24CP4-A
CATHODE-RAY TUBE

21\%2/3- BY 16\%2/3-INCH PICTURE SIZE
24-INCH RECTANGULAR, GLASS
FOCUS—MAGNETIC
DEFLECTION—MAGNETIC
90-DEGREE DEFLECTION ANGLE

FACEPLATE—SPHERICAL, GRAY
ION-TRAP GUN
EXTERNAL CONDUCTIVE COATING
ALUMINIZED SCREEN

DESCRIPTION AND RATING

The 24CP4-A is a magnetic-focus and deflection, direct-view all-glass picture tube which provides a 21\%2/3- by 16\%2/3-inch picture for television applications. The electron gun is designed for use with an external single-field ion-trap magnet. Other features of this tube include a high-quality gray faceplate which increases picture contrast and detail under high-ambient-light conditions, a reflective aluminized screen to increase light output, and a space-saving rectangular face shape. An external conductive coating serves as a filter capacitor when grounded.

GENERAL

ELECTRICAL
Heater Voltage ........................................................................ 6.3 Volts
Heater Current ......................................................................... 0.6 ± 10% Amperes

Focusing Method—Magnetic
Deflecting Method—Magnetic
Deflection Angle, approximate
Diagonal ........................................................................ 90 Degrees
Horizontal ........................................................................ 85 Degrees
Vertical ........................................................................ 70 Degrees

Direct Interelectrode Capacitances, approximate
Cathode to All Other Electrodes ........................................ 0.5 uuf
Grid-No. 1 to All Other Electrodes ........................................ 6 uuf
External Conductive Coating to Anode
Maximum ........................................................................ 750 uuf
Minimum ........................................................................ 500 uuf

OPTICAL
Phosphor Number—P4, Sulfide Type
  Fluorescent Color—White
  Phosphorescent Color—White
  Persistence—Short

Faceplate—Gray
Light Transmission at Center, approximate ................................ 68 Percent
**MECHANICAL**

Over-all Length ........................................... 21\(\frac{1}{8}\) ± \(\frac{7}{32}\) Inches

Greatest Bulb Dimensions

- Diagonal ........................................... 24 ± \(\frac{1}{8}\) Inches
- Width ........................................... 22\(\frac{1}{2}\) ± \(\frac{7}{32}\) Inches
- Height ........................................... 18\(\frac{7}{16}\) ± \(\frac{3}{32}\) Inches

Minimum Useful Screen Dimensions

- Diagonal ........................................... 22\(\frac{3}{4}\) Inches
- Width ........................................... 21\(\frac{1}{4}\) Inches
- Height ........................................... 16\(\frac{3}{4}\) Inches

Neck Length ........................................... 7\(\frac{1}{2}\) Inches

Bulb Number, ASA Designation—J192-A1
Bulb Contact—Recessed Small-cavity Cap, JETEC No. J1-21
Base—Small-shell Duodecal 5-Pin, JETEC No. B5-57
Basing, JETEC Designation—12N
Bulb Contact Alignment

- Anode Contact Aligns with Pin No. 6 Position ± 30 Degrees

Mounting Position—Any
Net Weight, approximate ........................................... 32 Pounds

**MAXIMUM RATINGS**

**DESIGN-CENTER VALUES***

<table>
<thead>
<tr>
<th>Component</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anode Voltage†</td>
<td>20,000 Max</td>
<td>Volts DC</td>
</tr>
<tr>
<td>Grid-No. 2 Voltage</td>
<td>500 Max</td>
<td>Volts DC</td>
</tr>
<tr>
<td>Grid-No. 1 Voltage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Negative-Bias Value</td>
<td>125 Max</td>
<td>Volts DC</td>
</tr>
<tr>
<td>Positive-Bias Value</td>
<td>0 Max</td>
<td>Volts DC</td>
</tr>
<tr>
<td>Positive-Peak Value</td>
<td>2 Max</td>
<td>Volts</td>
</tr>
<tr>
<td>Peak Heater-Cathode Voltage‡</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heater Negative with Respect to Cathode</td>
<td></td>
<td></td>
</tr>
<tr>
<td>During Warm-up Period not to Exceed 15 Seconds</td>
<td>410 Max</td>
<td>Volts</td>
</tr>
<tr>
<td>After Equipment Warm-up Period</td>
<td>180 Max</td>
<td>Volts</td>
</tr>
<tr>
<td>Heater Positive with Respect to Cathode</td>
<td>180 Max</td>
<td>Volts</td>
</tr>
</tbody>
</table>

**TYPICAL OPERATING CONDITIONS**

<table>
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<tr>
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<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anode Voltage§</td>
<td>16,000</td>
<td>Volts DC</td>
</tr>
<tr>
<td>Grid-No. 2 Voltage</td>
<td>300</td>
<td>Volts DC</td>
</tr>
<tr>
<td>Grid-No. 1 Voltageπ</td>
<td>-28 to -72</td>
<td>Volts DC</td>
</tr>
<tr>
<td>Focusing-Coil Current▲, approximate</td>
<td>117</td>
<td>Milliamperes DC</td>
</tr>
<tr>
<td>Ion-Trap Field Intensity▲, approximate</td>
<td>40</td>
<td>Gausses</td>
</tr>
</tbody>
</table>

**MAXIMUM CIRCUIT VALUES**

<table>
<thead>
<tr>
<th>Component</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grid-No. 1 Circuit Resistance</td>
<td>1.5 Max</td>
<td>Megohms</td>
</tr>
</tbody>
</table>

*The maximum ratings provide a ten-percent safety factor in accordance with the standard design-center system of rating cathode-ray tubes. The tube will withstand the combined effects of variations in line voltages and components provided the maximum design-center values are not exceeded by more than ten percent.*
†Anode and grid-No. 3 which are connected together within the tube are referred to herein as anode.

If this tube is operated at voltages in excess of 16,000 volts, x-ray radiation shielding may be necessary to avert possible danger of personal injury from prolonged exposure at close range. The protective face-viewing window of apparatus using tubes of this type may provide such a safeguard. If the radiation measured in contact with this window does not exceed 6.25 milliroentgens per hour, the window will normally provide adequate protection.

‡Cathode should be returned to one side or to the midtap of the heater transformer winding.

§Brightness and focus quality decrease with decreasing anode voltage. In general, the anode voltage should not be less than 14,000 volts.

πFor visual extinction of focused raster.

▲For JETEC focusing coil No. 109 with distance from the yoke-reference-line to center-of-air-gap distance equal to 3 3/4 inches.

♦Single-field ion-trap magnet adjusted to optimum position, equivalent to 40 milliamperes through JETEC ion-trap magnet No. 117.

![Diagram of the tube and magnet](image_url)

**SCREEN DIMENSIONS:**
- **DIAGONAL:** 22-3/4"  
- **WIDTH:** 21-3/8"  
- **HEIGHT:** 16-7/8"  

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**NOTES:**

1. **REFERENCE LINE** is determined by the plane of the upper edge of the shoulder of the reference-line gage (RETMA No 116) when the gage is resting on the cone.

2. **DEFLECTION ANGLE** on diagonal is 90 DEGREES.

3. **ANODE TERMINAL** aligns with pin-No. 6 position ± 30 DEGREES.

4. **APPROXIMATE POSITION** of ion-trap magnet.

5. **RECOMMENDED POSITION** for center of focusing field.

6. **EXTERNAL CONDUCTIVE COATING CONTACT AREA.**