

Seventeen-inch direct-view television picture tube with magnetic focusing, magnetic deflection, and a white P4 screen. Approximately 90-degree deflection and high-voltage operation provide a large monochrome receiver display.

GENERAL CHARACTERISTICS

BASE DESIGNATION	12L	BASE PINS	6
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 SCREEN VOLTAGE	500 V
CRT-specific electrode/focus/deflection data retained as parameter rows.	

17HP4 — Direct-View Cathode Ray Tube

A rectangular glass, electrostatic-focus, magnetic-deflection picture tube designed for television applications.

Overview

The **17HP4** is a direct-view cathode ray tube (CRT) designed primarily for television receiver applications. It features a rectangular glass construction, a unipotential cathode, electrostatic focusing, and magnetic deflection. The tube incorporates an external conductive coating and requires an external single-field ion trap for proper operation.

The 17HP4 family includes three variants that share identical electrical and mechanical characteristics, differing only in their faceplate and screen treatments:

- **17HP4:** The base model, featuring a grey filter faceplate.
- **17HP4A:** A variant featuring a grey frosted filter faceplate.
- **17HP4B:** A variant featuring an aluminized screen.

The tube provides a nominal raster size of approximately 10 3/4 inches by 14 1/8 to 14 1/4 inches, offering a compact yet highly readable display area for standard television designs.

Mechanical Specifications and Physical Dimensions

The 17HP4 is constructed with a rectangular glass bulb and a small shell duodecal 6-pin base (B6-63). Its physical dimensions and mechanical tolerances are tightly defined:

- **Overall Length:** 19 3/16 ± 3/8 inches
- **Greatest Bulb Dimensions:**
 - **Diagonal:** 16 5/8 ± 1/8 inches
 - **Width:** 15 3/8 ± 1/8 inches
 - **Height:** 12 1/4 ± 1/8 inches
- **Minimum Useful Screen Dimensions:**
 - **Width:** 14 5/16 inches
 - **Height:** 10 3/4 inches

The high-voltage anode connection is made via a recessed small cavity cap (J1-21) located on the bulb cone. This contact is aligned with pin position #6 on the base within a tolerance of ± 30 degrees.

Electrical Connections and Pinout

The 17HP4 utilizes a **12L** basing arrangement, viewed from the bottom of the tube. The electrical connections are distributed across the 6-pin duodecal base and the recessed anode cavity cap as follows:

Pin / Cap	Connection
Pin 1	Heater
Pin 2	Grid No. 1 (Control Grid)
Pin 6	Grid No. 4 (Focusing Grid)
Pin 10	Grid No. 2
Pin 11	Cathode
Pin 12	Heater
Anode Cap	Grid No. 3, Grid No. 5, Collector

Heater Ratings

The unipotential cathode is indirectly heated by a filament designed for standard television receiver power supplies:

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

Interelectrode Capacitances

The direct interelectrode capacitances of the tube are approximately:

- **Cathode to all other electrodes:** 5 μF
- **Grid No. 1 to all other electrodes:** 6 μF
- **External conductive coating to anode:**
 - **Maximum:** 1,500 μF
 - **Minimum:** 750 μF

The external conductive coating acts as a capacitor in conjunction with the internal anode coating, which can be utilized for high-voltage ripple filtering in the receiver's power supply.

Optical and Deflection Characteristics

The 17HP4 utilizes a standard phosphor screen and specific deflection angles to achieve its display geometry:

- **Phosphor:** No. 4, which produces a white fluorescent and white phosphorescent color with medium persistence.
- **Faceplate Light Transmission:** Approximately 66% at the center of the screen (specifically documented for the base 17HP4 model).
- **Deflection Angles (Approximate):**
 - **Horizontal:** 65 degrees
 - **Diagonal:** 70 degrees

These deflection angles dictate the scanning power and yoke design required to fully sweep the raster across the screen surface.

Operating Conditions and Design Center Ratings

The operating parameters of the 17HP4 are divided into typical operating conditions and absolute design center ratings. Designers must ensure that the maximum limits are not exceeded under worst-case line voltage and component tolerance conditions.

Design Center Ratings

- **Grid No. 3, Grid No. 5, Collector Voltage (Anode):** 16,000 Volts DC maximum
- **Grid No. 4 Voltage:** 500 Volts DC maximum

- **Grid No. 2 Voltage:** 500 Volts DC maximum
- **Grid No. 1 Voltage:**
 - **DC Negative-Bias Value:** 125 Volts maximum
 - **DC Positive-Bias Value:** 0 Volts maximum
 - **Positive-Peak Value:** 2 Volts maximum
- **Peak Heater-Cathode Voltage:**
 - **Heater negative with respect to cathode during warm-up** (not to exceed 15 seconds): 410 Volts maximum
 - **Heater negative with respect to cathode after warm-up:** 180 Volts maximum
 - **Heater positive with respect to cathode:** 180 Volts maximum
- **Grid No. 1 Circuit Resistance:** 1.5 Megohms maximum

Typical Operating Conditions

Under typical operating conditions, the tube is set up with the following electrode potentials:

- **Grid No. 3, Grid No. 5, Collector Voltage:** 14,000 Volts DC
- **Grid No. 4 Voltage:** -56 to +310 Volts DC (for focusing)
- **Grid No. 2 Voltage:** 300 Volts DC
- **Grid No. 1 Voltage (for visual extinction of undeflected focused spot):** -33 to -77 Volts DC
- **Ion Trap Current:** Approximately 85 mA when using a Standard Coil No. 111.

The wide range of Grid No. 4 voltage (-56 to +310 Volts) allows for precise electrostatic focusing adjustment across individual production variations of the tube. The ion trap current of 85 mA is required to align the electron beam through the gun structure, preventing ion burn on the phosphor screen.

Technical Summary

The **17HP4** is a versatile **rectangular glass cathode ray tube** featuring **electrostatic focus** and **magnetic deflection** (65° horizontal, 70° diagonal). Operating with a **6.3 V, 0.6 A heater**, it delivers a high-resolution monochrome display using **No. 4 white phosphor** with a medium persistence characteristic. The tube is supported by variants **17HP4A** (frosted faceplate) and **17HP4B** (aluminized screen) to suit different cabinet and lighting environments. With a maximum anode rating of **16,000 V** and a typical operating anode voltage of **14,000 V**, it provides a reliable, bright, and sharp display for television receivers of its era.



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

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OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum Anode Voltage	18000 V	—
Typical Anode Voltage	14000 V	—
Maximum Grid2 Voltage	500 V	—
Typical Grid2 Voltage	300 V	—

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
FocusingMethod	Magnetic	—
DeflectingMethod	Magnetic	—
DeflectionAngleApproximate	90 degree	—
PhosphorNumber	4	—
FluorescentColor	White	—



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

Section 1 · Cathode Ray

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum Grid No. 2 voltage	500 V	Published maximum Grid No. 2 voltage

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
FACEPLATE LIGHT TRANSMISSION AT CENTER (APPROX.)	66 %	FACEPLATE LIGHT TRANSMISSION AT CENTER (APPROX.) 66 PERCENT
HEATER VOLTAGE	6.3 V	HEATER VOLTAGE 6.3 voLTs
HEATER CURRENT	600 mA	HEATER CURRENT 0.6 AMP.
MAXIMUM DC GRID #3, GRID #5, COLLECTOR VOLTAGE	16000 V	MAXIMUM DC GRID #3, GRID #5, COLLECTOR VOLTAGE 16 000 VOLTS
MAXIMUM DC GRID #4 VOLTAGE	500 V	MAXIMUM DC GRID #4 VOLTAGE 500 voLTs
MAXIMUM DC GRID #2 VOLTAGE	500 V	MAXIMUM DC GRID #2 VOLTAGE 500 VOLTS
HEATER POSITIVE WITH RESPECT TO CATHODE IS	0 V	HEATER POSITIVE WITH RESPECT TO CATHODE ISO VOLTS
DC GRID #3, GRID #5, COLLECTOR VOLTAGE	14000 V	DC GRID #3, GRID #5, COLLECTOR VOLTAGE 14 000 voLTs
DC GRID #4 VOLTAGE -56 r	310 V	DC GRID #4 VOLTAGE -56 ro 310 voLTs
DC GRID #2 VOLTAGE	300 V	DC GRID #2 VOLTAGE 300 voLTs
DC GRID #1 VOLTAGE A -33 To -	77 V	DC GRID #1 VOLTAGE A -33 To -77 voLTs
DC ION TRAP CURRENT STANDARD COIL #111 (APPROX.)	85 mA	DC ION TRAP CURRENT STANDARD COIL #111 (APPROX.) 85 MA.

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
CATHODE TO ALL OTHER ELECTRODES	5 MMF	CATHODE TO ALL OTHER ELECTRODES 5 µmf
GRID #i TO ALL OTHER ELECTRODES	6 MMF	GRID #i TO ALL OTHER ELECTRODES 6 µmf
MAXIMUM EXTERNAL CONDUCTIVE COATING TO ANODE	1500 MMF	MAXIMUM EXTERNAL CONDUCTIVE COATING TO ANODE 1 500 µmf
MINIMUM EXTERNAL CONDUCTIVE COATING TO ANODE	750 MMF	MINIMUM EXTERNAL CONDUCTIVE COATING TO ANODE 750 µmf



SOURCE DATA APPENDIX

SOURCE OPERATING CONDITIONS

1968 General Electric Co

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

1968 GENERAL ELECTRIC CO

Section 1 · Cathode Ray

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
AnodeVoltageMaximum	16000 V	—
AnodeVoltageTypical	14000 V	—
Grid2VoltageMaximum	500 V	—