



TYPE 5CBP

Page 1 of 6

Cathode-Ray Tube

Type 5CBP_ is a 5-inch flat-faced cathode ray tube with electrostatic focus and deflection for use in oscilloscopes. A primary feature of this tube is a helical resistance winding extending from near the horizontal deflection plates to the face of the tube. This construction insures a smooth voltage gradient over the region of post-deflection acceleration. The tube is designed to combine high sensitivity of both the vertical and horizontal deflection plates with accurate axial alignment and freedom from pattern distortion.

ELECTRICAL DATA

Focusing method	Electrostatic
Deflecting method	Electrostatic
Direct Interelectrode Capacitance, Approximate:	
Cathode to all other electrodes	4.7 $\mu\mu f$
Grid #1 to all other electrodes	7.0 $\mu\mu f$
D1 to D2	1.9 $\mu\mu f$
D3 to D4	1.4 $\mu\mu f$
D1 to all other electrodes except D2	3.6 $\mu\mu f$
D2 to all other electrodes except D1	3.6 $\mu\mu f$
D3 to all other electrodes except D4	3.2 $\mu\mu f$
D4 to all other electrodes except D3	3.1 $\mu\mu f$
Post-Accelerator Helix Resistance	200 to 600 megohms

OPTICAL DATA

Phosphor Number:	P1	P2	P7	P11
Fluorescent Color	Green	Blue-green	Blue-white	Blue
Phosphorescent Color	Green	Green	Yellow	Blue
Persistence	Medium	Long	Long	Short
Faceplate	Clear, flat	Clear, flat	Clear, flat	Clear, flat

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P.O. Box 831
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Type 5CBP

Page 2 of 6

Cathode-Ray Tube

MECHANICAL DATA

Overall length	18-1/4 ± 3/16 inches
Greatest diameter of bulb	5-1/4 ± 3/32 inches
Minimum useful screen diameter	4-1/2 inches
Bulb number	J42K1 - Modified
Bulb contact	J1 - 21
Base	B12-37
Basing	14AG

Bulb contact alignment:

J1 - 21 contact aligns with trace of D1-D2 ± 10 degrees

J1 - 21 contact on same side as pin #4.

Base alignment:

Pin #1 aligns with D3-D4 trace ± 10 degrees.

Positive voltage on D1 deflects beam approximately toward pin #4.

Positive voltage on D3 deflects beam approximately toward pin #1.

Angle between D1-D2 and D3-D4 traces: 90 ± 1 degrees

RATINGS (Design Center Values) (Note 1)

Heater voltage	6.3 volts
Heater current at 6.3 volts	0.6 ± 10% ampere
Post-Accelerator voltage	6,000 Max volts DC
Isolation Shield voltage	2,100 Max volts DC
Deflection Plate Shield Voltage	2,100 Max volts DC
Accelerator voltage	2,000 Max volts DC
Ratio Post-Accelerator voltage to Accelerator voltage:	3 Max
Accelerator input	6 Max watts

March 20, 1958



Type 5CBP

Page 3 of 6

Cathode-Ray Tube

Grid #3 (Focusing electrode) voltage	800 Max volts DC
Grid #1 voltage	
Negative-bias value	200 Max volts DC
Positive-bias value	0 Max volts DC
Positive-peak value	2 Max volts
Peak heater-cathode voltage:	
Heater negative with respect to Cathode	
During warm-up period not to exceed 15 seconds:	180 Max volts
After equipment warm-up period	125 Max volts
Heater positive with respect to Cathode	125 Max volts
Peak voltage between Accelerator and any deflection electrode	500 Max volts

TYPICAL OPERATING CONDITIONS (Note 1)

Post-Accelerator voltage	4000 Volts
Isolation Shield voltage (Note 2)	1775 to 1975 Volts
Deflection Plate Shield Voltage (Note 3)	1775 to 1975 Volts
Accelerator voltage (Note 4)	1900 Volts
Grid #3 voltage (focusing electrode)	190 to 565 Volts
Grid #1 voltage (Note 5)	-62 to -85 Volts
Deflection factors: (Note 6)	
D1 and D2	19 to 23 Volts DC per cm
D3 and D4	6 to 7-1/2 Volts DC per cm
Useful scan D1-D2	10 cm
Useful scan D3-D4	6 cm
Focusing electrode current for any operating condition:	-15 to +10 microamperes
Spot position (undeflected) (Note 7)	5 Max millimeters from center

March 20, 1958



Type 5CBP

Page 4 of 6

Cathode-Ray Tube

TYPICAL OPERATING CONDITIONS, con't.

Pattern distortion at 100% of useful scan (Note 8)	1.5% Max
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MAXIMUM CIRCUIT VALUES

Grid #1 circuit resistance	1.5 Max megohms
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PIN CONNECTIONS

Pin 1 Heater	Pin 5 Grid #3 - Focus	Pin 10 NC
Pin 2 Cathode	Pin 7 NC	Pin 11 NC
Pin 3 Grid #1	Pin 8 NC	Pin 12 Deflection Plate Shield
Pin 4 NC	Pin 9 Accelerator	Pin 14 Heater

Notes

1. All voltages taken with respect to cathode.
2. The isolation shield and the lower end of the post-accelerator helix are connected together within the tube. With the proper potential on this electrode combination, barrel and pin-cushion distortions are minimized.
3. Adjustment of deflection plate shield voltage provides improved linearity of D3-D4 deflection by controlling the edge effect of D3-D4 plate field. In many applications base pin 12 may be connected externally to the isolation shield.
4. Under the typical operating conditions listed the accelerator voltage is made variable from 1775 volts to 1975 volts to provide for astigmatism control. In order to maintain proper astigmatism adjustment as total cathode current is varied, it is recommended that the resistance in the accelerator circuit be limited to 25,000 ohms.
5. Visual extinction of undeflected focused spot.
6. If use is made of the full deflection capabilities of the tube, the deflection plates will intercept part

March 20, 1958



Type 5CBP

Page 5 of 6

Cathode-Ray Tube

Notes, con't.

of the electron beam near the edge of scan; hence a low impedance deflection plate drive is desirable.

7. Connect free deflecting electrodes to accelerator.
8. With a 6 x 10 cm rectangular raster centered on the face of the tube, the raster edges will not deviate from straight parallel lines by more than 1 mm total on the left and right edges, nor by more than 0.5 mm total on the top and bottom.

March 20, 1958

