

ELECTRONIC TUBE REFERENCE

19GEP4

Specialized - Cathode Ray electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION
CONSTRUCTION
CATHODERAY

Wide-angle aluminized P4 monochrome television picture tube using electrostatic focusing and magnetic deflection, designed for high-voltage direct-view service with a large approximately 19-inch screen.

GENERAL CHARACTERISTICS

BASE DESIGNATION	—	BASE PINS	—
NOMINAL HEATER	6.3 V / 450 mA	PARALLEL HEATER	— / —
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION1 Cathode Ray
No fixed ratings recorded.
Television CRT electron-gun/display section.

19GEP4 — Black and White Television Picture Tube

The **19GEP4** is a 19-inch cathode-ray tube designed for black and white television receivers. It features low-voltage electrostatic focusing, magnetic deflection, and an aluminized P4 phosphor screen. The tube incorporates a tension-band implosion protection system with integrated mounting lugs.

Mechanical Design and Implosion Protection

The 19GEP4 is built using the EIA J149-F1A glass bulb envelope and features a net weight of approximately 15 lbs. The physical dimensions of the tube are characterized by:

- Overall Length: 11.625" ± 0.250"

- **Neck Length:** 4.375" $\pm$ 0.125"
- **Maximum Neck Diameter:** 1.168" at the splice
- **Greatest Dimensions (excluding mounting lugs):**
 - Diagonal: 18.733" $\pm$ 0.125"
 - Width: 16.552" $\pm$ 0.125"
 - Height: 13.446" $\pm$ 0.125"

The screen utilizes an aluminized P4 phosphor with a light transmittance of approximately 49% at the center. The projected minimum useful screen dimensions are:

- **Diagonal:** 17.562"
- **Horizontal:** 15.188"
- **Vertical:** 12.000"
- **Minimum Useful Area:** 172 sq. in.

For safety, the tube is equipped with a banded implosion protection system (Tension Band) with mounting lugs. This hardware must be grounded. The minimum resistance between the external conductive coating and the implosion hardware is 5 M Ω .

Heater and Electrical Connections

The 19GEP4 is equipped with an indirectly heated cathode designed for series or parallel heater chains. The heater has a nominal warm-up time of 11 seconds.

Heater Parameter	Value
Nominal Heater Voltage	6.3 V
Nominal Heater Current	450 $\pm$ 5% mA
Calculated Heater Power	2.835 W

Note: The heater power is calculated as 6.3 V multiplied by 0.45 A.

The tube uses an EIA B7-208 base with an EIA 8HR basing configuration. The high-voltage anode connection is made via a recessed EIA J1-21 bulb contact on the side of the envelope.

Pinout Configuration (EIA 8HR)

The electrical connections are assigned as follows:

Pin Number	Electrode Connection
Pin 1	Heater
Pin 2	Grid No. 1
Pin 3	Grid No. 2

Pin Number	Electrode Connection
Pin 4	Grid No. 4 (Focusing Electrode)
Pin 6	Grid No. 1
Pin 7	Cathode
Pin 8	Heater
Recess	Anode (EIA J1-21 Bulb Contact)

Electrostatic Focusing and Magnetic Deflection

The 19GEP4 utilizes low-voltage electrostatic focusing, controlled by Grid No. 4. Deflection is achieved magnetically, requiring an external deflection yoke. The deflection angles are:

- **Diagonal Deflection:** 114°
- **Horizontal Deflection:** 102°
- **Vertical Deflection:** 86°

For beam centering, a permanent magnet (PM) centering magnet capable of producing 0 to 8 gauss may be used. This magnet should extend no more than 2.125" from the Yoke Reference Line (EIA No. 126).

Electrical Characteristics and Capacitances

The direct interelectrode capacitances of the tube are:

- **Cathode to all other electrodes:** approximately 5 pF
- **Grid No. 1 to all other electrodes:** approximately 6 pF
- **External conductive coating to anode (including implosion hardware):** Minimum 1250 pF, Maximum 1750 pF

The capacitance between the external coating and the internal anode acts as a high-voltage filter capacitor when the coating is properly grounded.

Operating Ratings and Typical Cathode Drive Operation

All voltages are specified relative to Grid No. 1.

Absolute Maximum and Minimum Ratings

Parameter	Minimum Value	Maximum Value
Anode Voltage	11,000 V	23,000 V

Parameter	Minimum Value	Maximum Value
Grid No. 4 (Focusing) Voltage	−550 V	+1100 V
Grid No. 2 Voltage	200 V	550 V
Cathode Bias Voltage (Negative)	—	0 V
Cathode Peak Voltage (Negative)	—	2 V
Cathode Bias Voltage (Positive)	—	154 V
Cathode Peak Voltage (Positive)	—	220 V

Heater-Cathode Voltage Limits

The maximum allowable voltage differences between the heater and the cathode depend on polarity and timing:

- **Heater negative to cathode (during warm-up, ≤ 15 seconds):** 450 V maximum
- **Heater negative to cathode (after warm-up):** 300 V maximum
- **Heater positive to cathode:** 200 V maximum

Limiting Circuit Values

- **Maximum Grid No. 1 Circuit Resistance:** 1.5 M Ω
- **Minimum Grid No. 2 & Grid No. 4 Circuit Resistance:** 10,000 Ω

The inclusion of protective resistance in the Grid No. 2 and Grid No. 4 circuits is advised to safeguard the tube against damage from momentary internal arcs.

Typical Cathode Drive Operating Conditions

Under typical operating conditions, the tube is configured with the following parameters:

- **Anode Voltage:** 18,000 V
- **Grid No. 4 Voltage:** 0 to 400 V
- **Grid No. 2 Voltage:** 400 V
- **Cathode Voltage for Raster Cut-off:** 36 to 78 V

Radiation Safety Note

When operating the 19GEP4, shielding may be required to protect against soft X-rays if the anode voltage is allowed to exceed 16 kV.

Technical Summary

The **19GEP4** is a **114° magnetic deflection, low-voltage electrostatic focus** black and white television picture tube. It features a **19-inch diagonal** screen with an **aluminized P4 phosphor** and a **tension-band implosion protection system** that requires grounding. Operating with a **6.3 V, 450 mA heater**, the tube is typically driven via the cathode with an anode voltage of **18,000 V**, requiring a raster cut-off voltage between **36 and 78 V**.

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1965 Westinghouse Data Book

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

1965 WESTINGHOUSE DATA BOOK

Section 1 · Cathode Ray

CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater Voltage	6.3 V	—
Heater Current	450 mA	—
Heater Warm-up Time	11 s	—
Focusing Method	Low Voltage Electrostatic text	—
Deflection Method	Magnetic text	—
Horizontal Deflection Angle	102 deg	Approximate
Vertical Deflection Angle	86 deg	Approximate
Diagonal Deflection Angle	114 deg	Approximate
Phosphor	Aluminized P4 text	—
Fluorescence	White text	—
Persistence	Short to Medium text	—
Light Transmittance	49 percent	Approximate
Cathode-to-All Capacitance	5 pF	Approximate
Grid1-to-All Capacitance	6 pF	Approximate
External Coating-to-Anode Capacitance Minimum	1250 pF	—
External Coating-to-Anode Capacitance Maximum	1750 pF	—

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum Anode Voltage	23000 V	—
Minimum Anode Voltage	11000 V	—

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum Focus Electrode Voltage Positive	1100 V	Grid4
Maximum Focus Electrode Voltage Negative	-550 V	Grid4
Maximum Grid2 Voltage	550 V	—
Minimum Grid2 Voltage	200 V	—
Maximum Heater-Cathode Voltage During Warmup	450 V	Duration<=15s
Maximum Heater-Cathode Voltage After Warmup	300 V	—
Typical Anode Voltage	18000 V	CathodeDrive
Typical Focus Voltage Minimum	0 V	Grid4
Typical Focus Voltage Maximum	400 V	Grid4
Typical Grid2 Voltage	400 V	CathodeDrive
Cathode Voltage for Raster Cutoff Minimum	36 V	CathodeDrive
Cathode Voltage for Raster Cutoff Maximum	78 V	CathodeDrive
Maximum Grid1 Circuit Resistance	1.5 Mohm	—

TUBE TINKER

An independent reference for electronic tubes, vacuum tubes, and their source documents.

[Catalog](#) [Tube types](#) [Full books](#) [Blog](#) [Feedback & corrections](#)

© 2026 Tube Tinker