**TUNG-SOL**

**CATHODE RAY**

The 21AMP4 and 21AMP4A are direct-view picture tubes designed for use in television applications. They are identical except for the metal-backed screen on the 21AMP4A. Their common features include:

- **Unipotential Cathode**
- **External Conductive Coating**
- **Rectangular Glass Construction**
- **Magnetic Focus and Deflection**
- **Spherical Grey Filter Faceplate**
- **External Single Field Ion Trap**
- **15° x 19° Raster Size**

**ELECTRICAL DATA**

<table>
<thead>
<tr>
<th>Focusing Method</th>
<th>Deflecting Method</th>
<th>Deflection Angle (Approx.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Magnetic</td>
<td>Magnetic</td>
<td>Horizontal: 85°</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Vertical: 68°</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Diagonal: 90°</td>
</tr>
</tbody>
</table>

**Direct Interelectrode Capacitances (Approx.):**

- Cathode to all other electrodes: 5 µµf
- Grid #1 to all other electrodes: 6 µµf
- Maximum external conductive coating: 750 µµf
- Minimum external conductive coating: 500 µµf

**OPTICAL DATA**

<table>
<thead>
<tr>
<th>Phosphor Number</th>
<th>Sulfide Type</th>
<th>No. 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluorescent Color</td>
<td>Phosphorescent Color</td>
<td>White</td>
</tr>
<tr>
<td>Persistence</td>
<td>Faceplate Light Transmission at Center (Approx.)</td>
<td>Short</td>
</tr>
<tr>
<td></td>
<td>75 Percent</td>
<td></td>
</tr>
</tbody>
</table>

**MECHANICAL DATA**

<table>
<thead>
<tr>
<th>Overall Length</th>
<th>Greatest Dimensions of Bulb:</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 7/16 Inches</td>
<td>Diagonal: 21 3/8 ± 3/16 Inches</td>
</tr>
<tr>
<td></td>
<td>Width: 20 1/4 ± 3/16 Inches</td>
</tr>
<tr>
<td></td>
<td>Height: 16 3/8 ± 3/16 Inches</td>
</tr>
</tbody>
</table>

**Minimum Useful Screen Dimensions:**

- Diagonal: 20 1/4 Inches
- Width: 19 1/8 Inches
- Height: 15 Inches

**Bulb Contact:**

- Recessed Small Cavity Cap: J4-21
- Base: Small Shell Duodecal 5 Pin: 85-57
- Basing: 12N

**Bulb Contact Alignment:**

J4-21 Contact aligns with vacant pin position #6 ± 30 Degrees

**PIN CONNECTIONS**

- Pin 1 - Heater
- Pin 2 - Grid No. 1
- Pin 10 - Grid No. 2
- Pin 11 - Cathode

**PIN 12 - Heater**

**Anode Cap:**

- Grid No. 3
- Collector

*Continued on following page*
TUNG-SOL

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RATINGS
DESIGN CENTER VALUES

HEATER VOLTAGE 6.3 VOLTS
HEATER CURRENT 0.6 AMP
MAXIMUM DC ANODE, GRID #3, COLLECTOR VOLTAGE A 15000 VOLTS
MAXIMUM DC GRID #2 VOLTAGE 500 VOLTS
MAXIMUM GRID #4 VOLTAGE:
  DC NEGATIVE-BIAS VALUE 125 VOLTS
  DC POSITIVE-BIAS VALUE 0 VOLTS
  POSITIVE-PEAK VALUE 2 VOLTS
MAXIMUM DC PEAK HEATER-CATHODE VOLTAGE:
  HEATER NEGATIVE WITH RESPECT TO CATHODE
  DURING WARM-UP PERIOD NOT TO EXCEED 15 SECONDS 410 VOLTS
  AFTER EQUIPMENT WARM-UP PERIOD 180 VOLTS
  HEATER POSITIVE WITH RESPECT TO CATHODE 180 VOLTS

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

DC ANODE, GRID #3, COLLECTOR VOLTAGE A 16000 VOLTS
DC GRID #2 VOLTAGE 300 VOLTS
DC GRID #4 VOLTAGE B -28 TO -72 VOLTS
DC FOCUSING COIL CURRENT (APPROX.) C 102 ± 20% MA.
DC ION TRAP MAGNET FIELD INTENSITY (APPROX.) STANDARD COIL #111 95 ± 50% MA.
ION TRAP MAGNET (RATED STRENGTH) 45 GAUSSES

CIRCUIT VALUES

MAXIMUM GRID #4 CIRCUIT RESISTANCE 1.5 VOLTS

A BRILLIANCE AND DEFINITION DECREASE WITH DECREASING ANODE VOLTAGE. IN GENERAL, ANODE VOLTAGE SHOULD NOT BE LESS THAN 14,000 VOLTS.

B VISUAL EXTINCTION OF UNDEFOCUSED FOCUSED SPOT.

C FOR STANDARD FOCUS COIL #109, OR EQUIVALENT, WITH THE COMBINED GRID #2 BIAS VOLTAGE AND VIDEO SIGNAL VOLTAGE ADJUSTED TO PRODUCE A HIGHLIGHT BRIGHTNESS OF 30 FOOT LAMBERTS ON A 15" BY 19 3/8" PICTURE SIZE. DISTANCE FROM REFERENCE LINE TO CENTER OF AIR GAP OR FOCUS COIL SHALL BE 3 INCHES.