TYPE 10UP21 CATHODE-RAY TUBE

The Type 10UP- is a 10-inch electrostatic focus and magnetic deflection cathode-ray tube. It is similar to the Type 10KP- but with an electrostatic focus lens system and considerably improved resolution. It is designed for specific applications where high resolution is the prime requirement. The focus lens is designed to operate at or near cathode potential to afford substantially automatic focus, independent of accelerator voltage variations. A gray filter face plate is used in conjunction with a metal-backed screen for improved contrast and brightness.

GENERAL CHARACTERISTICS

**Electrical Data**
- Heater Voltage: 6.3 Volts
- Heater Current: 0.6 ± 10% Ampere
- Focusing Method: Electrostatic
- Deflecting Method: Magnetic
- Deflecting Angle (Approx.): 50 Degrees
- Phosphor: No. 21
- Fluorescence: Orange
- Phosphorescence: Orange
- Persistence: Long

**Direct Inter-electrode Capacitance**, Approx.
- Cathode to all other electrodes: 5 uuf.
- Grid No. 1 to all other electrodes: 6.5 uuf.

**Mechanical Data**
- Overall Length: 17 5/8 ± 3/8 Inches
- Greatest Diameter of Bulb: 10 1/2 ± 1/8 Inches
- Minimum Useable Screen Diameter: 9 Inches
- Bulb Contact (Recessed small cavity cap): J1-21
- Base (Small shell duodecal 6-Pin): B6-63
- Basing: 12M
- Bulb Contact Alignment: J1-21 contact aligns with vacant pin position No. 3 ± 10 Degrees

**MAXIMUM RATINGS** Design Center Values

- Accelerator Voltage: 12,000 Max. Volts D-C
- Focusing Electrode Voltage: -500 to +1000 Max. Volts D-C
- Grid No. 2 Voltage: 700 Max. Volts D-C
- Grid No. 1 Voltage:
  - Negative Bias Value: 180 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: 180 Max. Volts D-C
- Heater Positive with respect to cathode: 180 Max. Volts D-C

**TYPICAL OPERATING CONDITIONS**

- Accelerator Voltage:
  - 10,000 Volts D-C
- Focusing Electrode Voltage:
  - 0 to +200 Volts D-C
- Focusing Electrode Current:
  - -15 to +25 mA. D-C
- Grid No. 2 Voltage: 300 Volts D-C
- Grid No. 1 Voltage:
  - -28 to -72 Volts D-C
- Line Width:
  - 0.013 Inch Max.
- Spot Position (Undelected):
  - 1/2 Inch

**MAXIMUM CIRCUIT VALUES**

- Grid No. 1 Circuit Resistance: 1.5 Max. Megohms

from RTMA release #1180, April 24, 1953
1. At or near this rating, the effective resistance of the accelerator supply should be adequate to limit the accelerator input power to 6 watts.

2. Brilliance and definition decrease with decreasing accelerator voltage. In general, accelerator voltage should not be less than 7,000 volts.

3. With Grid No. 1 voltage adjusted to produce an accelerator current of 50 µa., with the pattern adjusted for best overall focus. Measured with a 525-line interlaced and synchronized 6x8-inch pattern with interlaced line blanking.

4. Visual extinction of focused, 6x8-inch pattern.

5. Measured with a 525-line interlaced and synchronized pattern with interlaced line blanking. Pattern width adjusted to 90% of minimum useful screen diameter. Ib = 25 µa., measured with interlaced line blanking. Line width is the merged raster width divided by the number of lines (262,5).

6. The center of the undeflected, focused spot will fall within a circle of 1/2-inch radius concentric with the center of the tube face.

**BOTTOM VIEW OF BASE**

<table>
<thead>
<tr>
<th>PIN NO.</th>
<th>ELEMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>HEATER</td>
</tr>
<tr>
<td>2</td>
<td>GRID NO.1</td>
</tr>
<tr>
<td>6</td>
<td>FOCUSING ELECTRODE</td>
</tr>
<tr>
<td>10</td>
<td>GRID NO.2</td>
</tr>
<tr>
<td>11</td>
<td>CATHODE</td>
</tr>
<tr>
<td>12</td>
<td>HEATER</td>
</tr>
</tbody>
</table>

**CAP - ACCELERATOR**

**BOTTOM VIEW OF TUBE**

NOTE 1 - NECK O.D. TO BE \( \frac{8}{16} + \frac{1}{16} \) WITHIN THIS SPACE.