6866
DISPLAY STORAGE TUBE

DIRECT-VIEW TYPE
4"-DIAMETER DISPLAY
NON-EQUILIBRIUM WRITING GRID-CONTROL READING (VIEWING)

DATA

General:

	Writing Section	Viewing Section	
Heater, for Unipotential Cathode:			
Voltage (AC or DC)	6.3	6.3	volts
Current	0.6	0.6	amp
Minimum Cathode Heating Time before other electrode voltages are applied	–	30	sec
Direct Interelectrode Capacitances (Approx.):[o]			
Grid No.1 to all other tube electrodes	6	18	μμf
Cathode to all other tube electrodes	4.2	6.5	μμf
Deflecting electrode DJ_1 to deflecting electrode DJ_2	1.8	–	μμf
Deflecting electrode DJ_3 to deflecting electrode DJ_4	1.8	–	μμf
DJ_1 to all other tube electrodes	7.5	–	μμf
DJ_2 to all other tube electrodes	8	–	μμf
DJ_3 to all other tube electrodes	6	–	μμf
DJ_4 to all other tube electrodes	7	–	μμf
Focusing Method	Electrostatic	None	
Deflection Method	Electrostatic	None	
Deflecting-Electrode Arrangement	*See Dimensional Outline*	–	
Phosphor	–	High-Visual-Efficiency Type, Aluminized	
Fluorescence	–	Yellow	
Phosphorescence	–	Yellow	

Minimum Useful Screen Diameter	4"
Maximum Overall Length	15-1/2"
Seated Length	14" ± 3/8"
Maximum Tube Radius	3-5/32"
Bulb-Flange Diameter	5-1/8" ± 1/16"
Greatest Bulb Diameter	5" ± 1/16"
Bulb Terminals:	
Caps (Two)	Recessed Small Cavity (JETEC No.J1-21)
Flange	*See Dimensional Outline*
Flexible cable	*See Dimensional Outline*
Ambient-Temperature Range	-65° to +100 °C
Mounting Position	Any
Weight (Approx.)	2 lbs
Socket	Alden Part No.435SBA, or equivalent
Base	Small-Button Thirtyfivar 31-Pin (JETEC No.E31-36)

[o] Without external shield.

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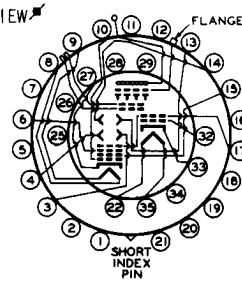
BOTTOM VIEW*



Pin 1 – No Connection
Pin 2 – Same as Pin 1
Pin 3 – Deflecting Electrode DJ_4 of Writing Gun
Pin 4 – Deflecting Electrode DJ_3 of Writing Gun
Pin 5 – Same as Pin 1
Pin 6 – Grid No.3 of Writing Gun
Pin 7 – Same as Pin 1
Pin 8 – Heater of Writing Gun
Pin 9 – Heater of Writing Gun
Pin 10 – Grid No.1 of Writing Gun
Pin 11 – Same as Pin 1
Pin 12 – Same as Pin 1
Pin 13 – Deflecting Electrode DJ_1 of Writing Gun
Pin 14 – Deflecting Electrode DJ_2 of Writing Gun
Pin 15 – Grid No.2 of Writing Gun
Pin 16 – Internal Connection–Do Not Use
Pin 17 – Grid No.4 of Writing Gun, Grid No.2 of Viewing Gun
Pin 18 – Same as Pin 1
Pin 19 – Same as Pin 1
Pin 20 – Same as Pin 16
Pin 21 – Same as Pin 1
Pin 22 – Heater of Viewing Gun
Pin 25 – Same as Pin 1
Pin 26 – Same as Pin 1
Pin 27 – Cathode of Writing Gun
Pin 28 – Same as Pin 1
Pin 29 – Same as Pin 1
Pin 32 – Grid No.1 of Viewing Gun
Pin 33 – Cathode of Viewing Gun
Pin 34 – Same as Pin 1
Pin 35 – Heater of Viewing Gun
Flexible Cable – Connection to Screen
Flange – Backing–Electrode
Recessed Cavity Cap – *Nearer Tube Face*–Grid No.4 of Viewing Gun
Nearer Electron Guns–Grid No.3 of Viewing Gun

Maximum Ratings, *Absolute Values:*

	Writing Section	Viewing Section**	
SCREEN VOLTAGE	–	11000 max.	volts
PEAK BACKING-ELECTRODE VOLTAGE.	–	20 max	volts

* Pins 23 and 31 are not shown because they are trimmed to the same dimension as the short index pin and are not to be used.

**: See next page.

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	Writing Section		Viewing Section**	
	Equivalent Values			
GRID-No.4 VOLTAGE	2900 max.*	150 max.**	300 max.	volts
GRID-No.3 VOLTAGE	1000 max.*	-	300 max.	volts
GRID-No.2 VOLTAGE	2750 max.*	-	150 max.	volts
CATHODE VOLTAGE	-	-2900 max.**	-	volts
GRID-No.1 VOLTAGE:				
Negative bias value . .	200 max.*		100 max.	volts
Positive bias value . .	0 max.*		0 max.	volts
Positive peak value . .	2 max.*		0 max.	volts
PEAK VOLTAGE BETWEEN GRID No.4 AND ANY DEFLECTING ELECTRODE. .	500 max.		-	volts
PEAK HEATER-CATHODE VOLTAGE:				
Heater negative with respect to cathode. .	125 max.*		125 max.	volts
Heater positive with respect to cathode. .	125 max.*		125 max.	volts

VIEWING SECTION**

Operating Values and Typical Performance Characteristics:

Screen Voltage	5000	10000	10000	volts
DC Backing-Electrode Voltage	5	5	5	volts
Grid-No.4 Voltage	150	210	150	volts
Grid-No.3 Voltage#.	25 to 125	50 to 150	25 to 125	volts
Grid-No.2 Voltage†#	50 to 75	70 to 105	50 to 75	volts
Grid-No.1 Voltage#.	0 to -50	0 to -75	0 to -50	volts
Maximum Screen Current. . .	350	600	350	μamp
Maximum Peak Backing-Electrode Current	1.5	2	1.5	ma
Maximum Grid-No.4 Current♦.	2	3	2	ma
Maximum Grid-No.3 Current♦.	1.5	2	1.5	ma
Maximum Cathode Current♦. .	3	4	3	ma
Writing Speed††	300000	300000	300000	in./sec
Number of Half-Tone Steps□ .	5	5	5	
Viewing Duration▲	40	20	40	sec
Maximum Erasing-Uniformity Factor□□.	0.5	0.5	0.5	
Resolution⊕.	50	50	50	lines/in.
Brightness♦♦.	275	2750	1500	fl ←

** Voltages are shown with respect to cathode of Viewing Gun.

\# Adjusted for brightest, most uniform pattern.

† Grid No.2 of the Viewing Gun is connected internally to grid No.4 of the Writing Gun.

♦ For conditions with combined adjustment of grid-No.1 voltage, grid-No.2 voltage, and grid-No.3 voltage to give brightest, most uniform pattern.

*, ††, □, ▲, □□, ⊕, ♦♦: See next page.

← Indicates a change.

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DISPLAY STORAGE TUBE

WRITING SECTION•

Range Values for Equipment Design:*

With any grid-No.2 voltage (E_{c_2}) between 500 and 2750 volts

Grid-No.4 Voltage (E_{c_4})	95% to 105% of E_{c_2}	volts
Grid-No.3 Voltage for Focus	14% to 28% of E_{c_2}	volts
Maximum Grid-No.1 Voltage for Cutoff of Undeflected Focused Spot	-4.6% of E_{c_2}	volts
Maximum Grid-No.3 Current	-15 to +10	μamp
Maximum Cathode Current	*See Curve*	
Deflection Factors:		
DJ_1 and DJ_2	28 to 38	v dc/in./kv of E_{c_4}
DJ_3 and DJ_4	28 to 38 ##	v dc/in./kv of E_{c_4}
Focused Beam Position		

Examples of Use of Design Ranges:*

With grid-No.2 voltage of	*1500*	*2500*	*volts*
Grid-No.4 Voltage (E_{c_4})	1425 to 1575	2375 to 2625	volts
Grid-No.3 Voltage for Focus	210 to 420	350 to 700	volts
Maximum Grid-No.1 Voltage for Cutoff of Undeflected Focused Spot	-69	-115	volts
Deflection Factors when $E_{c_4} = E_{c_2}$:			
DJ_1 and DJ_2	42 to 57	70 to 95	v dc/in.
DJ_3 and DJ_4	42 to 57	70 to 95	v dc/in.

Equivalent Values for Examples of Writing-Gun Voltages Referred to Cathode of Viewing Gun:

Cathode Voltage	-1450 to -1395	-2450 to -2395	volts
Grid-No.2 Voltage	-25 to +180	-75 to +230	volts
Grid-No.3 Voltage for Focus	-1240 to -975	-2100 to -1695	volts
Grid-No.4 Voltage	50 to 105	50 to 105	volts

VIEWING SECTION and WRITING SECTION

Circuit Values:

Grid-No.1-Circuit Resistance (Either gun)	1.0 max.	megohm
Resistance in Any Deflecting-Electrode Circuit■	0.1 max.	megohm
Backing-Electrode-Circuit Resistance	0.005 max.	megohm
Series Current-Limiting Resistance in Screen Circuit.	1.0 min.	megohm

* Voltages are shown with respect to cathode of Writing Gun.

†† Measured under conditions of writing from just zero brightness (viewing-beam cutoff) to maximum brightness with grid No.1 of Writing Gun at -10 volts with respect to cathode of Writing Gun, and grids No.2 and No.4 of Writing Gun at +2500 volts with respect to cathode of Writing Gun.

□ Observed with an RCA-2F21 Monoscope display.

▲, □□, #, ††, •, ##, ■: See next page.

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▲ Expressed in terms of the time required for the brightness of the unwritten background to rise from just zero brightness (viewing-beam cutoff) to 10% of the maximum brightness.

□□ Defined as $(t_2 - t_1)/t_2$, where

t_1 = time measured from start of erasing to instant at which any screen area is reduced to zero brightness.

t_2 = time measured from start of erasing to instant at which entire screen area is reduced to zero brightness.

⊕ Measured by shrinking-raster method at a display brightness of 50% of saturated brightness and with grids No.2 and No.4 of Writing Gun at +2500 volts with respect to cathode of Writing Gun. ←

⊕⊕ Measured with entire storage grid written to produce maximum brightness and with screen at indicated voltage.

● The cathode of the Writing Gun is operated at about −2500 volts with respect to the cathode of the Viewing Gun which is usually operated at ground potential.

The center of the undeflected focused beam will fall within a circle having a 10-mm radius concentric with the center of the face under the following conditions: grids No.2 and No.4 of Writing Gun at +2500 volts with respect to cathode of Writing Gun, grid No.3 of Writing Gun at voltage to give focus, grid No.1 of Writing Gun at voltage which will permit storage of a charge just sufficient to give a barely perceptible spot on screen, viewing Section operating under normal conditions, and tube shielded against extraneous fields.

■ It is recommended that the deflecting-electrode-circuit resistances be approximately equal.

OPERATING CONSIDERATIONS

Magnetic shielding must be provided to prevent external fields from interfering with the required accurate control of the low-velocity viewing beam. A cylindrical shield of properly annealed high-permeability material about 1/16-inch thick is usually satisfactory. The screen cable should be placed outside the shield.

The *metal flange* at the face end of the tube requires the use of a spring-contact ring bearing against the edge of the flange.

To prevent possible damage to the tube, allow the viewing-gun beam current to reach normal operating value before turning on the writing-gun beam current, and keep the viewing beam on until the writing beam is turned off.

←Indicates a change.

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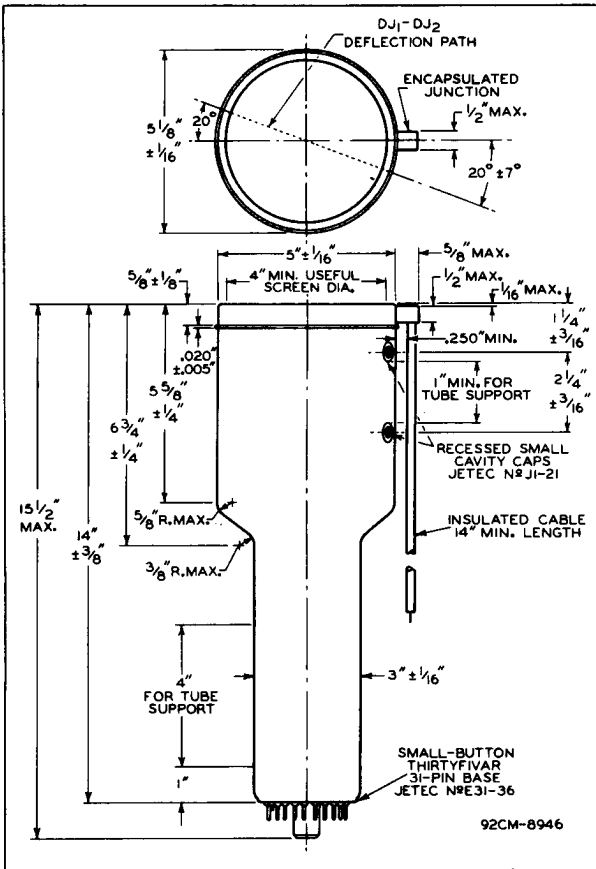

CENTER LINE OF BULB WILL NOT DEVIATE MORE THAN 3° IN ANY DIRECTION FROM PERPENDICULAR ERECTED AT CENTER OF FACEPLATE.

THE PLANE THROUGH TUBE AXIS AND EACH OF THE FOLLOWING ITEMS MAY VARY FROM THE DEFLECTION PATH PRODUCED BY DJ_1 AND DJ_2 BY THE FOLLOWING ANGULAR TOLERANCES (MEASURED ABOUT THE TUBE AXIS): PIN 27, ± 10°; EACH CAVITY CAP (ON SAME SIDE AS PIN 27), ± 17°; ENCAPSULATED JUNCTION, + 10°. ANGLE BETWEEN $DJ_1 - DJ_2$ DEFLECTION PATH AND $DJ_3 - DJ_4$ DEFLECTION PATH IS 90° ± 3°.

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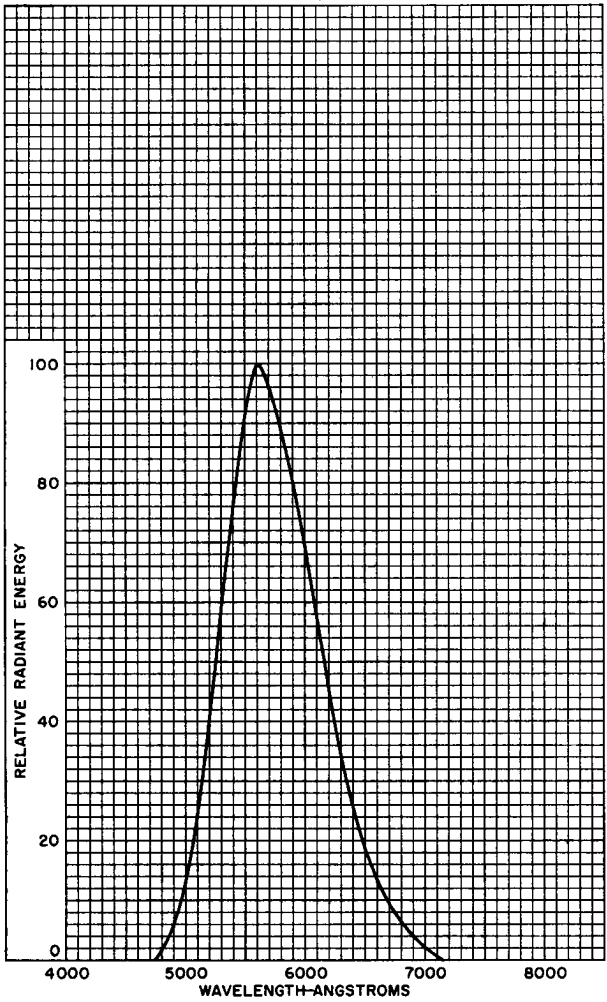
SPECTRAL-ENERGY EMISSION CHARACTERISTIC OF PHOSPHOR



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AVERAGE CHARACTERISTIC

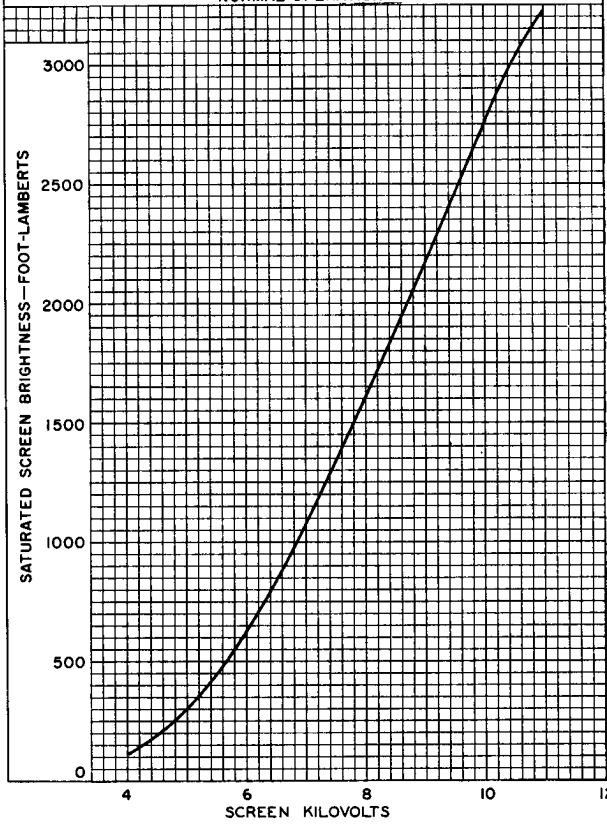
VIEWING SECTION

E_f = 6.3 VOLTS
BACKING-ELECTRODE VOLTS* = 5
GRID-No 4 VOLTS* = 210
GRID-No 2 VOLTS* = 85
GRID-No 3 VOLTS* } ADJUSTED FOR BRIGHTEST,
GRID-No 1 VOLTS* } MOST UNIFORM DISPLAY.

*REFERRED TO CATHODE OF VIEWING GUN.

WRITING SECTION

NORMAL OPERATION



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AVERAGE CHARACTERISTICS

VIEWING SECTION

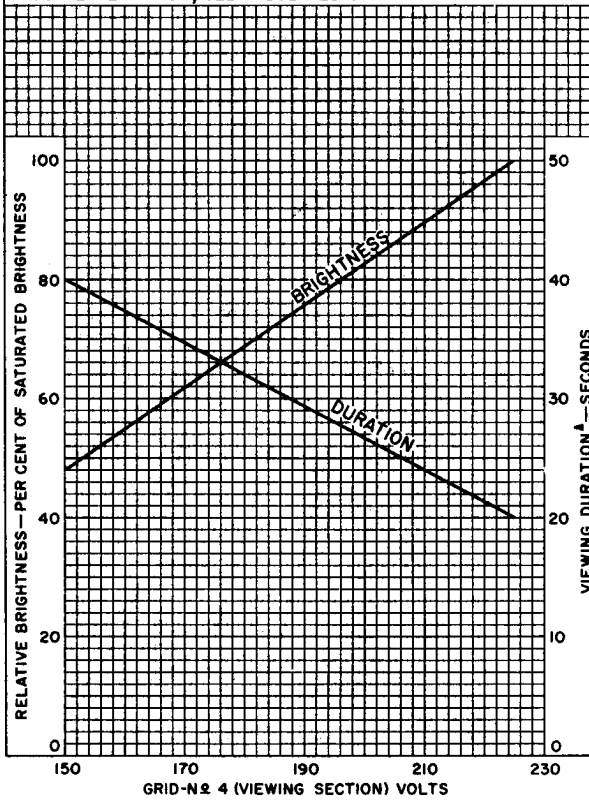
E_f = 6.3 VOLTS
SCREEN KILOVOLTS* = 5 TO 10
BACKING-ELECTRODE VOLTS* = 5
GRID-NO. 2 VOLTS* = 85
GRID-NO. 3 VOLTS* } ADJUSTED FOR BRIGHTEST,
GRID-NO. 1 VOLTS* } MOST UNIFORM DISPLAY

*REFERRED TO CATHODE OF VIEWING GUN

WRITING SECTION

NORMAL OPERATION

▲FOR EXPLANATION, SEE TABULATED DATA



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TYPICAL ERASURE CHARACTERISTICS

VIEWING SECTION

E_f = 6.3 VOLTS

SCREEN KILOVOLTS* = 10

GRID-№ 4 VOLTS* = 210

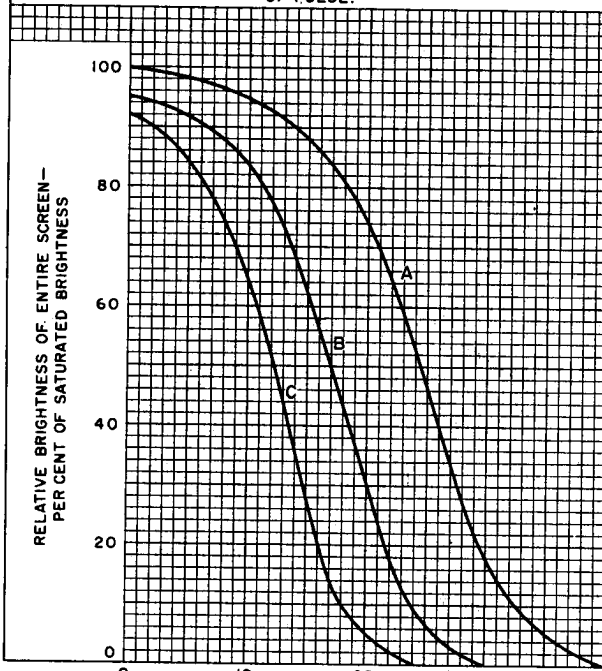
GRID-№ 2 VOLTS* = 85

GRID-№ 3 VOLTS* } ADJUSTED FOR BRIGHTEST,
GRID-№ 1 VOLTS* } MOST UNIFORM DISPLAY

*REFERRED TO CATHODE OF VIEWING GUN

CURVE	BACKING-ELECTRODE VOLTS	
	DC	POSITIVE RECTANGULAR PULSE AMPLITUDE (APPROX.)
A	10	10
B	5	8
C	2	7

ERASURE IS PRODUCED BY POSITIVE RECTANGULAR PULSE APPLIED TO BACKING-ELECTRODE. INDICATED DURATION IS SUM OF DURATIONS OF NUMBER OF PULSES OR ELAPSED TIME AFTER START OF PULSE.



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CURRENT CHARACTERISTIC FOR WRITING GUN

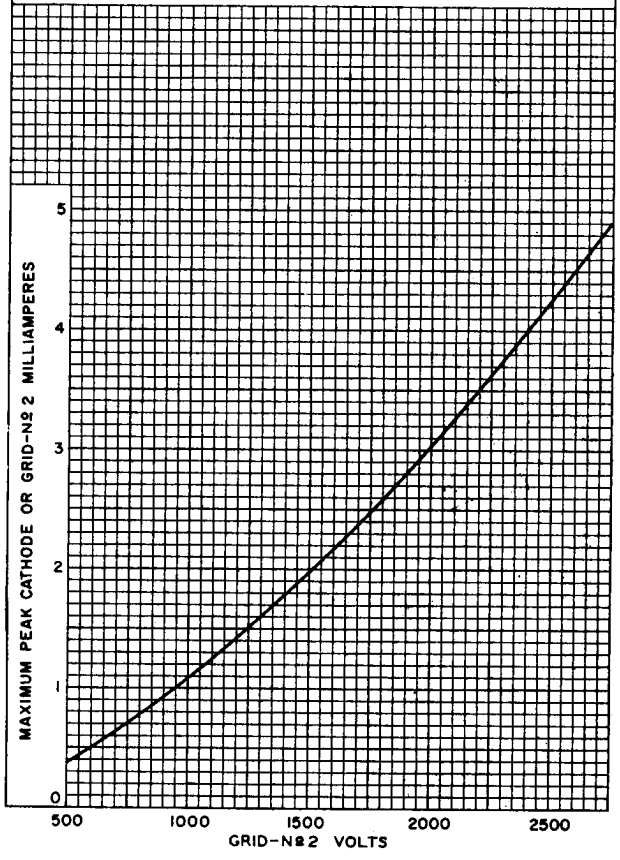
WRITING SECTION

E_f = 6.3 VOLTS
GRID-№ 4 VOLTS* = GRID-NO. 2 VOLTS
GRID-№ 3 VOLTS* = ADJUSTED FOR FOCUS
GRID-№ 1 VOLTS* = 0

*REFERRED TO CATHODE OF WRITING GUN

VIEWING SECTION

NORMAL OPERATION



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TYPICAL DRIVE CHARACTERISTIC
FOR WRITING GUN

WRITING SECTION

E_f = 6.3 VOLTS
GRID-№ 4 VOLTS* = 2500
GRID-№ 3 VOLTS* = ADJUSTED FOR FOCUS
GRID-№ 2 VOLTS* = 2500
GRID-№ 1* BIASED TO SPOT CUTOFF
*REFERRED TO CATHODE OF WRITING GUN

VIEWING SECTION

NORMAL OPERATION