

ELECTRONIC TUBE REFERENCE

CONSOLIDATED TECHNICAL DATA

19GP4

1 SECTION
CONSTRUCTION
CATHODERAY

Specialized - Cathode Ray electronic tube

P4 monochrome television picture tube using magnetic deflection and high-voltage direct-view operation; manufacturer documentation for 19GP4 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	19000 V
MAXIMUM SCREEN VOLTAGE	410 V
CRT ratings, operating conditions, capacitances, and optical/deflection data retained below as parameters.	

19GP4 — Direct-View Cathode Ray Picture Tube

The **19GP4** is a direct-view cathode ray picture tube designed primarily for television receiver applications. It features a round glass construction, a grey filter faceplate, and a unipotential cathode. The tube utilizes magnetic deflection and magnetic focus, along with an external single-field ion trap to prevent ion burn on the phosphor screen.

Mechanical Specifications and Physical Construction

The 19GP4 is characterized by its round glass envelope and a specialized faceplate designed to enhance picture contrast under ambient light. The faceplate is a grey filter glass providing approximately 66%

light transmission at the center. The tube produces a standard rectangular raster size of 11 3/4 inches by 15 3/4 inches.

The physical dimensions and mechanical clearances of the tube are as follows:

- **Overall Length:** 21 1/4 ± 1/2 inches
- **Greatest Diameter of Bulb:** 18 7/8 ± 1/8 inches
- **Minimum Useful Screen Diameter:** 17 3/8 inches
- **Neck Diameter:** 1 7/16 ± 1/16 inches
- **Reference Line to Neck End:** 6 5/16 inches
- **Reference Line to Top of Bulb:** 14 3/8 inches
- **Ion Trap Magnet Space:** A length of 4 5/8 inches along the neck must be kept clear to accommodate the external single-field ion trap magnet.

The screen is coated with Phosphor No. 4, which produces a white fluorescent color and a white phosphorescent color with medium persistence, making it well-suited for television display rates.

Electrical Connections and Basing

The 19GP4 uses a small shell duodecal 5-pin base (designation B5-57) with a 12D basing configuration. High-voltage anode connection is made via a recessed small cavity cap (designation J1-21) located on the side of the bulb. 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 Number	Connection
Pin 1	Heater
Pin 2	Grid No. 1
Pin 10	Grid No. 2
Pin 11	Cathode
Pin 12	Heater
Anode Cap	Anode (Recessed small cavity cap J1-21)

Interelectrode Capacitances

The direct interelectrode capacitances of the tube are relatively low, helping to maintain signal integrity:

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

Ratings and Operating Conditions

The operating limits of the 19GP4 are defined under the Design Center rating system. Operating the tube within these limits ensures reliable performance and longevity.

Maximum Ratings (Design Center Values)

- **Heater Voltage:** 6.3 Volts
- **Heater Current:** 0.6 Ampere
- **Maximum DC Anode Voltage:** 19,000 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
 - Heater negative with respect to cathode after equipment warm-up: 125 Volts
 - Heater positive with respect to cathode: 125 Volts

Typical Operating Conditions

For standard television operation, the typical electrical and magnetic operating parameters are established as follows:

- **DC Anode Voltage:** 13,000 Volts
- **DC Grid No. 2 Voltage:** 250 Volts
- **DC Grid No. 1 Voltage:** -27 to -63 Volts (adjusted to achieve visual extinction of the undeflected focused spot)
- **DC Focusing Coil Current:** Approximately 130 mA. This value is specified using a standard focus coil #109 or equivalent, with the focus coil air gap center positioned 3.0 inches from the reference line. This current is determined with the combined Grid No. 1 bias and video signal adjusted to produce a highlight brightness of 20 foot-lamberts on the 11 3/4" x 15 3/4" picture.
- **DC Ion Trap Current:** Approximately 105 mA when using a standard single-field ion trap coil #111.

Circuit Constraints

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

Technical Summary

The **19GP4** is a 66-degree magnetic deflection and magnetic focus cathode ray tube designed for television display service. Featuring a round glass bulb with an 18 7/8-inch diameter, it provides a 17 3/8-inch minimum useful screen diameter and displays an 11 3/4" x 15 3/4" raster. The tube is equipped with

a grey filter faceplate offering 66% light transmission to optimize contrast, and it utilizes a standard No. 4 white phosphor. Operating at a typical anode voltage of 13,000 V (with a design maximum of 19,000 V), the 19GP4 requires an external single-field ion trap magnet and a standard focusing coil to produce a sharp, focused image. It is powered by a standard 6.3 V, 0.6 A heater and is based on a small shell duodecal 5-pin configuration.



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	13000 V	Typical

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Deflection angle	66 degree	Approximate

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



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
HEATER	6.3 V	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
HEATER CURRENT	0.6	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
DC ANODE	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 FOCUSING COIL CURRENT S (APPROX.)	13 mA	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
11 j!4" % 15 j/4^ PCI TURE SIZE. – value 1	4	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
11 j!4" % 15 j/4^ PCI TURE SIZE. – value 2	15	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
11 j!4" % 15 j/4^ PCI TURE SIZE. – 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
MAXIMUMDC 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 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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