RCA-23FDP4 is a black-and-white pan-o-ply picture tube which eliminates the need for either an integral protective window or a separate safety-glass window and its companion dust seal in the receiver. As a result internal reflections are reduced, and picture contrast is improved. Integral implosion protection in the pan-o-ply picture tube is provided by means of a formed rim band and a welded tension band around the periphery of the tube panel. The 23FDP4 is a rectangular glass picture tube having an aluminized screen with nearly straight sides and slightly rounded corners.

Features of the 23FDP4 include:
- PAN-O-PLY—Integral Implosion Protection
- 110° Magnetic Deflection
- Low-Voltage Electrostatic Focus
- Aluminized Screen
- Electron Gun Requiring No Ion-Trap Magnet
- 15.156" Max. Overall Length
- 5.125" Neck Length
- 15.125" x 19.250" Screen
- 6.3 Volt/450 Ma Heater
- Low Grid-No. 2 Voltage—For Cathode-Drive Service
- 23 kv Max. Anode Voltage

**GENERAL DATA**

**Electrical:**
- Focusing Method: Electrostatic
- Deflection Method: Magnetic
- Deflection Angles (Approx.):
  - Diagonal: 110°
  - Horizontal: 90°
  - Vertical: 82°

**Direct Inter-electrode Capacitances:**
- Cathode to all other electrodes: 5 pf
- Grid No. 1 to all other electrodes: 6 pf
- External conductive coating to anode:
  - Max.: 2500 pf
  - Min.: 1700 pf

- Heater Current at 6.3 volts: 450 ± 20 ma
- Heater Warm-Up Time (Average): 11 seconds

**Optical:**
- Phosphor: P4—Sulfide Type, Aluminized
- Faceplate: Filterglass
- Light transmission at center (Approx.): 42%

**Mechanical:**
- Weight (Approx.): 28 lbs

**Tube Dimensions:**
- Overall length: 14.875" ± 0.281"
- Neck length: 5.125" ± .125"
- Diagonal: 23.500" ± .125"
- Greatest width: 20.650" ± .125"
- Greatest height: 16.650" ± .125"

**Minimum Screen Dimensions (Projected):**
- Diagonal: 22.312"
- Greatest width: 19.250"
- Greatest height: 15.125"
- Area: 282 sq. in.

**Bulb Designation:**
- J187 K

**Cap Designation:**
- Recessed Small Cavity (JEDEC No. J1-21)

**Base Designation:**
- Small-Button Neogoighter 7-Pin, Arrangement 1, (JEDEC No. B7-208)

**Basing Designation:**
- 810

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**Pin 1:** Heater
**Pin 2:** Grid No. 1
**Pin 3:** Grid No. 2
**Pin 4:** Grid No. 4
**Pin 6:** Grid No. 1
**Pin 7:** Cathode
**Pin 8:** Heater

**Cap:** Anode (Grid No. 3, Grid No. 5, Screen, Collector)
**C:** External Conductive Coating

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From JEDEC release #4649, March 30, 1964
## Maximum and Minimum Ratings, Design-Maximum Values:

Unless otherwise specified, voltage values are positive with respect to grid No. 1.

<table>
<thead>
<tr>
<th>Component</th>
<th>Range</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anode Voltage</td>
<td>23,000 max. volts</td>
<td>11,000 min. volts</td>
</tr>
<tr>
<td>Grid-No.4 Voltage</td>
<td></td>
<td>Positive: 1250 max. volts Negative: 400 max. volts</td>
</tr>
<tr>
<td>Grid-No.2 Voltage</td>
<td></td>
<td>Positive: 70 max. volts Negative: 40 min. volts</td>
</tr>
<tr>
<td>Cathode Voltage</td>
<td></td>
<td>Negative peak: 2 max. volts Negative bias: 0 max. volts Positive bias: 100 max. volts Positive peak: 150 max. volts</td>
</tr>
<tr>
<td>Heater Voltage</td>
<td></td>
<td>Positive: 6.9 max. volts Negative: 5.7 min. volts</td>
</tr>
<tr>
<td>Peak Heater-Cathode Voltage</td>
<td></td>
<td>Heaters negative with respect to cathode: After equipment warm-up period not exceeding 15 seconds: 450 max. volts After equipment warm-up period: 300 max. volts Heater positive with respect to cathode: Combined AC &amp; DC voltage: 200 max. volts DC Component: 100 max. volts</td>
</tr>
</tbody>
</table>

### Typical Operating Conditions for Cathode-Drive

- **Service:** Unless otherwise specified, voltage values are positive with respect to grid No. 1.

<table>
<thead>
<tr>
<th>Component</th>
<th>Range</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anode Voltage</td>
<td>18,000 volts</td>
<td></td>
</tr>
<tr>
<td>Grid-No.4 Voltage</td>
<td>200 volts</td>
<td></td>
</tr>
<tr>
<td>Grid-No.2 Voltage</td>
<td>50 volts</td>
<td></td>
</tr>
<tr>
<td>Cathode Voltage</td>
<td>34 to 52 volts</td>
<td>For visual extinction of focused raster (See Fig. 2)</td>
</tr>
<tr>
<td>Field Strength</td>
<td>0 to 12 gauss</td>
<td>For adjustable Centering Magnet</td>
</tr>
<tr>
<td>Maximum Circuit Voltage</td>
<td></td>
<td>Grid-No.1 Circuit Resistance: 1.5 max. megohms</td>
</tr>
</tbody>
</table>

### Operating Considerations

**X-Radiation Warning:** When operated at anode voltages up to 16 kilovolts, this picture tube does not produce any harmful X-radiation. However, because the rating of this type permits operation at voltages as high as 23 kilovolts (design-maximum value), shielding of the tube for X-radiation may be needed to protect against possible injury from prolonged exposure at close range whenever the operating conditions involve voltages in excess of 16 kilovolts.

### Test Circuit for Determining Heater Warm-Up Time

![Test Circuit Diagram](image)

**E = Rated Heater Voltage of Tube Under Test.**

**Ic = Rated Heater Current of Tube Under Test.**

**9255-8503**

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RASTER CUTOFF CHART
For Cathode-Drive Service

E, = 6.5 VOLTS
ANODE-TO-GRID-No.1 VOLTS = 18,000
GRID-No.4-TO-GRID-No.1 VOLTS ADJUSTED FOR FOCUS.
* CATHODE-TO-GRID-No.1 VOLTAGE, FOR VISUAL EXTESTION
OF FOCUSED RASTER INCREASES OR DECREASES DIRECTLY
BY APPRX. 1 VOLT FOR EVERY 1000-VOLT CHANGE IN
ANODE-TO-GRID-No.1 VOLTAGE.

Fig. 2

BULB-CONTOUR DIMENSIONS

SHORT-SIDE VIEW

LONG-SIDE VIEW

DIAGONAL VIEW

FOR THE CONTOUR
X: 5752 X 376

PLANES A THROUGH I ARE NORMAL TO THE TUBE AXIS AND AT
FIXED LOCATIONS FROM THE Y AXIS. THESE COORDINATES
DESCRIBE THE BOGIE BULB EXTERNAL CONTOUR IN PLANES
THROUGH THE TUBE AXIS AND THE RESPECTIVE FACEPLATE AXES.


NOTE 3: SOCKET FOR THIS BASE SHOULD NOT BE RIGIDLY MOUNTED; IT SHOULD HAVE FLEXIBLE LEADS AND BE ALLOWED TO MOVE FREELY. BOTTOM CIRCUMFERENCE OF BASE WAFER WILL FALL WITHIN A CIRCLE CONCENTRIC WITH BULB AXIS AND HAVING A DIAMETER OF 1-3/4".

NOTE 4: EXTERNAL CONDUCTIVE COATING AND IMPLANTATION PROTECTION HARDWARE MUST BE GROUNDED.

NOTE 5: TO CLEAN THIS AREA, WIPE ONLY WITH SOFT DRY LINTLESS CLOTH.

NOTE 6: MEASURED FROM THE TENSION BAND.

NOTE 7: BULGE AT SPLICE-LINE SEAL MAY INCREASE THE INDICATED MAXIMUM VALUE FOR ENVELOPE WIDTH, DIAGONAL, AND HEIGHT BY NOT MORE THAN 1/8"