

ELECTRONIC TUBE REFERENCE

19JP4

Specialized - Cathode Ray electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION
CONSTRUCTION
CATHODERAY

P4 monochrome television picture tube using magnetic deflection and high-voltage direct-view operation; manufacturer documentation for 19JP4 provides focusing, deflection, and beam-control characteristics for television picture service.

GENERAL CHARACTERISTICS

BASE DESIGNATION	120	BASE PINS	5
NOMINAL HEATER	6.3 V / 600 mA	PARALLEL HEATER	– / –
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION1 Cathode Ray	
MAXIMUM PLATE VOLTAGE	18000 V
MAXIMUM SCREEN VOLTAGE	410 V
CRT ratings, operating conditions, capacitances, and optical/deflection data retained below as parameters.	

19JP4 — Direct-View Television Picture Tube

The **19JP4** is a rectangular glass picture tube designed for direct-view television applications. It features magnetic focusing and magnetic deflection, a unipotential cathode, and an external single-field ion trap. The tube incorporates a grey filter faceplate to improve picture contrast under ambient light, providing approximately 66% light transmission at the center of the screen.

Mechanical Design and Optical Characteristics

The 19JP4 is constructed with a rectangular glass envelope. Its physical dimensions and screen area are optimized for standard television raster displays.

Physical Dimensions

- **Overall Length:** 20 13/16 ± 3/8 inches
- **Neck Diameter:** 1 7/16 ± 1/16 inches
- **Greatest Bulb Diagonal:** 18 5/8 ± 1/8 inches
- **Greatest Bulb Width:** 17 1/16 ± 1/8 inches

Screen and Optical Specifications

The screen utilizes Phosphor No. 4, which produces a white fluorescent and phosphorescent color with medium persistence. The faceplate is treated with a grey filter to enhance contrast.

- **Minimum Useful Screen Diagonal:** 17 21/32 inches
- **Minimum Useful Screen Width:** 16 inches
- **Minimum Useful Screen Height:** 12 inches
- **Standard Raster Size:** 12 inches by 16 inches

Deflection Angles

The deflection system is designed for wide-angle scanning, with approximate deflection angles of:

- **Horizontal Deflection:** 65 to 66 degrees
- **Diagonal Deflection:** 70 degrees

Electrical Connections and Basing

The 19JP4 uses a small shell duodecal 5-pin base (designated B5-57) with a [12D](#) basing arrangement. High voltage to the anode is supplied via a recessed small cavity cap (J1-21) located on the bulb. This bulb contact is aligned with pin position #6 within a tolerance of ± 30 degrees.

Pinout Configuration (Bottom View)

The electrical connections for the duodecal base are assigned as follows:

Pin Number	Connection
Pin 1	Heater
Pin 2	Grid No. 1
Pin 10	Grid No. 2
Pin 11	Cathode
Pin 12	Heater
Cap	Anode (Recessed small cavity cap J1-21)

Direct Interelectrode Capacitances

The approximate direct interelectrode capacitances of the tube are:

- **Cathode to all other electrodes:** 5 IIf
- **Grid No. 1 to all other electrodes:** 6 IIf

Heater and Maximum Ratings

The ratings of the 19JP4 are established under the Design Center system. Operating the tube beyond these limits may impair performance or cause permanent damage.

Heater Specifications

- **Heater Voltage:** 6.3 Volts
- **Heater Current:** 0.6 Ampere

Design Center Maximum Ratings

- **Maximum DC Anode Voltage:** 18,000 Volts
- **Maximum DC Grid No. 2 Voltage:** 410 Volts
- **Maximum Grid No. 1 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: 150 Volts
 - **Heater positive with respect to cathode:** 150 Volts

Typical Operating Conditions and Circuit Values

Under typical operating conditions, the 19JP4 is configured with specific electrode potentials and magnetic focusing parameters to achieve a focused, high-brightness display.

Typical Operating Points

- **DC Anode Voltage:** 12,000 Volts
- **DC Grid No. 2 Voltage:** 300 Volts
- **DC Grid No. 1 Voltage (for visual extinction of undeflected focused spot):** -33 to -77 Volts

Focusing and Ion Trap Alignment

To achieve standard focus and ion separation, external magnetic components must be operated at specific currents:

- **DC Focusing Coil Current:** 95 $\pm$ 20% mA. This value is specified using a standard focus coil #109 or equivalent, positioned such that the distance from the reference line to the center of the air gap on the focus coil is 3.0 inches. This current is determined with the combined Grid No. 1 bias voltage and video signal voltage adjusted to produce a highlight brightness of 30 foot-lamberts on a 12" x 16" picture size.
- **DC Ion Trap Current:** 75 $\pm$ 50% mA, using a standard single-field coil #111.

Circuit Constraints

- **Maximum Grid No. 1 Circuit Resistance:** 1.5 Megohms

Technical Summary

The **19JP4** is a rectangular glass cathode ray tube designed for direct-view television applications. It features a 12" x 16" raster size, a grey filter faceplate with 66% light transmission, and utilizes Phosphor No. 4 to produce a medium-persistence white display. Operating with a 6.3 V, 0.6 A heater, the tube supports a maximum anode voltage of 18,000 V and utilizes magnetic focusing and deflection alongside an external single-field ion trap. Its electrical interface is provided by a small shell duodecal 5-pin base and a recessed small cavity cap for the high-voltage anode connection.



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
DC anode voltage	12000 V	Typical

CHARACTERISTIC

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Horizontal deflection angle	65 degree	Approximate

CAPACITANCE

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Cathode to all other electrodes	5 pF	—



SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1966 Tung Sol Electronic Tubes 4 of 4

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

1966 TUNG SOL ELECTRONIC TUBES 4 OF 4

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CHARACTERISTICS

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
MAGNETIC FOCUS AND DEFLECTION – value 1	12 mA	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
MAGNETIC FOCUS AND DEFLECTION – value 2	16 mA	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
FACEPLATE LIGHT TRANSMISSION	66 percent	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
HEATER	5.3 V	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
HEATER POSITIVE WITH RESPECT TO CATHODE	15 V	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
DC ION TRAP CURRENT STANDARD COIL #111 – value 1	111 mA	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
DC ION TRAP CURRENT STANDARD COIL #111 – value 2	75 mA	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
DC ION TRAP CURRENT STANDARD COIL #111 – value 3	5 mA	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
12" % 16" PICTURE SIZE. DISTANCE FROM REFERENCE LINE TO CENTER CF AIR GAP ON FOCUS – value 1	12	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
12" % 16" PICTURE SIZE. DISTANCE FROM REFERENCE LINE TO CENTER CF AIR GAP ON FOCUS – value 2	16	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
MAXIMUM DC GRID #2 VOLTAGE – value 1	2 V	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
MAXIMUM DC GRID #2 VOLTAGE – value 2	41 V	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
MAXIMUM GRID #1 VOLTAGE	1 V	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
MAXIMUM GRID #1 CIRCUIT RESISTANCE – value 1	1 mA	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
MAXIMUM GRID #1 CIRCUIT RESISTANCE – value 2	1.5 mA	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.

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