



4NP - CATHODE RAY TUBE

The Electronic Tube Corporation Type 4NP - is a 4x1-3/4 inch rectangular, nono-accelerator Cathode Ray Tube. The 4NP - is designed for use with equipment subject to extreme shock, severe vibration, and altitudes above 50,000 feet. All electrode leads are brought out through the base to simplify the mechanical design of the equipment in which the tube is used. The tube is available with mumetal shield secured to the base. The base is designed for high altitude use, along with a mating socket.

GENERAL CHARACTERISTICS

Electrical Data

Heater Voltage 6.3 Volts
Heater Current 0.6 ±10% Amperes

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

Cathode to All	5.5 uuf
Grid No. 1 to All	6.4 uuf
D1 to D2	1.7 uuf
D3 to D4	2.8 uuf
D1 to all	8.2 uuf
D2 to all	8.2 uuf
D3 to all	8.5 uuf
D4 to all	8.5 uuf

Mechanical Data

Overall Length 10.0 Inches Max.
Greatest Bulb Dimension (Diagonal) 4.268 Inches
Minimum Useful Screen Diameter (along tube axes) 1.125x3.5 Inches
Base
Basing Special
Base Alignment Special
D1 D2 trace aligns with Pin No. 8 and tube axis 10 Degrees
Positive voltage on D1 deflects the beam approximately towards Pin No. 8 ---
Positive voltage on D3 deflects the beam approximately towards Pins No. 5 and 6. ---

Trace Alignment

Angle between D3 D4 and D1 D2 trace
D3 D4 Trace Aligns with bulb side wall

± 1 Degrees
±1-1/2 Degrees

MAXIMUM RATINGS Design Center Values

Accelerator Voltage (Note 1)	3000 Max. Volts D-C
Focusing Voltage	1500 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 D-C
Peak Heater to 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 Altitude	550 Max. Volts D-C 70,000 ft.

TYPICAL OPERATING CONDITIONS

For Accelerator Voltage of	2500 Volts D-C
Focusing Voltage	510 to 710 Volts D-C
Grid No. 1 Voltage (Note 2)	-60 to -100 Volts D-C
Line Width A Ecl = 20V above cut-off	.7 MM
Line Width B (Note 3)	1.0 MM
Deflection Factors	
D1 and D2	117 145 Volts D-C/Inch
D3 and D4	82 100 Volts D-C/Inch
Deflection Factor Uniformity	3% Max.
Useful Scan	
D1 D2	3-1/2 Inches
D3 D4	1-1/4 Inches
Pattern Distortion (Notes 4 and 5)	
Spot Position (Undelected and focused)	7 MM
Spot Displacement	5 MM

CIRCUIT DESIGN VALUES

Focusing Current for any operating condition	-15 ± 15 Microamperes
Grid No. 1 Voltage (Note 2)	25.6 to 38.4 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	47.3 to 57.7 Volts D-C/Inch/KV of Accelerator Voltage
D3 and D4	32.9 to 40.1 Volts D-C/Inch/KV of Accelerator Voltage
Resistance in any Deflecting-Electrode Circuit (Note 6)	1 Max. Megohms

NOTES

1. The product of accelerator voltage and average current should be limited to 6 watts.
2. Visual extinction of the undeflected spot.
3. Measurement shall be made at ± 1.5 and $\pm .5$ from the tube face center horizontally and vertically respectively.
4. The total vertical movement of the upper or lower ends of a 1 inch vertical trace (centered with respect to the tube face), deflected horizontally 1.75 inches to the left and right of the center of the tube face, shall not exceed 0.040 inch. The 102 trace shall be considered vertical.
5. The total horizontal movement of the left or right ends of a 3-1/2 inch horizontal trace (centered with respect to the tube center), deflected vertically 0.5 inches above and below the center of the tube face, shall not exceed 0.020 inches. The D3D4 trace shall be considered horizontal.
6. It is recommended that the deflecting electrode circuit resistances be approximately equal.

