

ELECTRONIC TUBE REFERENCE

19FP4

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 19FP4 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	41 V
CRT-specific electrode, focusing and deflection data retained as parameters.	

19FP4 — Direct-View Television Picture Tube

The 19FP4 is a direct-view cathode ray tube designed for television receiver applications, featuring magnetic focus, magnetic deflection, and a grey filter faceplate.

Overview

The **19FP4** is a round glass cathode ray tube (CRT) developed for television display systems. It utilizes magnetic focus and magnetic deflection, with a nominal deflection angle of approximately 66 degrees. To prevent ion burn on the phosphor screen, the tube requires an external double field ion trap. The 19FP4

features a grey filter faceplate to improve picture contrast under ambient lighting conditions, and it is designed to display a standard television raster.

Mechanical and Optical Construction

The 19FP4 is constructed with a round glass envelope. Its physical dimensions are characterized by an overall length of $22 \pm 1/2$ inches and a maximum bulb diameter of $18 \frac{7}{8} \pm 1/8$ inches. The neck of the tube has a diameter of $1 \frac{7}{16} \pm 1/16$ inches, and a 5-inch space along the neck must be kept clear for the installation of the external ion trap magnet. The minimum useful screen diameter is $17 \frac{3}{8}$ inches, which accommodates a standard television raster size of approximately $11 \frac{3}{8}$ " x $15 \frac{3}{4}$ " to $11 \frac{3}{4}$ " x $15 \frac{3}{4}$ ".

The faceplate is a grey filter faceplate designed with approximately 66% light transmission at the center to enhance contrast. The screen is coated with No. 4 phosphor, which produces a white fluorescent and phosphorescent color with medium persistence, suitable for displaying moving television images without excessive trailing or flicker.

Electrical Connections and Basing

The 19FP4 uses a small shell duodecal 5-pin base (designated B5-57) with a 12D basing arrangement. The high-voltage anode connection is made via a recessed small cavity cap (J1-21) located on the bulb cone. This anode contact is aligned with the pin position #3 within a tolerance of ± 10 degrees.

The pin connections, viewed from the bottom of the base, are assigned as follows:

Pin	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)

The heater is designed for a nominal operating voltage of 6.3 Volts and draws a nominal current of 0.6 Ampere. The cathode is a unipotential, indirectly heated type.

Maximum Ratings and Operating Conditions

The operating limits of the 19FP4 are defined under the Design Center rating system. These limits must be observed to ensure reliable operation and prevent damage to the tube's electrodes and phosphor screen.

Design Center Ratings

Parameter	Value
Maximum DC Anode Voltage	19,000 V
Maximum DC Grid No. 2 Voltage	410 V
Maximum Grid No. 1 DC Negative-Bias Value	125 V
Maximum Grid No. 1 DC Positive-Bias Value	0 V
Maximum Grid No. 1 Positive-Peak Value	2 V
Maximum Grid No. 1 Circuit Resistance	1.5 MΩ

Heater-Cathode Voltage Ratings

- **Heater negative with respect to cathode:**
 - During warm-up period (not to exceed 15 seconds): 410 Volts
 - After equipment warm-up period: 125 Volts
- **Heater positive with respect to cathode:** 125 Volts

Typical Operating Conditions

Under typical operating conditions, the tube is operated with a DC anode voltage of 13,000 Volts and a DC Grid No. 2 voltage of 250 Volts. The control grid (Grid No. 1) voltage required for visual extinction of the undeflected focused spot ranges from -27 to -63 Volts.

Focusing is achieved magnetically using a standard focus coil (such as standard focus coil #109 or equivalent). With the focus coil's air gap center positioned 3.0 inches from the reference line, the typical focusing current is approximately 130 mA. This current is specified under the condition where the combined Grid No. 1 bias and video signal are adjusted to produce a highlight brightness of 20 foot-lamberts on the standard raster size.

An external double field ion trap is required, utilizing a standard coil (such as standard coil #108) operated with a typical DC current of approximately 110 mA to properly align the electron beam and prevent ion damage.

Technical Summary

The **19FP4** is a 66-degree, magnetically focused and deflected cathode ray tube designed for television display service. It features a round glass envelope with a 18 7/8-inch diameter, a grey filter faceplate with 66% light transmission, and a No. 4 white phosphor screen. Operating with a 6.3 V, 0.6 A heater, the tube is rated for a maximum anode voltage of 19,000 Volts, with typical operation at 13,000 Volts. It utilizes a small shell duodecal 5-pin base and a recessed small cavity cap for the high-voltage anode connection. Proper operation requires an external double field ion trap and a magnetic focusing coil.



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	260 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

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CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
DEFLECTION ANGLE (APPROX.)	66 degrees	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 POSITIVE WITH RESPECT TO CATHODE	1	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
DC GRID #2 VOLTAGE	2 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	1 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	3 V	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
DC FOCUSING COIL CURRENTS (APPROX.)	13 mA	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
DC ION TRAP CURRENT STANDARD – value 1	108 mA	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
DC ION TRAP CURRENT STANDARD – value 2	11 mA	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
BFOR – value 1	4109 V	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
BFOR – value 2	41 V	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
VIDEO SIGNAL VOLTAGE ADJUSTED TO PRODUCE A	20 V	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
11 j/4" X 15 j/4" PICTURE SIZE. DISTANCE FROM – value 1	4	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
11 j/4" X 15 j/4" PICTURE SIZE. DISTANCE FROM – value 2	15	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
11 j/4" X 15 j/4" PICTURE SIZE. DISTANCE FROM – value 3	4	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 VOLTAGE	19 V	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
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	1 mA	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.