



ELECTRONIC TUBE REFERENCE

12JP4

Specialized - Cathode Ray electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION

CONSTRUCTION

CATHODERAY

Twelve-inch P4 cathode-ray display tube with a conventional 6.3 V, 0.6 A heater. The available Tung-Sol documentation is sparse, so no specialized television, radar, or instrumentation properties are assigned beyond its display function.

GENERAL CHARACTERISTICS

BASE DESIGNATION	—	BASE PINS	—
NOMINAL HEATER	6.3 V / 600 mA	PARALLEL HEATER	— / —
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION 1 Cathode Ray*No fixed ratings recorded.*

12JP4 — Cathode Ray Picture Tube

A directly viewed, magnetic-deflection and magnetic-focus cathode ray tube designed for television receiver applications, featuring a 12-inch nominal face diameter and a white-fluorescing screen.

Overview

The **12JP4** is a specialized cathode ray picture tube designed for direct-view television receivers. It utilizes magnetic deflection and magnetic focus to produce high-brilliance, high-definition pictures measuring 7 3/4 inches by 10 1/4 inches. The tube features a screen with white fluorescence and medium persistence, and it is designed to operate in any mounting position.

Physical Construction and Dimensions

The 12JP4 is constructed with a glass bulb having a nominal face diameter of 12 inches (with a tolerance of $\pm 3/16$ inch). The physical dimensions of the tube are as follows:

- **Overall Length:** 17 1/2 inches $\pm$ 1/2 inch
- **Neck Length (to start of flare):** 7 3/8 inches $\pm$ 1/4 inch
- **Distance from Face to Neck Junction:** 10 1/2 inches $\pm$ 1/4 inch

For the high-voltage anode connection, the tube features a recessed small ball cap on the side of the bulb. This anode contact is designed to align with the vacant pin position #3 of the base within a tolerance of ± 10 degrees.

Base and Pin Connections

The 12JP4 utilizes a **Small Shell Duodecal 7-Pin Base** (designated as **12D**). The pin connections, viewed from the bottom of the base, are assigned as follows:

Pin Number	Connection
1	Heater
2	Grid No. 1
6	No Connection
7	No Connection
10	Grid No. 2
11	Cathode
12	Heater
Cap	Anode No. 1

Heater and Cathode Characteristics

The tube incorporates an indirectly heated, coated unipotential cathode. The heater is designed to operate on either alternating current (AC) or direct current (DC).

Parameter	Value
Heater Voltage	6.3 V
Heater Current	0.6 A

To ensure proper operation and prevent damage, the cathode should be returned to one side or to the mid-tap of the heater transformer winding.

Electrical Ratings

The ratings of the 12JP4 are interpreted according to the RMA Standard M8-210. These values represent the absolute limits within which the tube must be operated to ensure reliability and longevity.

Rating Parameter	Maximum Limit
Heater Voltage	6.3 V
Anode Voltage	12,000 V
Grid No. 2 Voltage	410 V
Grid No. 1 Negative Bias Voltage	125 V
Grid No. 1 Positive Bias Voltage	0 V
Grid No. 1 Positive Peak Voltage	2 V
Peak Heater-Cathode Voltage (Heater Negative with respect to Cathode)	125 V
Peak Heater-Cathode Voltage (Heater Positive with respect to Cathode)	125 V

Typical Operating Conditions and Characteristics

Under typical operating conditions, the 12JP4 is operated with an anode potential of 10,000 V. The typical parameters are outlined below:

- **Anode Voltage:** 10,000 V
- **Grid No. 2 Voltage:** 250 V
- **Grid No. 1 Voltage (for visual extinction of undeflected focused spot):** -27 V to -63 V
- **Focusing Coil Current (Approximate):** 146 mA
- **Maximum Grid No. 1 Circuit Resistance:** 1.5 MΩ

Focusing and Spot Alignment

The approximate focusing coil current of 146 mA is specified for a standard focus coil when the combined Grid No. 1 bias voltage and video signal voltage are adjusted to produce a highlight brightness of 25 foot-lamberts on the 7 3/4" x 10 1/4" picture area.

When the tube is operated at its normal heater voltage, with an anode voltage of 10,000 V, Grid No. 2 voltage of 250 V, and Grid No. 1 voltage set to a value that avoids damage to the screen, and with the tube shielded against external influences, the undeflected and unfocused spot will fall within a circle of 25 mm radius. The center of this circle coincides with the geometric center of the tube face.

Electrostatic Capacitances

The direct interelectrode capacitances of the 12JP4 are measured without external shielding:

- **Cathode to all other electrodes** (K to $H + G_1 + G_2 + A$): $6\ \mu\text{F}$ (pF)
- **Grid No. 1 to all other electrodes** (G_1 to $H + K + G_2 + A$): $7.9\ \mu\text{F}$ (pF)

Performance Curves and Interpretation

The performance characteristics of the 12JP4 are illustrated by curves relating the peak Grid No. 1 signal voltage to both highlight brightness and anode current. These curves are plotted under the conditions of a 6.3 V heater supply, a Grid No. 2 voltage of 250 V, Grid No. 1 biased to cut-off, and a focused raster size of $7\ \frac{3}{4}'' \times 10\ \frac{1}{4}''$.

- **Highlight Brightness:** The brightness (measured in foot-lamberts) increases non-linearly with the peak Grid No. 1 signal voltage. At an anode voltage (E_b) of 12,000 V, the highlight brightness rises more steeply, reaching approximately 100 foot-lamberts at a peak signal of 45 V. At an anode voltage of 10,000 V, the brightness reaches approximately 80 foot-lamberts at the same peak signal voltage.
- **Anode Current:** The anode current (measured in microamperes) also increases with the peak Grid No. 1 signal voltage, following a similar non-linear curve. The anode current reaches approximately 1000 microamperes (1.0 mA) at a peak Grid No. 1 signal of approximately 45 V.

These curves demonstrate the modulation characteristics of the electron gun, showing how the video signal applied to Grid No. 1 controls both the beam current (anode current) and the resulting screen luminance.

Technical Summary

The **12JP4** is a 12-inch magnetic-deflection and magnetic-focus cathode ray picture tube designed for direct-view television applications. It features a white-fluorescing, medium-persistence screen capable of displaying a $7\ \frac{3}{4}'' \times 10\ \frac{1}{4}''$ image. Operating with a standard 6.3 V, 0.6 A heater and a Small Shell Duodecal 7-pin base, the tube supports anode voltages up to 12,000 V. Its design provides high-definition images with typical highlight brightness levels up to 80–100 foot-lamberts under standard operating conditions, controlled by a Grid No. 1 signal of up to 50 V peak.



SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1961 Tung Sol

Published test conditions and operating points. Values on this page are preserved as reported by this source.

1961 TUNG SOL

Section 1 · Cathode Ray

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater voltage	6.3 V	Nominal
Heater current	600 mA	Nominal

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