5CP-A CATHODE-RAY TUBES

The Type 5CP-A Cathode-ray Tubes are designed for oscillographic applications. The intensifier principle is used to provide a maximum deflection sensitivity for a given final accelerating voltage. A glass envelope has been designed to provide great mechanical strength and the tube base design provides adequate insulation between electrode leads for high altitude installation. The gun is designed to draw negligible focusing electrode current.

The four types differ only in the characteristics of the fluorescent screens. Other screen types may be obtained on special order.

GENERAL CHARACTERISTICS

Electrical

Heater Voltage ..... 6.3 Volts
Heater Current ..... 0.6 ± 10% Ampere
Focusing Method ..... Electrostatic
Deflecting Method ..... Electrostatic

Phosphor	No. 1	No. 2	No. 7	No. 11
Fluorescence	Green	Green	Blue	Blue
Phosphorescence	—	Green	Yellow	—
Persistence	Medium	Long	Long	Short

Direct Interelectrode Capacitances, Nominal
- Cathode to all other electrodes ..... 9 μμf.
- Grid No. 1 to all other electrodes ..... 8 μμf.
- D1 to D2 ..... 2 μμf.
- D3 to D4 ..... 2 μμf.
- D1 to all other electrodes except D2 ..... 7 μμf.
- D2 to all other electrodes except D1 ..... 7 μμf.
- D3 to all other electrodes except D4 ..... 5 μμf.
- D4 to all other electrodes except D3 ..... 6 μμf.

Mechanical

Overall Length ..... 16¾ ± ⅜ Inches
Greatest Diameter of Bulb ..... 5¼ ± 3/32 Inches
Minimum Useful Screen Diameter ..... 4½ Inches
Bulb Contact J1-22
Base B12-37
Basing 14J

Base Alignment:
- D1D2 trace aligns with Pin No. 5 and tube axis ..... ± 10 Degrees
- Positive voltage on D1 deflects beam approximately toward Pin No. 5.
- Positive voltage on D3 deflects beam approximately toward Pin No. 2.
- Angle between D3D4 and D1D2 traces ..... 90 ± 3 Degrees

Bulb contact alignment:
- J1-22 contact aligns with D1D2 trace ..... ± 10 Degrees
- J1-22 contact on same side as Pin No. 5

MAXIMUM RATINGS—(Design Center Values)

Anode No. 3 Voltage (Accelerator High-Voltage Electrode) ..... 4000 Max. Volts D-C
Anode No. 2 Voltage[1] ..... 2000 Max. Volts D-C
Ratio Anode No. 3 Voltage to Anode No. 2 Voltage ..... 2.3 Max.
Anode No. 1 Voltage ..... 1000 Max. Volts D-C

Grid No. 1 Voltage
Negative Bias Value ..... 200 Max. Volts D-C
Positive Bias Value ..... 0 Max. Volts D-C
Positive Peak Value ..... 2 Max. Volts

Peak Heater-Cathode Voltage
Heater Negative with respect to Cathode ..... 125 Max. Volts D-C
Heater Positive with respect to Cathode ..... 125 Max. Volts D-C

Peak Voltage between Anode No. 2 and any Deflection Electrode ..... 500 Max. Volts

TYPICAL OPERATING CONDITIONS

For Anode No. 3 Voltage of	2000	3000	4000 Volts
For Anode No. 2 Voltage of	2000	1500	2000 Volts
Anode No. 1 Voltage for focus	375 to 690	280 to 515	375 to 690 Volts
Grid No. 1 Voltage[2]	—30 to —90	—22.5 to —67.5	—30 to —90 Volts
Deflection Factors:			
D1 and D2	62 to 84	58 to 80	78 to 106 D-C V/in.
D3 and D4	54 to 74	50 to 68	66 to 90 D-C V/in.

Anode No. 1 Voltage for focus ..... 18.7% to 34.5% of Eb2 Volts
Grid No. 1 Voltage[2] ..... 1.5% to 4.5% to Eb2 Volts
Anode No. 1 Current for any operating condition ..... —15 to +10 Microamperes

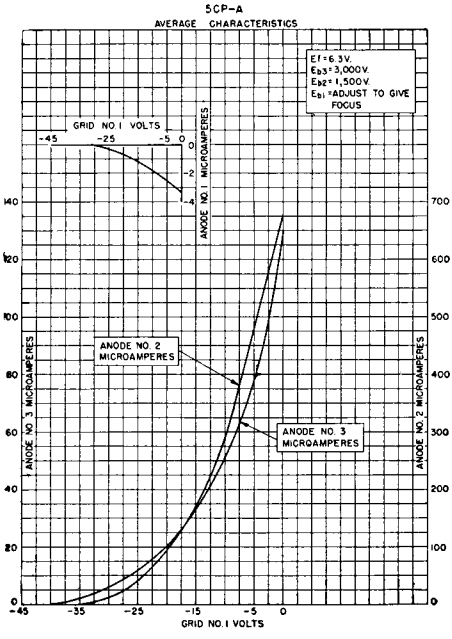
Deflection Factors:
No 3rd Anode or Eb3 = Eb2
D1 and D2 ..... 31 to 42 Volts D-C per inch per Kilovolt of Eb2
D3 and D4 ..... 27 to 37 Volts D-C per inch per Kilovolt of Eb2
Eb3 = Twice Eb2
D1 and D2 ..... 39 to 53 Volts D-C per inch per Kilovolt of Eb2
D3 and D4 ..... 33 to 45 Volts D-C per inch per Kilovolt of Eb2
Spot Position (Undeflected)[3] ..... Within 25 Millimeters square

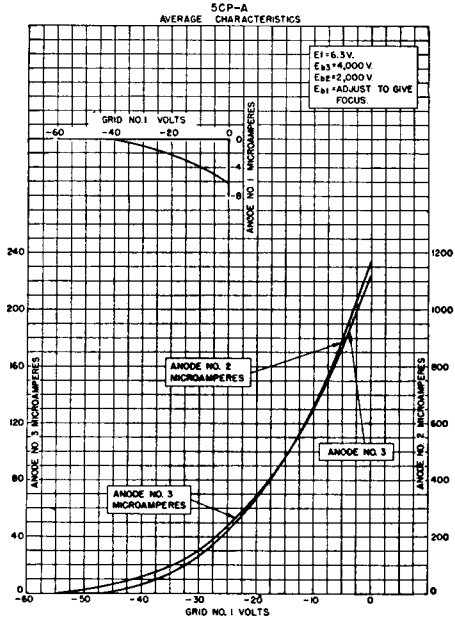
MAXIMUM CIRCUIT VALUES

Grid No. 1 Circuit Resistance ..... 1.5 Max. Megohms
Resistance in any Deflecting-Electrode Circuit[4] ..... 5 Max. Megohms

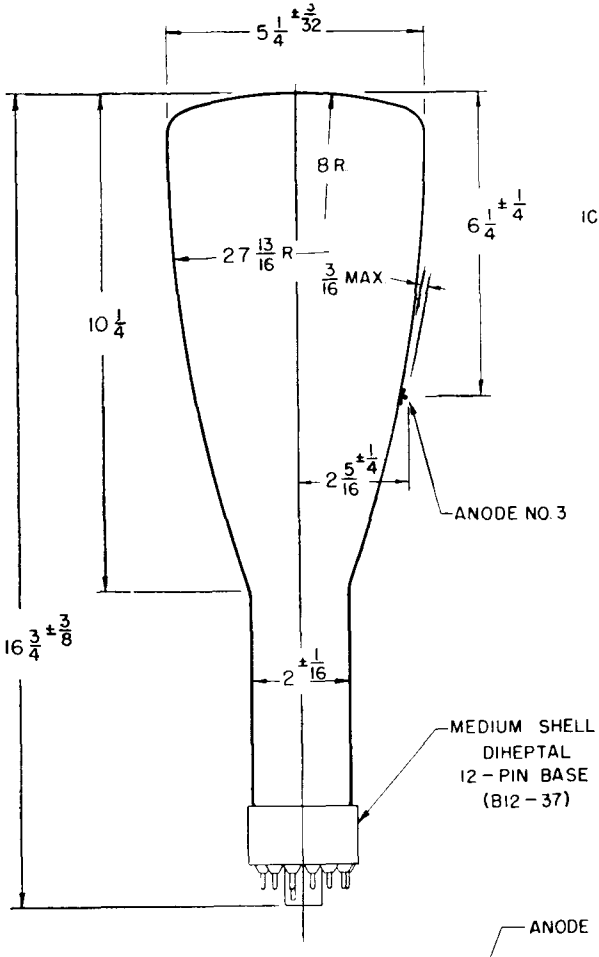
NOTES

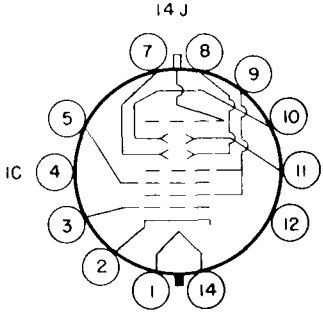
1. The product of Anode No. 2 voltage and average Anode No. 2 current should be limited to 6 watts.
2. Visual extinction of undeflected focused spot.
3. When the tube is operated at (1) normal heater voltage; (2) Eb3 = 3000 volts; (3) Eb2 = 1500 volts; (4) Eb1 adjusted for focus; (5) Ec1 set at such a value as will avoid damage to the screen; (6) with each of the deflecting electrodes connected to Anode No. 2; and (7) with the tube shielded against external influences:
   The spot will fall within a 25 mm. square, the center of which coincides with the geometric center of the tube face and the sides of which are parallel to the traces produced by deflecting electrodes D1 and D2 and by deflecting electrodes D3 and D4 respectively.
4. It is recommended that the deflecting electrode circuit resistances be approximately equal.
5. For optimum focus the average potentials of the deflection plates and second anode should be the same.

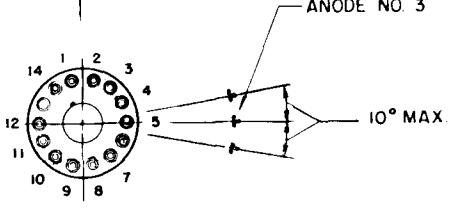

5CP-A
AVERAGE CHARACTERISTICS
Ef = 6.3V.
Eb3 = 3,000V.
Eb2 = 1,500V.
Eb1 = ADJUST TO GIVE FOCUS
GRID NO. 1 VOLTS
-45 -25 -5 0
0 -2 -4
ANODE NO. 1 MICROAMPERES
ANODE NO. 2 MICROAMPERES
ANODE NO. 3 MICROAMPERES
ANODE NO. 3 MICROAMPERES
ANODE NO. 2 MICROAMPERES
140 120 100 80 60 40 20 0
700 600 500 400 300 200 100 0
-45 -35 -25 -15 -5 0
GRID NO. 1 VOLTS


5CP-A
AVERAGE CHARACTERISTICS
Ef = 6.3V.
Eb3 = 4,000V.
Eb2 = 2,000V.
Eb1 = ADJUST TO GIVE FOCUS.
GRID NO. 1 VOLTS
-60 -40 -20 0
0 -4 -8
ANODE NO. 1 MICROAMPERES
ANODE NO. 2 MICROAMPERES
ANODE NO. 3
ANODE NO. 3 MICROAMPERES
ANODE NO. 3 MICROAMPERES
ANODE NO. 2 MICROAMPERES
240 200 160 120 80 40 0
1200 1000 800 600 400 200 0
-60 -50 -40 -30 -20 -10 0
GRID NO. 1 VOLTS

TYPE 5CP-A





BOTTOM VIEW OF BASE

PIN NO	ELEMENT
1	HEATER
2	CATHODE
3	GRID NO 1
4	INTERNAL CONNECTION
5	ANODE NO. 1
7	DEFLECTING ELECTRODE D_3
8	DEFLECTING ELECTRODE D_4
9	ANODE NO. 2, GRID NO. 2
10	DEFLECTING ELECTRODE D_2
11	DEFLECTING ELECTRODE D_1
14	HEATER