

ELECTRONIC TUBE REFERENCE

19EP4

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 19EP4 provides focusing, deflection, and beam-control characteristics for television picture service.

GENERAL CHARACTERISTICS

BASE DESIGNATION	12D	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	19 V
MAXIMUM SCREEN VOLTAGE	2 V
CRT-specific electrode, focusing and deflection data retained as parameters.	

19EP4 — Monochrome Television Picture Tube

The **19EP4** is a direct-view rectangular glass picture tube designed for television receiver applications. It features a grey filter faceplate, magnetic focus, and magnetic deflection. The tube incorporates a unipotential cathode, an external double field ion trap, and a standard phosphor screen that provides a white display with medium persistence.

Mechanical and Optical Design

The 19EP4 is constructed with a rectangular glass envelope and a grey filter faceplate to enhance picture contrast under ambient illumination. The tube provides a nominal raster size of 12" x 16", with a minimum

useful screen diameter of 17 21/32 inches.

Optical Characteristics

- **Phosphor:** No. 4
- **Fluorescent Color:** White
- **Phosphorescent Color:** White
- **Persistence:** Medium

Physical Dimensions and Alignment

- **Overall Length:** 21 1/8 ± 3/8 inches
- **Greatest Diameter of Bulb:** 18 5/8 ± 1/8 inches
- **Bulb Contact:** Recessed small cavity cap (J1-21)
- **Base:** Small shell duodecal 5-pin (B5-57)
- **Basing Designation:** 12D
- **Bulb Contact Alignment:** The J1-21 anode contact aligns with pin position #6 ± 30 degrees.

Electrical Connections and Pinout

The 19EP4 utilizes a 5-pin duodecal base (B5-57) with the 12D basing configuration. The electrical connections, viewed from the bottom of the base, are assigned as follows:

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

Maximum Ratings

The following design-center values represent the absolute operating limits established for the 19EP4 to ensure reliable performance and prevent premature tube failure:

- **Heater Voltage:** 6.3 V
- **Heater Current:** 0.6 A
- **Maximum DC Anode Voltage:** 19,000 V
- **Maximum DC Grid No. 2 Voltage:** 410 V

- **Maximum Grid No. 1 Voltage:**
 - **DC Negative-Bias Value:** 125 V
 - **DC Positive-Bias Value:** 0 V
 - **Positive-Peak Value:** 2 V
- **Maximum DC Peak Heater-Cathode Voltage:**
 - **Heater negative with respect to cathode (during warm-up period ≤ 15 seconds):** 410 V
 - **Heater negative with respect to cathode (after equipment warm-up):** 125 V
 - **Heater positive with respect to cathode:** 125 V
- **Maximum Grid No. 1 Circuit Resistance:** 1.5 M Ω

Typical Operating Conditions

Under typical operating conditions, the 19EP4 is operated with magnetic focusing and deflection systems. The deflection angles are approximately 65 degrees horizontally and 70 degrees diagonally.

- **DC Anode Voltage:** 13,000 V
- **DC Grid No. 2 Voltage:** 250 V
- **DC Grid No. 1 Voltage:** -26 to -63 V (for visual extinction of the undeflected focused spot)
- **DC Focusing Coil Current:** 95 $\pm$ 20% mA
 - *Note:* This current is specified using a standard focus coil #109 or equivalent, with the combined Grid No. 1 bias and video signal adjusted to produce a highlight brightness of 25 foot-lamberts on a 12" x 16" picture. The distance from the reference line to the center of the focus coil air gap is 3.25 inches.
- **DC Ion Trap Current:** 75 $\pm$ 50% mA
 - *Note:* This current is specified using a standard double field ion trap coil #108.



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
Maximum Anode Voltage	19000 V	—
Typical Anode Voltage	13000 V	—
Maximum Grid2 Voltage	410 V	—
Typical Grid2 Voltage	300 V	—

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
DeflectionAngleApproximate	66 degree	—
FocusingMethod	Magnetic	—
DeflectingMethod	Magnetic	—
PhosphorNumber	4	—
FluorescentColor	White	—
Persistence	Medium	—



SOURCE OPERATING CONDITIONS

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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

Section 1 · Cathode Ray

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.
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.
HEATER	6.3 V	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
HEATER POSITIVE	125	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
DC ANODE VOLTAGE	13 V	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
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.
DC GRID #2 VOLTAGE – value 2	25 V	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
DC GRID #1 VOLTAGE A – value 1	26 V	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
DC GRID #1 VOLTAGE A – value 2	63 V	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
DC FOCUSING COIL CURRENTS (APPROX.) – value 1	95 mA	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
DC FOCUSING COIL CURRENTS (APPROX.) – value 2	2 mA	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
BFOR STANDARD FOCUS COIL 1109r OR EQUIVALENT WITH COMBINED GRID #1 BIAS VOLTAGE AND – value 1	1109 V	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
BFOR STANDARD FOCUS COIL 1109r OR EQUIVALENT WITH COMBINED GRID #1 BIAS VOLTAGE AND – value 2	1 V	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
VIDEO SIGNAL VOLTAGE ADJUSTED TO PRODUCE A MIGNLIGHT BRIGHTNESS OF 25 FDOT LAMBERTS ON A	25 V	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
12" x 16" PICTURE SIZE. DISTANCE FROM REFERENCE LINE TO CENTER OF 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" x 16" PICTURE SIZE. DISTANCE FROM REFERENCE LINE TO CENTER OF 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 ANODE	19 V	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
MAXIMUM pC GRID #2 VOLTAGE	2 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.
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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