2 max watts
Grid No. 2 dissipation	0.3 max watt
Peak heater-cathode voltage	
Heater negative with respect to cathode	100 max volts
Heater positive with respect to cathode	100 max volts
Ambient temperature range	-55 to +90 C

*May deviate ± 10 per cent from rated value provided such deviation occurs for less than 2 per cent of the operating time.

**The 5693 may be operated at a grid No. 2 voltage as high as the maximum rated grid No. 2 supply voltage (330 volts) when the grid No. 2 dissipation is not exceeded for any signal conditions and when a resistor is used in series with the grid No. 2 and its supply voltage.

***For resistance-coupled amplifier applications, the negative grid No. 1 bias may be as low as -0.5 volt.

Maximum circuit value (see curve K-69087-72A224)

Characteristics and range values

Heater voltage, 6.3; plate voltage, 250; grid No. 3 voltage, 0; grid No. 2 voltage, 100; grid No. 1 voltage, -3

	Minimum	Average	Maximum
Heater current	0.275	0.3	0.325 amperes
Heater-cathode current with heater-cathode voltage of ± 100 volts			5 microamperes
Plate current	2.3	3.0	3.7 milliamperes
Plate current for grid No. 1 voltage of -7.5 volts	2	30	80 microamperes
Plate current for grid No. 3 voltage of -70 volts	150	450	750 microamperes
Grid No. 2 current	0.60	0.85	1.10 milliamperes
Reverse grid No. 1 current			0.1 microamperes
Plate resistance	1.0		megohms
Transconductance	1400	1650	1900 micromhos

Typical operation—resistance-coupled amplifier

Plate and grid No. 2 supply voltage	90			180			300			volts
Plate load resistor	0.1	0.25	0.5	0.1	0.25	0.5	0.1	0.25	0.5	megohms
Grid No. 1 resistor	0.25	0.5	1	0.25	0.5	1	0.25	0.5	1	megohms
Grid No. 2 resistor	0.29	0.92	1.7	0.31	0.94	2.2	0.37	1.10	2.2	megohms
Cathode resistor	880	1700	3800	800	1060	2180	530	860	1410	ohms
Grid No. 2 bypass capacitor†	0.085	0.045	0.03	0.09	0.06	0.04	0.09	0.06	0.05	uf
Cathode bypass capacitor†	7.4	4.5	2.4	8	6.6	3.8	10.9	7.4	5.8	uf
Blocking capacitor†	0.016	0.005	0.002	0.015	0.004	0.002	0.016	0.004	0.002	uf
Peak output voltage‡	23	18	22	60	47	44	96	88	79	volts
Voltage gain Δ	68	93	119	82	131	192	98	167	238	

†The cathode and grid No. 2 bypass capacitors and blocking capacitors have been chosen to give output voltages at 100 cycles per second (f_1) which are equal to 0.7 of the mid-frequency value. For any other value of (f_1), multiply the values of cathode bypass, grid No. 2 bypass, and blocking capacitors by $100/f_1$.

‡This peak output voltage is obtained across the grid resistor of the following stage at any frequency within the flat region of the output vs frequency curve, and is for the condition where the signal level is adequate to swing the grid of the resistance-coupled amplifier tube to the point where its grid starts to draw current.

Δ At an output voltage of 5 volts rms.

GL-5693 OPERATIONAL CHARACTERISTICS

 $E_i = 6.3$ VOLTS PLATE VOLTAGE = 300

GRID NO. 3 VOLTAGE = 0

CURVE	GRID-NO. 2 RESISTOR	GRID-NO. 2 SUPPLY VOLTAGE
1	0 MEG.	100
2	0.25 MEG.	300
3	0.5 MEG.	300
4	0.75 MEG.	300

CURVES BASED ON FOLLOWING VALUES:

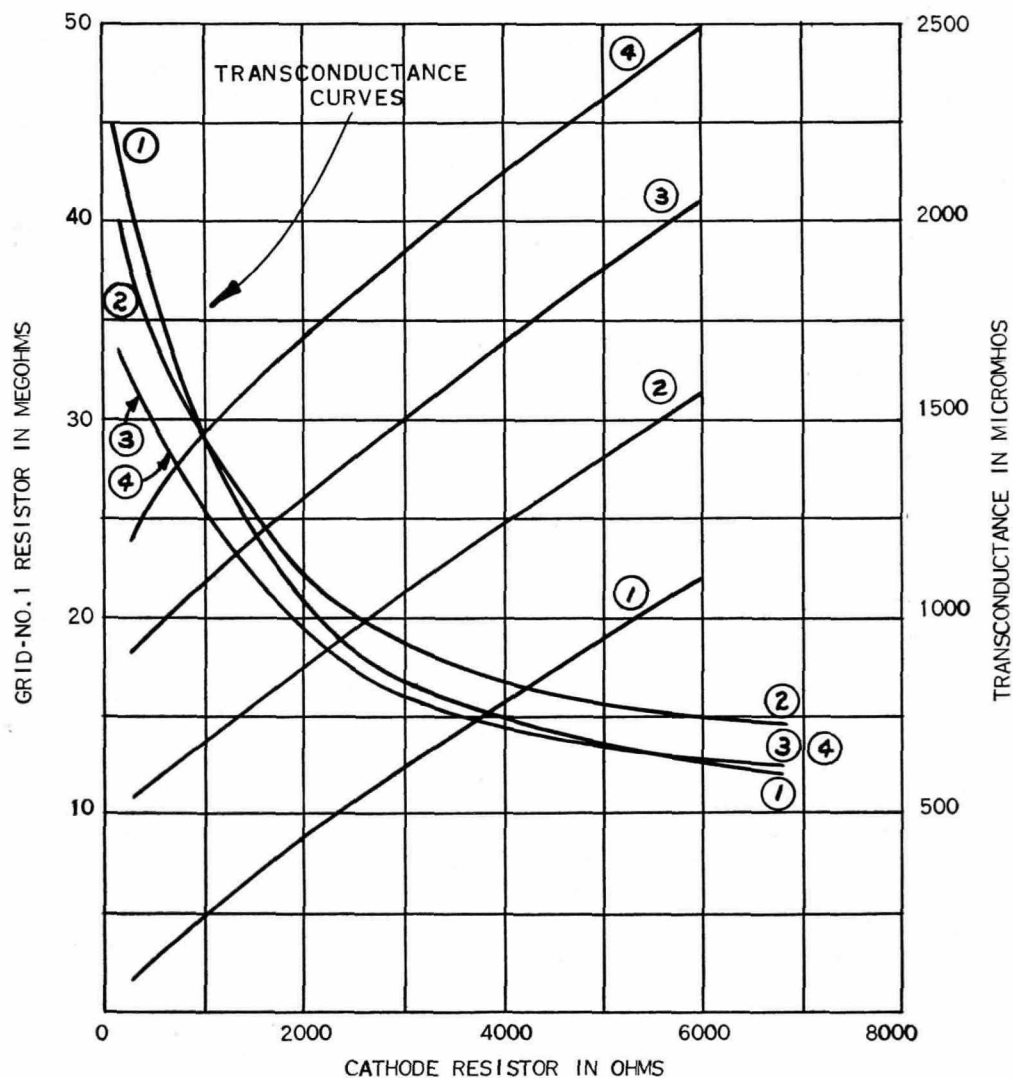
$$\Delta I_K = 300 \mu\text{AMP}, \Delta I_{g1} = 0.1 \mu\text{AMP}$$

EXPRESSING THESE VALUES AS A RATIO:

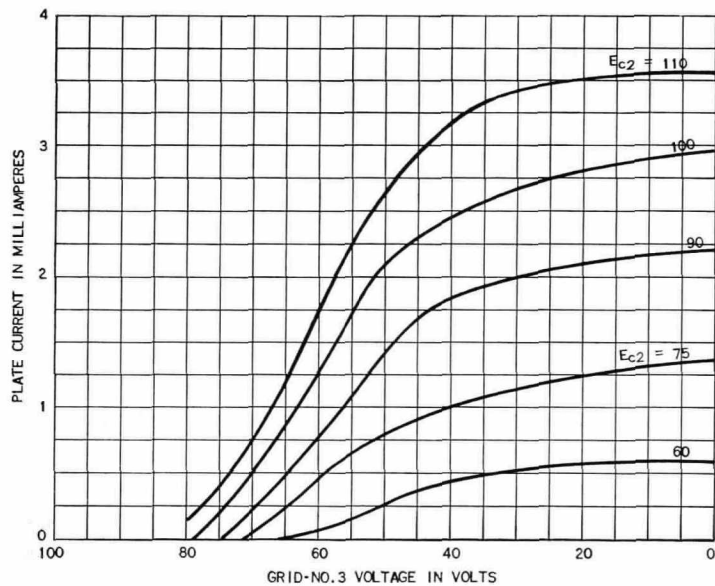
$$\frac{\Delta I_K}{\Delta I_{g1}} = \frac{300}{0.1} \text{ OR } 3000$$

FOR APPLICATIONS PERMITTING OTHER VALUES OF ΔI_K , A NEW RATIO OF $\Delta I_K / \Delta I_{g1}$ CAN BE CALCULATED. THE VALUES OF R_{g1} AS READ FROM THE CURVE MUST BE MULTIPLIED BY A FACTOR WHICH IS THE QUOTIENT OF THE NEW RATIO DIVIDED BY THE OLD RATIO. FOR EXAMPLE, IF THE NEW RATIO IS 6000 THE MULTIPLYING FACTOR IS 6000/3000, OR 2, AND VALUES OF R_{g1} AS READ FROM THE CURVE ARE THEREFORE MULTIPLIED BY 2.

NOTE: TRANSCONDUCTANCE CURVES WERE OBTAINED WITH GRID-NO. 2 RESISTOR AND CATHODE RESISTOR SUITABLY BYPASSED.



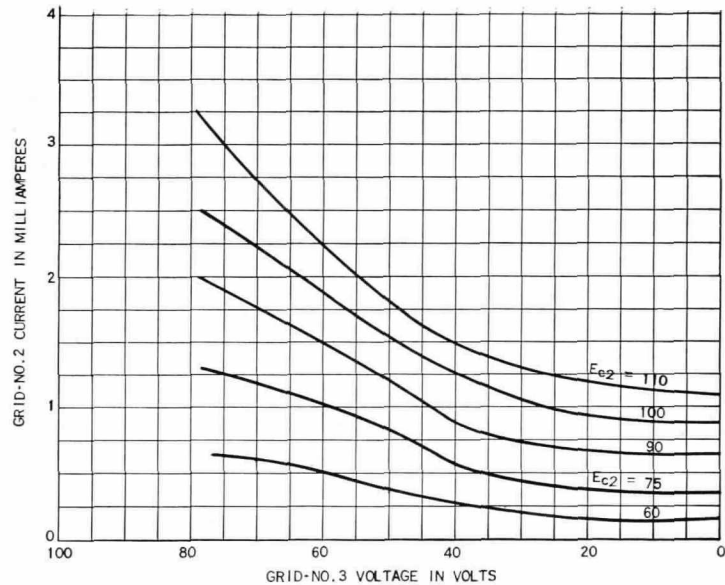
GL-5693
AVERAGE SUPPRESSOR CHARACTERISTICS
 $E_i = 6.3$ VOLTS
PLATE VOLTAGE = 250
GRID NO. 1 VOLTAGE = -3



K-69087-72A229

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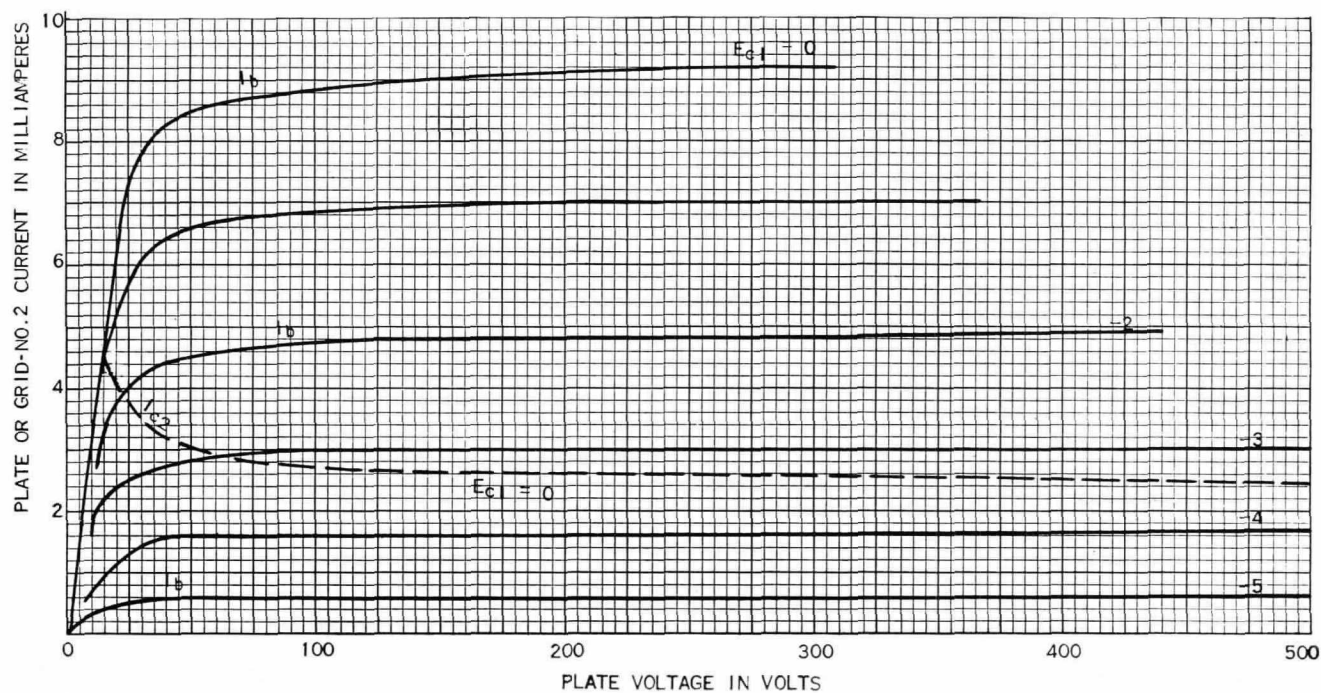
GL-5693
AVERAGE SUPPRESSOR CHARACTERISTICS
 $E_i = 6.3$ VOLTS
PLATE VOLTAGE = 250
GRID NO. 1 VOLTAGE = -3



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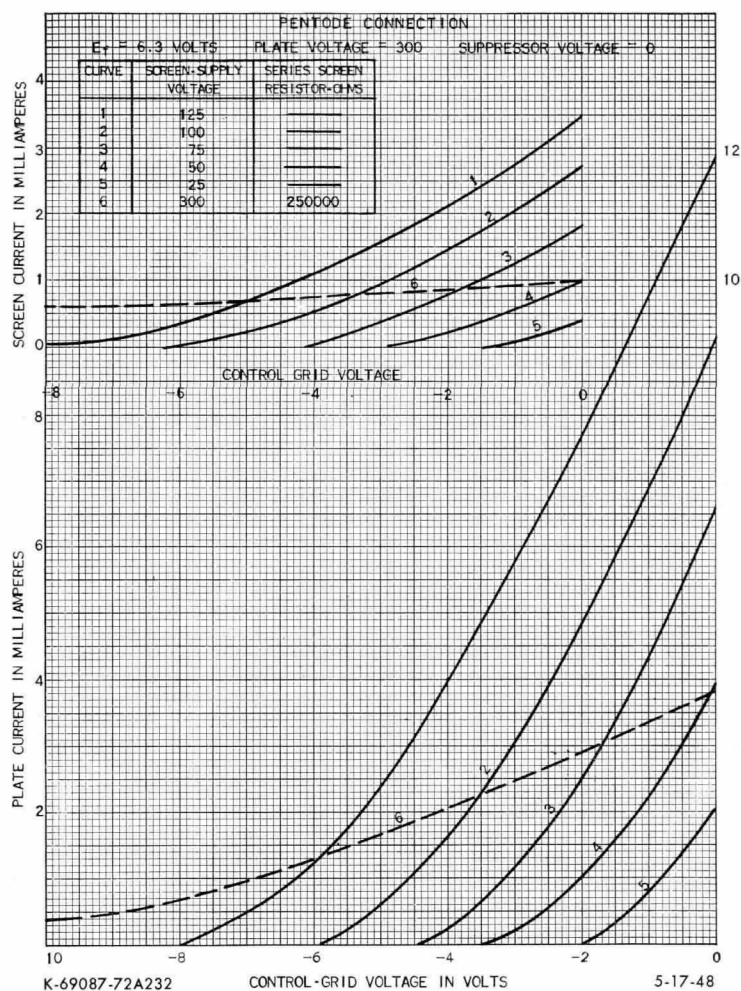
GL-5693
AVERAGE PLATE CHARACTERISTICS
PENTODE CONNECTION
 $E_i = 6.3$ VOLTS
GRID NO. 2 VOLTAGE = 100
GRID NO. 3 VOLTAGE = 0



K-69087-72A231

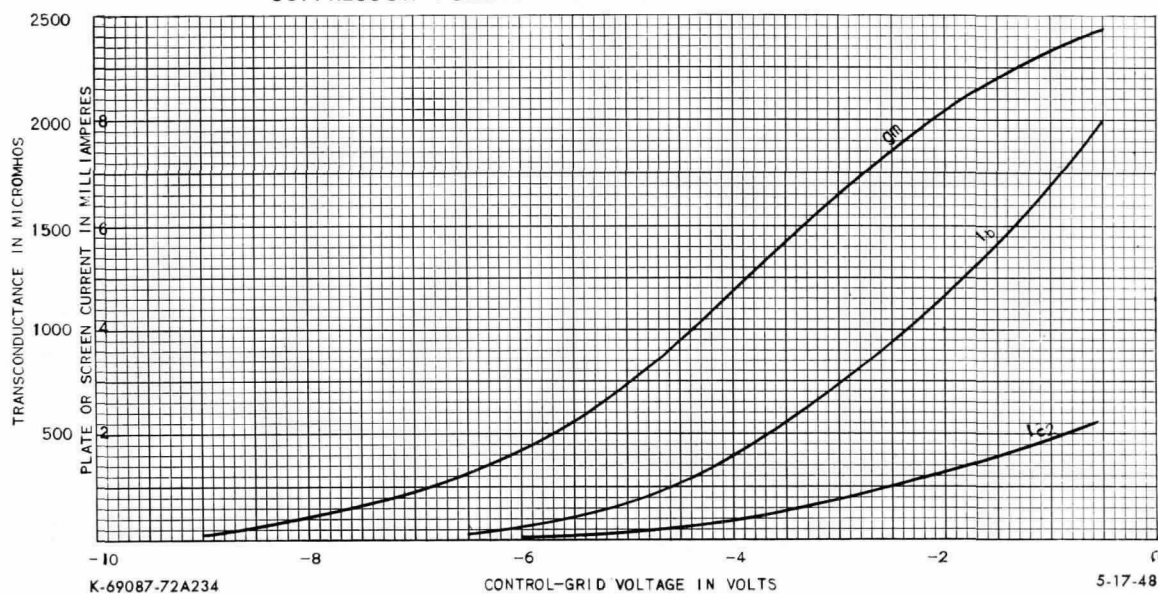
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GL-5693 AVERAGE CHARACTERISTICS

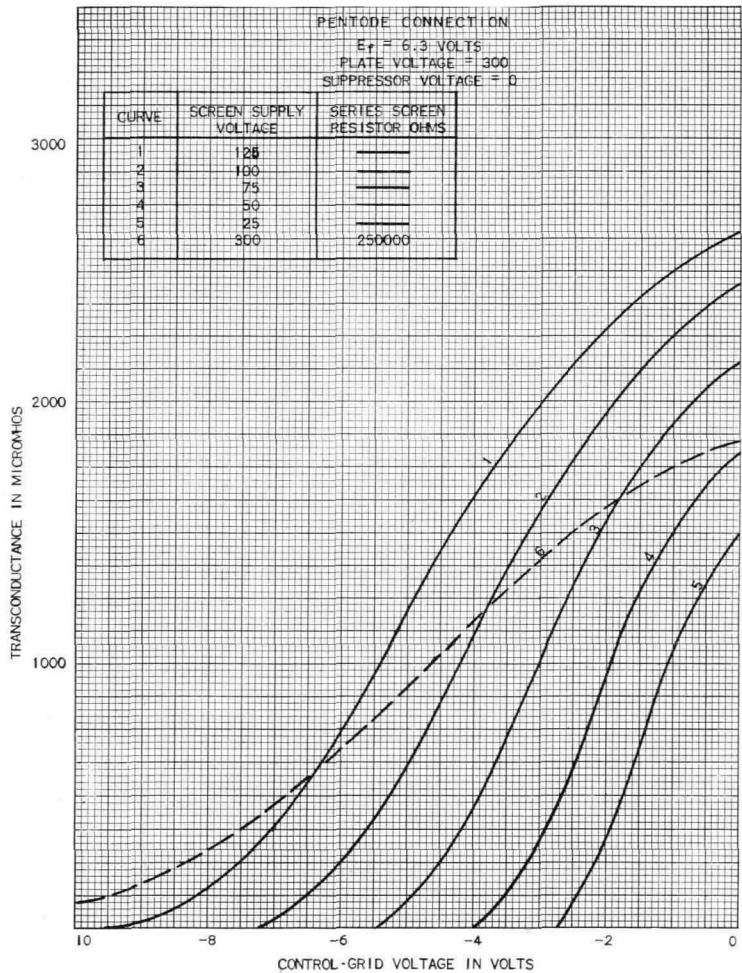


GL-5693 AVERAGE CHARACTERISTICS

PENTODE CONNECTION $E_i = 6.3$ VOLTS PLATE VOLTAGE = 250
 SUPPRESSOR VOLTAGE = 0 SCREEN VOLTAGE = 100



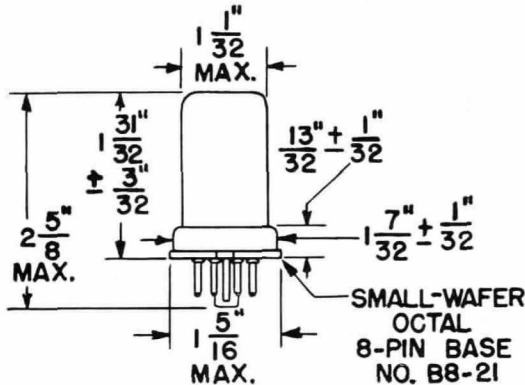
GL-5693 AVERAGE CHARACTERISTICS



K-69087-72A233

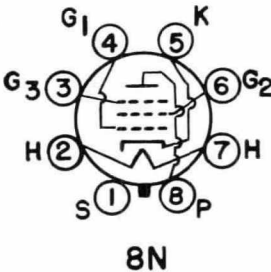
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OUTLINE
GL-5693 PIOTRON



N-15119AZ

BASING DIAGRAM



- | | |
|-------------------|-------------------|
| PIN 1: SHELL | PIN 5: CATHODE |
| PIN 2: HEATER | PIN 6: GRID NO. 2 |
| PIN 3: GRID NO. 3 | PIN 7: HEATER |
| PIN 4: GRID NO. 1 | PIN 8: PLATE |

5-17-48

Electronics Department

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Schenectady, N. Y.