5XP-B CATHODE-RAY TUBES

The Types 5XP-B Cathode-ray Tubes are identical to the Types 5XP-A Cathode-ray Tubes, except for the addition of a metallized screen.

In the study of high frequency signals of low repetition rates, or single transients, the use of a metallized screen is a significant advantage. Metallization increases the light output of the screen, which is very desirable in these high frequency applications, and also prevents the building up of spurious charges on the screen by successive transients. Under some circumstances, these spurious charges may distort succeeding transients.

Film-fogging, a problem encountered when photo-recording with high-speed cameras, is also minimized by metallization. This fogging, partly caused by cathode glow passing through an unmetallized screen, may occur when the shutter is held open for a time, awaiting a single transient. In the Type 5XP-B Cathode-ray Tube, cathode glow cannot be transmitted through the metallized layer, thereby eliminating film fogging from this cause.

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. 11
Fluorescence	Green	Green	Blue
Phosphorescence	—	Green	—
Persistence	Medium	Long	Short

Direct Interelectrode Capacitances	Min.	Max
Cathode to all other electrodes	3.1	5.8 μμf.
Grid No. 1 to all other electrodes	3.3	6.2 μμf.
D1 to D2	1.0	2.0 μμf.
D3 to D4	1.0	2.0 μμf.
D1 to all other electrodes except D2	1.4	2.8 μμf.
D2 to all other electrodes except D1	1.4	2.8 μμf.
D3 to all other electrodes except D4	1.1	2.3 μμf.
D4 to all other electrodes except D3	1.1	2.3 μμf.

Mechanical

Overall Length	17⅝ ± ¼ Inches
Greatest Diameter of Bulb	5¼ ± 3/32 Inches
Minimum Useful Screen Diameter	4¼ Inches
Bulb Contacts (Recessed Small Ball Caps)	J1-22
Neck Contacts (Small Ball Caps)	J1-25
Base (Medium Shell Diheptal 12-Pin)	B12-37
Basing	14P
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 ± 1 Degrees
Bulb Contact Alignment:	
J1-22 contacts align with D1D2 trace	± 10 Degrees
J1-22 contacts on same side as Pin No. 5	

MAXIMUM RATINGS—(Design Center Values)

Post Accelerator Voltage ..... 25,500 Max. Volts D-C
5,000 Min. Volts D-C
Accelerator Voltage[1] ..... 3,650 Max. Volts D-C
Ratio Post Accelerator Voltage to Accelerator Voltage[2] ..... 10 Max.
Focusing Voltage ..... 1,550 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 ..... 0 Max. Volts
Peak Heater Cathode Voltage
Heater Negative with respect to Cathode ..... 180 Max. Volts D-C
Heater Positive with respect to Cathode ..... 180 Max. Volts D-C
Peak Voltage between Accelerator and any Deflection Electrode ..... 1,200 Max. Volts

TYPICAL OPERATING CONDITIONS

For Post Accelerator Voltage[3] of ..... 12,000 Volts
For Accelerator Voltage of ..... 2,000 Volts
Focusing Voltage ..... 362 to 695 Volts
Grid No. 1 Voltage[4] ..... −45 to −75 Volts
Modulation[5] ..... 52 Volts Max.
Line Width A[5] ..... .020 Inch Max.
P1 Light Output[5] (at Ib3 = 10 ua.) ..... 40 Ft. L. Min.
Deflection Factors:
D1 and D2 ..... 130 to 159 Volts D-C per Inch
D3 and D4 ..... 42 to 52 Volts D-C per Inch
Deflection Factor Uniformity[6] ..... 5% Maximum
Useful Scan[7]
D1 and D2 ..... 4.25 Inches*
D3 and D4 ..... 1.60 Inches**
Pattern Distortion at 75% of Useful Scan[2,8] ..... 2% Maximum
Frequency for 10% reduction in D3D4 deflection amplitude
due to transit time[10] ..... 200 mc.
Spot Position (Undeflected) ..... Within a 5/16-inch radius circle[11]

CIRCUIT DESIGN VALUES

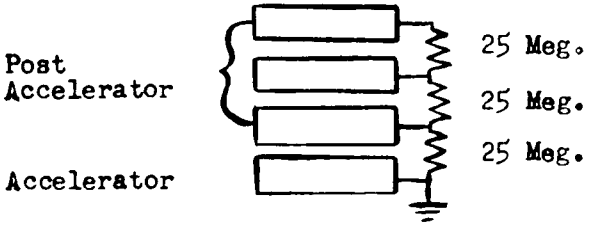
Focusing Voltage ..... 181 to 348 Volts per Kilovolt of Accelerator Voltage
Focusing Current for any operating condition ..... −15 to +10 Microamperes
Grid No. 1 Voltage[4] ..... 22.5 to 37.5 Volts per Kilovolt of Accelerator Voltage
Grid No. 1 Circuit Resistance ..... 1.5 Max. Megohms
Deflection Factors
Post Accelerator Voltage = Accelerator Voltage
D1 and D2 ..... 38 to 46 Volts D-C/Inch/KV of Accelerator Voltage
D3 and D4 ..... 12 to 15 Volts D-C/Inch/KV of Accelerator Voltage
Resistance in any Deflecting Electrode Circuit[12] ..... 5 Max. Megohms

* ± 2.125" minimum from tube face center
** ± .8" minimum from tube face center

NOTES

1. The product of Accelerator Voltage and average Accelerator Current should be limited to 6 watts.
2. It is recommended that Post Accelerator to Accelerator Voltage ratio be not more than 6 to 1 in applications where minimum pattern distortion is required.
3. Accelerator to final intensifier electrode voltage equally divided over the three intensifier electrodes.

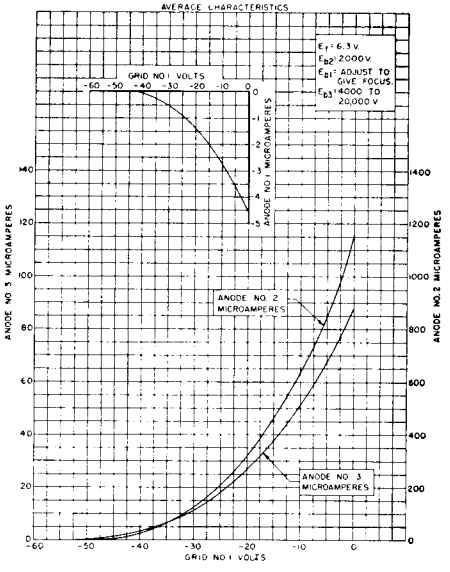
Suggested Method of Intensifier Connection



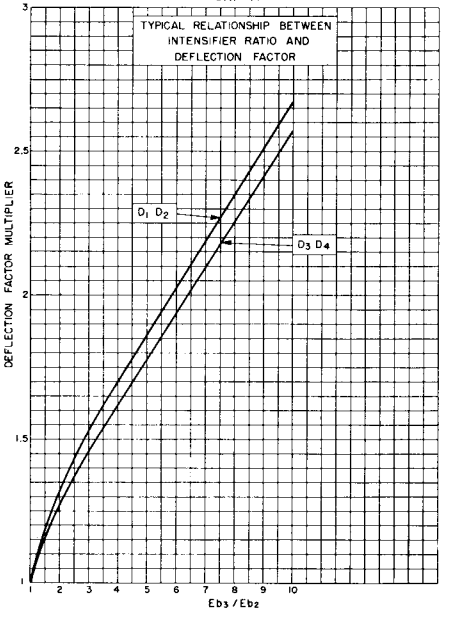
The two accelerator terminals must be connected together.

4. Visual extinction of undeflected focused spot.
5. Measured in accordance with MIL-E-1 specifications at Ib3 = 25 ua.
6. The deflection factor (for both D1D2 and D3D4 plate pairs, separately) for a deflection of less than 75% of the useful scan will not differ from the deflection factor for a deflection at 25% of the useful scan by more than the indicated value.
7. Reduction in useful scan when Post Accelerator voltage is greater than Accelerator voltage is determined by the ratio of these voltages measured with respect to cathode. Values shown are therefore applicable to any operating condition with the same voltage ratios.
8. All portions of a raster pattern, adjusted so its widest points just touch the sides of a 1.275 x 3.060-inch rectangle, will fall within the area bounded by the 1.275 x 3.060-inch rectangle and an inscribed 1.225 x 2.940-inch rectangle.
9. Deflection accuracy may be obtained by combining angle between traces, deflection factor uniformity and pattern distortion characteristics. In general, for deflections less than those indicated the accuracy will improve.
10. Computed.
11. When the tube is operated at typical operating conditions (Eh = 6.3 V., Eb3 = 12,000 V., Eb2 = 2,000 V., Eb1 at focus); with Ec1 adjusted to avoid damage to the screen; with each of the deflecting electrodes connected to the accelerator; and with the tube shielded against external influences, the spot will fall within a 5/16-inch radius circle, centered on the tube face.
    Under stable operating conditions, the position of the spot will not shift with changes in intensity by more than .025 inch.
12. It is recommended that the deflecting electrode circuit resistances be approximately equal.
13. For optimum focus the average potentials of the deflection plates and second anode should be the same.

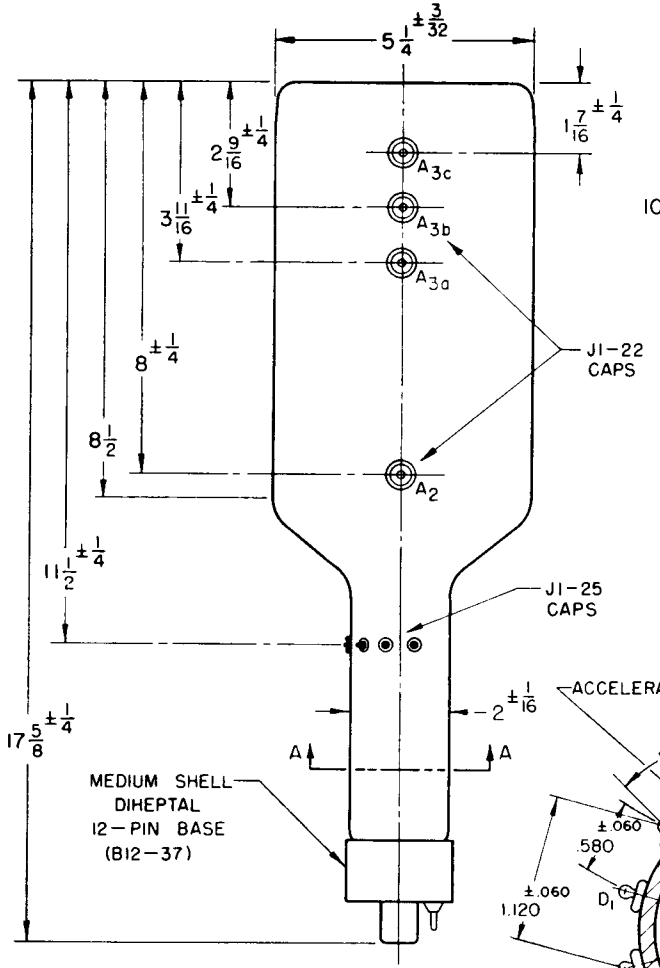
5XP1-B, 5XP2-B, 5XP11-B

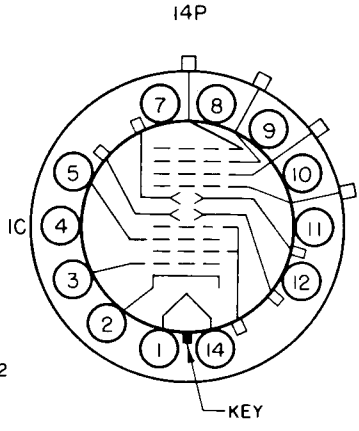


5XP-B AND 5XP-A



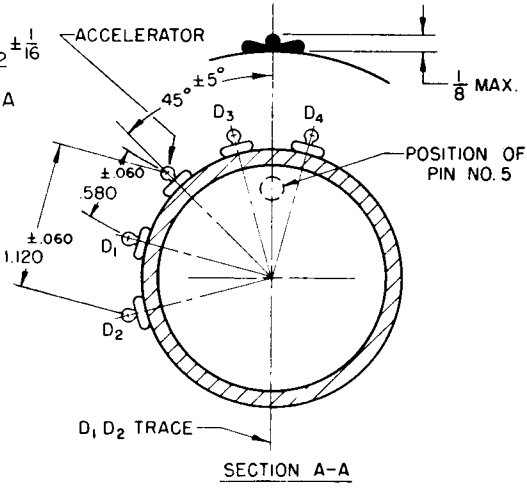
TYPE 5XP-B





BOTTOM VIEW OF BASE

PIN NO.	ELEMENT
1	HEATER
2	CATHODE
3	GRID NO. 1
4	INTERNAL CONNECTION
5	FOCUSING ELECTRODE
14.	HEATER



SECTION A-A