5RP-A CATHODE-RAY TUBES

The Type 5RP-A Cathode-ray Tubes are high-voltage tubes which incorporate an intensifier subdivided into several steps. This feature permits the use of much higher overall accelerating voltages with deflection sensitivities only slightly less than heretofore obtainable in low-voltage cathode-ray tubes. Operation with intensifier to second anode voltage ratios as high as 10:1 are made possible by the multiband feature. The tube has a flat face and a cylindrical body. The deflection plate and anode connections are made through the neck of the tube instead of through the base. Low-capacity deflection plate leads facilitate high-frequency operation. 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 ..... 5 μμf.
- Grid No. 1 to all other electrodes ..... 5 μμf.
- D1 to D2 ..... 2 μμf.
- D3 to D4 ..... 2 μμf.
- D1 to all other electrodes except D2 ..... 2.5 μμf.
- D2 to all other electrodes except D1 ..... 2 μμf.
- D3 to all other electrodes except D4 ..... 2.5 μμf.
- D4 to all other electrodes except D3 ..... 2 μμf.

Mechanical

Overall Length ..... 16¾ ± ⅜ 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 ±2 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)

Anode No. 3 Voltage (Accelerator High Voltage Electrode) ..... 25,500 Max. Volts D-C
Anode No. 2 Voltage[1,2] ..... 3,500 Max. Volts D-C
Ratio Anode No. 3 Voltage to Anode No. 2 Voltage ..... 10 Max.
Anode No. 1 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 ..... 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 ..... 1,200 Max. Volts

TYPICAL OPERATING CONDITIONS

For Anode No. 3 Voltage[3] of	10,000	20,000	Volts
For Anode No. 2 Voltage of	2,000	2,000	Volts
Anode No. 1 Voltage for focus	362 to 695	362 to 695	Volts
Grid No. 1 Voltage[1]	−30 to −90	−30 to −90	Volts
Deflection Factors:			
D1 and D2	102 to 154	140 to 210	Volts D-C per Inch
D3 and D4	97 to 145	131 to 197	Volts D-C per Inch

Anode No. 1 Voltage for focus ..... 18.1% to 34.8% of Eb2 Volts
Grid No. 1 Voltage[1] ..... 1.5% to 4.5% of Eb2 Volts
Anode No. 1 Current for any operating condition ..... −50 to +10 Microamperes
Deflection Factors:
No 3rd Anode or Eb3 = Eb2
D1 and D2 ..... 30 to 45 Volts D-C per inch per Kilovolt of Eb2
D3 and D4 ..... 30 to 45 Volts D-C per inch per Kilovolt of Eb2
Eb3 = Twice Eb2
D1 and D2 ..... 36 to 54 Volts D-C per inch per Kilovolt of Eb2
D3 and D4 ..... 36 to 54 Volts D-C per inch per Kilovolt of Eb2
Spot Position (Undeflected) ..... Within a 10 Millimeter radius circle[5]

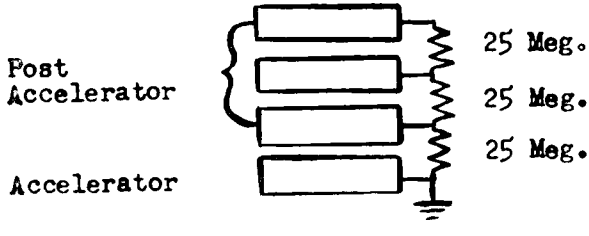
MAXIMUM CIRCUIT VALUES

Grid No. 1 Circuit Resistance ..... 1.5 Max. Megohms
Resistance in any Deflecting Electrode Circuit[6] ..... 5 Max. Megohms

NOTES

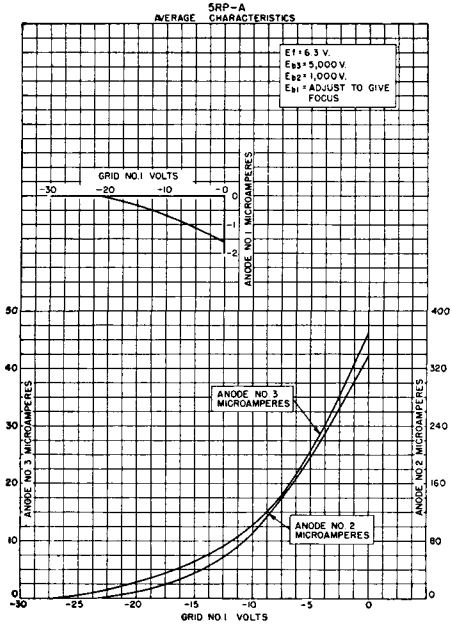
1. Anode No. 2 and Grid No. 2, which are connected together within the tube, are referred to herein as Anode No. 2.
2. The product of Anode No. 2 voltage and average Anode No. 2 current should be limited to 6 watts.
3. Anode No. 2 to final intensifier electrode voltage equally divided over the three intensifier electrodes.

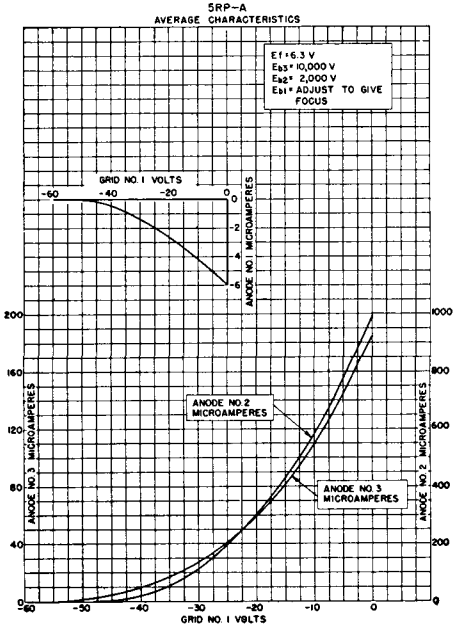
Suggested Method of Intensifier Connection



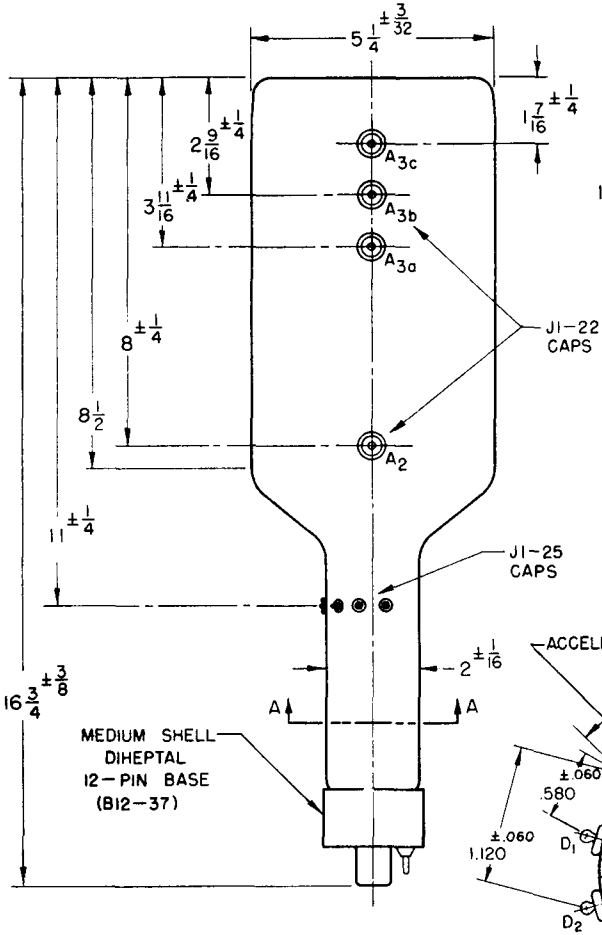
The two accelerator terminals must be connected together.

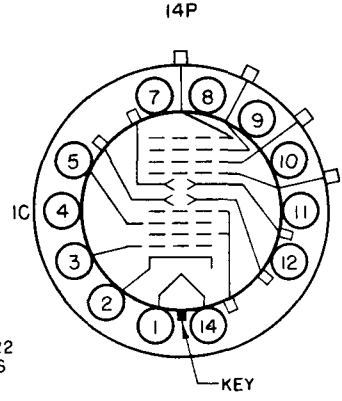
4. Visual extinction of undeflected focused spot.
5. Centered with respect to the tube face with the tube shielded.
6. It is recommended that the deflecting electrode circuit resistances be approximately equal.
7. For optimum focus the average potentials of the deflection plates and second anode should be the same.


5RP-A
AVERAGE CHARACTERISTICS
Ef = 6.3 V.
Eb3 = 5,000 V.
Eb2 = 1,000 V.
Eb1 = ADJUST TO GIVE FOCUS
GRID NO.1 VOLTS
-30 -20 -10 -0
0 -1 -2
ANODE NO.1 MICROAMPERES
ANODE NO.3 MICROAMPERES
ANODE NO.2 MICROAMPERES
ANODE NO.3 MICROAMPERES
ANODE NO.2 MICROAMPERES
0 10 20 30 40 50
0 80 160 240 320 400
-30 -25 -20 -15 -10 -5 0
GRID NO.1 VOLTS


5RP-A
AVERAGE CHARACTERISTICS
Ef = 6.3 V
Eb3 = 10,000 V
Eb2 = 2,000 V
Eb1 = ADJUST TO GIVE FOCUS
GRID NO.1 VOLTS
-60 -40 -20 0
0 -2 -4 -6
ANODE NO.1 MICROAMPERES
ANODE NO.3 MICROAMPERES
ANODE NO.2 MICROAMPERES
ANODE NO.3 MICROAMPERES
ANODE NO.2 MICROAMPERES
0 40 80 120 160 200
0 200 400 600 800 1000
-60 -50 -40 -30 -20 -10 0
GRID NO.1 VOLTS

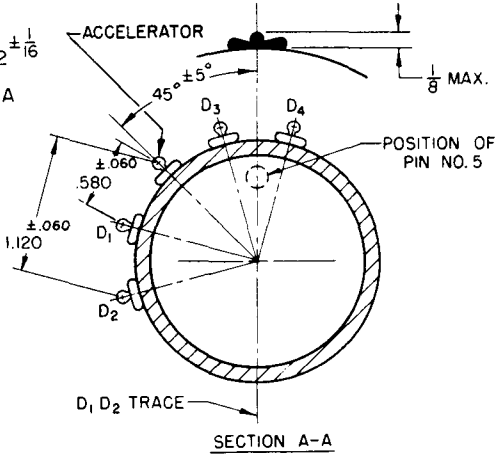
TPPE 5RP-A





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