2050-A

Gas Thyratron

TETRODE TYPE

For Relay and Grid-Controlled-Rectifier Service

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:		
Voltage (AC or DC)	6.3 ± 10%	volts
Current at 6.3 volts	0.6	amp
Cathode:		
Minimum heating time prior to tube conduction	10	sec
Direct Interelectrode Capacitances (Approx.):[a]		
Grid No.1 to anode	0.15	μμf
Grid No.1 to cathode and grid No.2	2.2	μμf
Ionization Time (Approx.):		
For dc anode volts = 100, grid-No.1 volts (square-wave pulse) = 50, peak anode amperes during conduction = 1	0.5	μsec
Deionization Time (Approx.):		
With dc anode volts = 125, grid-No.1 volts = -250, grid-No.1 resistor (ohms) = 1000, dc anode amperes = 0.1	50	μsec
With dc anode volts = 125, grid-No.1 volts = -10, grid-No.1 resistor (ohms) = 1000, dc anode amperes = 0.1	100	μsec
Maximum Critical Grid-No.1 Current for dc anode supply volts (rms) = 460, average anode amperes = 0.1	0.5	μa
Anode Voltage Drop (Approx.)	8	volts
Grid-No.1 Control Ratio (Approx.) for grid-No.1 resistor (ohms) = 0, grid No.2 connected to cathode at socket	250	
Grid-No.2 Control Ratio (Approx.) for grid-No.1 resistor (ohms) = 0, grid-No.2 resistor (ohms) = 0, grid No.1 connected to cathode at socket	800	

Mechanical:

Operating Position	Any
Maximum Overall Length	3-1/16"
Maximum Seated Length	2-1/2"
Maximum Diameter	1-9/32"
Dimensional Outline	See *General Section*
Bulb	T9
Base	Intermediate-Shell Octal 6-Pin, Arrangement 3, with External Barriers (JEDEC Group 1, B6-229)

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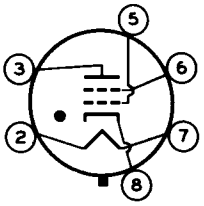
Basing Designation for BOTTOM VIEW. 6BS

Pin 2 – Heater
Pin 3 – Anode
Pin 5 – Grid No.1



Pin 6 – Grid No.2
Pin 7 – Heater
Pin 8 – Cathode

RELAY AND GRID-CONTROLLED-RECTIFIER SERVICE

Maximum and Minimum Ratings, *Absolute-Maximum Values:*

For anode supply frequency of 60 cps

PEAK ANODE VOLTAGE:				
Forward.	180	max.	650 max.	volts
Inverse.	360	max.	1300 max.	volts
GRID-No.2 (SHIELD-GRID) VOLTAGE:				
Peak, before tube conduction	-100	max.	-100 max.	volts
Average[b], during tube conduction	-10	max.	-10 max.	volts
GRID-No.1 (CONTROL-GRID) VOLTAGE:				
Peak, before tube conduction	-250	max.	-250 max.	volts
Average[b], during tube conduction	-10	max.	-10 max.	volts
CATHODE CURRENT:				
Peak	1	max.	1 max.	amp
Average[b]	0.2	max.	0.1 max.	amp
Fault, for duration of 0.1 second maximum	10	max.	10 max.	amp
GRID-No.2 CURRENT:				
Average[b]	+0.01	max.	+0.01 max.	amp
GRID-No.1 CURRENT:				
Average[b]	+0.01	max.	+0.01 max.	amp
PEAK HEATER-CATHODE VOLTAGE:				
Heater negative with respect to cathode . . .	100	max.	100 max.	volts
Heater positive with respect to cathode . . .	25	max.	25 max.	volts
AMBIENT-TEMPERATURE RANGE. .	-75 to +90		-75 to +90	°C

Typical Operation for Relay Service:

RMS Anode Voltage.	117	400	volts
Grid No.2.	*Connected to cathode at socket*		
RMS. Grid-No.1 Bias Voltage[c].	5	–	volts
DC Grid-No.1 Bias Voltage. .	–	-6	volts
Peak Grid-No.1 Signal Voltage.	5	6	volts
Grid-No.1-Circuit Resistance	1	1	megohm
Anode-Circuit Resistance[d]. .	1200	2000	ohms

Maximum Circuit Values:

Grid-No.1-Circuit Resistance:

For average anode current below 0.1 ampere	10 max.	megohms
For average anode current above 0.1 ampere	2 max.	megohms

[a] Without external shield.

[b] Averaged over any interval of 30 seconds maximum.

[c] Approximately 180° out of phase with the anode voltage.

[d] Sufficient resistance, including the tube load, must be used under any conditions of operation to prevent exceeding the current ratings.

OPERATING CONSIDERATIONS

The *heater* is designed to operate on either ac or dc at 6.3 volts. Regardless of the heater-voltage supply used, *the heater voltage must never be allowed to deviate from its rated range.* Heater operation outside of this voltage range will impair tube performance and may cause tube failure. Low heater voltage causes low cathode temperature with resultant cathode sputtering and consequent destruction of the cathode; high heater voltage causes high cathode temperature with resultant heating of the grid and consequent grid emission which produces unpredictable shifts in the critical grid-No.1 voltage for conduction.

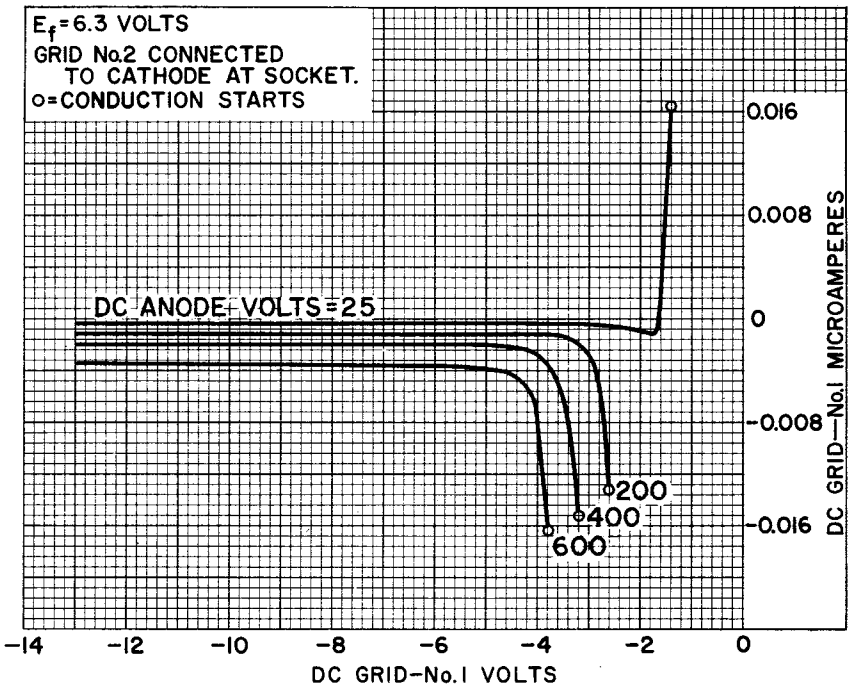
The *cathode* should be allowed to reach normal operating temperature before anode current is drawn. *The delay period should not be less than 10 seconds after application of heater voltage.* Unless this recommendation is followed, the cathode will be damaged.

The *shield grid* (grid No.2) is normally connected to the cathode at socket. It may, however, be used as a control electrode because the control characteristic of grid No.1 may be shifted by varying the potential of grid No.2. As grid No.2 is made negative, the grid-No.1 characteristic is shifted in the positive direction. The use of grid No.2 as the control electrode (with grid No.1 connected to cathode at socket) has the advantage of increased sensitivity but consideration must be given to the higher preconduction current, higher capacitance to anode, and less stability of operation.

A *grid-No.1 resistor* having a value as high as 10 megohms to give circuit sensitivity can be used with the 2050-A because its control-grid current is very low. However, when a high value of grid resistor is used, care should be taken to keep the tube base and socket clean and dry in order to make the effect of leakage currents between the control-grid base pin and anode base pin very small.

Sufficient anode-circuit resistance, including the tube load, must be used under any conditions of operation to prevent exceeding the current ratings of the tube.

AVERAGE GRID-No.1 CHARACTERISTICS
Before Tube Conduction



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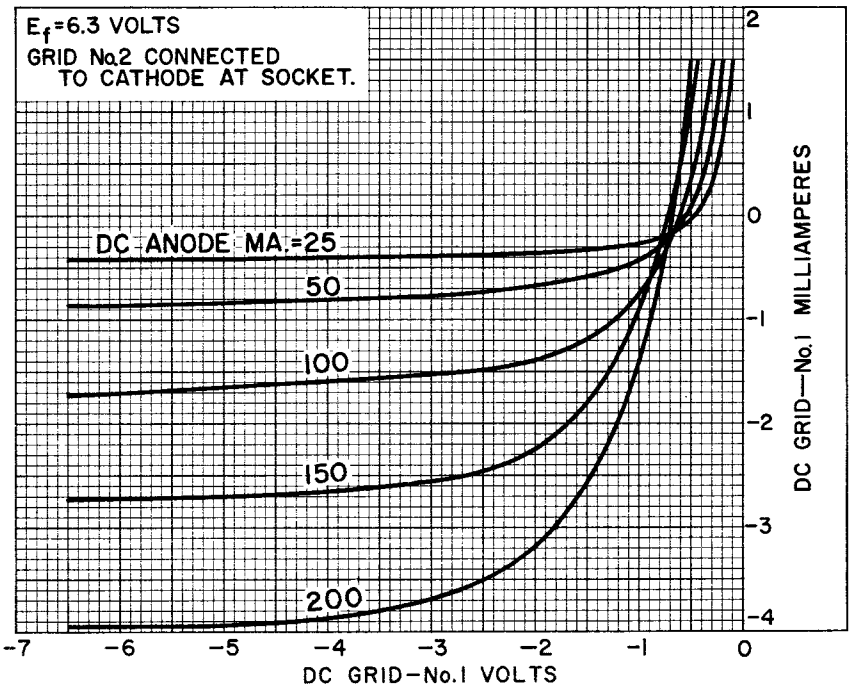
During Tube Conduction



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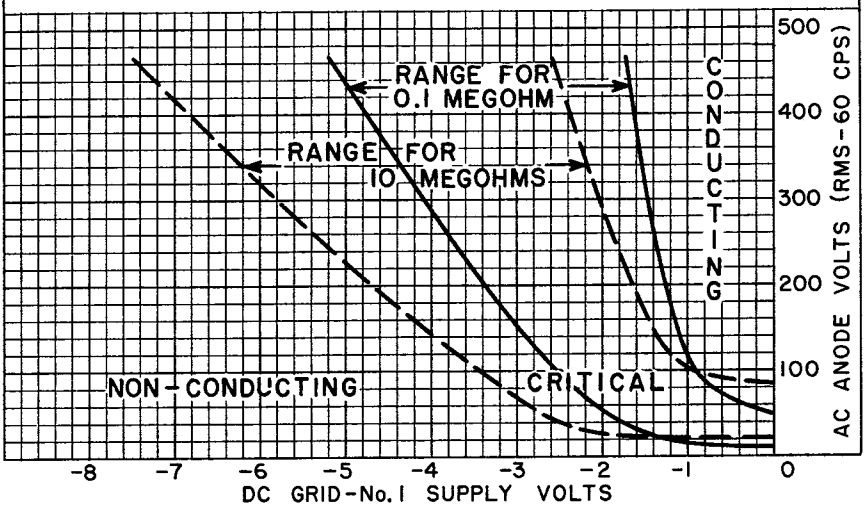
OPERATIONAL RANGE OF CRITICAL GRID-No.1 VOLTAGE

E_f = 6.3 ± 10% VOLTS
GRID No.2 CONNECTED TO CATHODE AT SOCKET.
AMBIENT-TEMPERATURE RANGE (°C) = -75 TO +90
RANGES SHOWN ARE FOR TWO VALUES OF GRID-No.1 RESISTOR AND TAKE INTO ACCOUNT INITIAL DIFFERENCES BETWEEN INDIVIDUAL TUBES AND SUBSEQUENT DIFFERENCES DURING TUBE LIFE.



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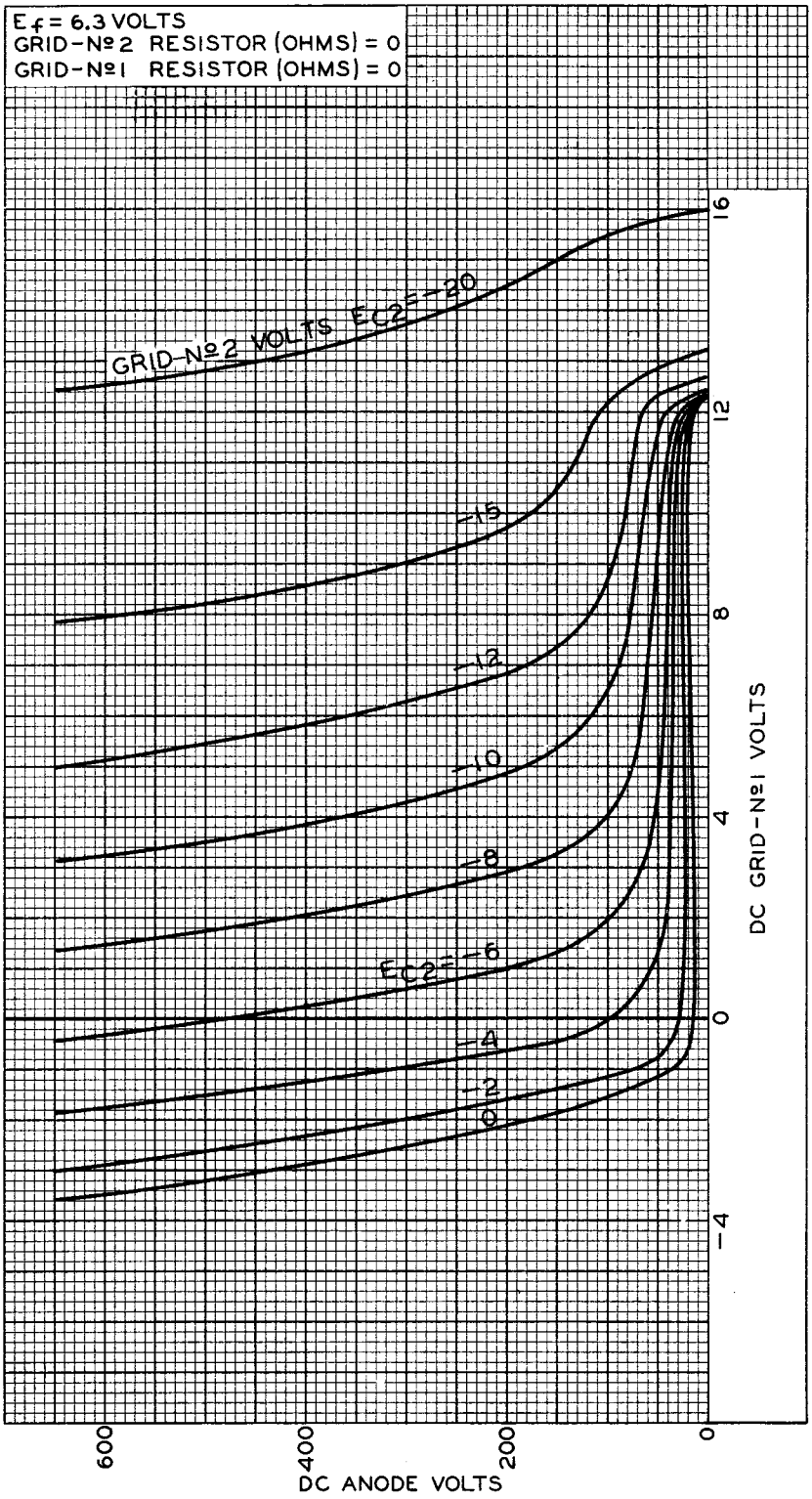
AVERAGE CONTROL CHARACTERISTICS



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