

ELECTRONIC TUBE REFERENCE

16ANP4

Specialized - Cathode Ray electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION
CONSTRUCTION
CATHODERAY

Sixteen-inch aluminized P4 direct-view picture tube with electrostatic focusing and magnetic deflection. Its white medium-short-persistence screen, wide 114-degree deflection, and roughly 14 kV typical anode operation suit television display service.

GENERAL CHARACTERISTICS

BASE DESIGNATION	—	BASE PINS	—
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	18000 V
Published maximum ratings and characteristics promoted semantically from the approved source.	

16ANP4 — Television Picture Tube

The **16ANP4** is a 16-inch direct-viewed rectangular glass television picture tube designed for use in television receivers. It features a spherical faceplate with a bonded shield, electrostatic focusing, and 114-degree magnetic deflection. The tube utilizes an aluminized P4 phosphor screen that produces white fluorescence with medium-short persistence. It does not require an ion trap and includes an external conductive coating that must be grounded.

The 16ANP4 is closely related to the [16AQP4](#). Both tubes share identical electrical and mechanical specifications, except for the treatment of the safety plate. The 16ANP4 uses the FP125A safety plate, whereas the [16AQP4](#) features an anti-reflection treated safety plate designed to reduce specular reflection.

Construction and Physical Characteristics

The 16ANP4 is built with a J125A glass bulb and a laminated gray filter glass safety plate (FP125A) bonded directly to the face of the tube. This faceplate assembly provides a light transmittance of approximately 60 percent.

Mechanical Dimensions

- **Minimum Useful Screen Dimensions:**
 - Height: 10 1/4 inches
 - Width: 12 3/4 inches
 - Diagonal: 14 7/8 inches
 - Area: 125 square inches
- **Neck Length:** 4 1/8 ± 1/8 inches
- **Overall Length:** 10 7/16 ± 3/8 inches
- **Weight (Approximate):** 9 1/2 pounds

Deflection and Focusing

The tube employs electrostatic focusing and magnetic deflection. The deflection angles are approximately:

- **Horizontal:** 103 degrees
- **Diagonal:** 114 degrees
- **Vertical:** 88 degrees

Connections and Basing

The 16ANP4 uses a **B7-208** base with an **8HR** basing configuration. The high-voltage anode connection is made via a recessed small cavity cap (**J1-21**).

The pin connections (viewed from the bottom of the base) are:

- **Pin 1:** Heater
- **Pin 2:** Grid No. 1
- **Pin 3:** Grid No. 2
- **Pin 4:** Grid No. 4 (Focusing Electrode)
- **Pin 6:** Cathode
- **Pin 7:** Grid No. 1
- **Pin 8:** Heater
- **Recessed Cap:** Anode

Base pin No. 4 aligns with the vertical centerline (A-A') within 30 degrees and is located on the same side as the anode contact (J1-21). The reference line of the tube is determined by plane C-C' of the JEDEC No. 126 Reference Line Gauge when seated against the bulb.

Electrical and Heater Characteristics

The 16ANP4 features an indirectly heated cathode with the following nominal heater ratings:

- **Heater Voltage:** 6.3 Volts
- **Heater Current:** 0.60 ± 5% Ampere
- **Heater Warm-up Time:** 11 Seconds

The heater warm-up time is defined as the time required for the voltage across the heater to reach 80% of its rated value when four times the rated heater voltage is applied to a circuit consisting of the tube heater in series with a resistance. This series resistance is calculated as: $\text{Series Resistance} = 3 \times \frac{\text{Rated Heater Voltage}}{\text{Rated Heater Current}}$ Using the nominal values, this series resistance is: $3 \times \frac{6.3 \text{ V}}{0.60 \text{ A}} = 31.5 \Omega$

Direct Interelectrode Capacitances

- **Cathode to all other electrodes:** 5 pF (approximate)
- **Grid No. 1 to all other electrodes:** 6 pF (approximate)
- **External conductive coating to anode:** 800 pF minimum to 1200 pF maximum

The external conductive coating must be grounded to serve as a high-voltage filter capacitor in conjunction with the internal conductive coating.

Operating Modes and Maximum Ratings

The 16ANP4 can be operated in either **Grid Drive Service** or **Cathode Drive Service**. The maximum ratings are established under the Design Maximum Rating System.

Grid Drive Service Ratings and Typical Operation

In Grid Drive Service, control signals are applied to Grid No. 1 while the cathode is typically held at a reference potential.

Parameter	Maximum Rating (Design Maximum)	Typical Operation
Anode Voltage	18,000 V dc (Max) / 10,000 V dc (Min)	14,000 V dc
Grid No. 4 Voltage (Focusing)	-550 to +1100 V dc	0 to 400 V dc
Grid No. 2 Voltage	550 V dc	300 V dc
Grid No. 1 Voltage (Negative Bias)	155 V dc	—
Grid No. 1 Voltage (Negative Peak)	220 V	—

Parameter	Maximum Rating (Design Maximum)	Typical Operation
Grid No. 1 Voltage (Positive Bias)	0 V dc	—
Grid No. 1 Voltage (Positive Peak)	2 V	—
Grid No. 1 Voltage for Cutoff	—	-33 to -70 V dc

Cathode Drive Service Ratings and Typical Operation

In Cathode Drive Service, control signals are applied to the cathode while Grid No. 1 is typically held at a reference potential.

Parameter	Maximum Rating (Design Maximum)	Typical Operation
Anode Voltage	18,000 V dc (Max) / 10,000 V dc (Min)	14,000 V dc
Grid No. 4 Voltage (Focusing)	-400 to +1250 V dc	0 to 400 V dc
Grid No. 2 Voltage	700 V dc	300 V dc
Cathode Voltage (Positive Bias)	155 V dc	—
Cathode Voltage (Positive Peak)	220 V	—
Cathode Voltage (Negative Bias)	0 V dc	—
Cathode Voltage (Negative Peak)	2 V	—
Cathode Voltage for Cutoff	—	+31 to +57 V dc

Cutoff Characteristics

The cutoff voltages specified above are for the visual extinction of a focused raster. For the cutoff of an undeflected focused spot, the absolute value of the bias between the cathode and Grid No. 1 increases by approximately 5 volts. This means the cutoff range shifts to approximately -38 to -75 V dc for Grid Drive, and +36 to +62 V dc for Cathode Drive.

Peak Heater-Cathode Voltage Ratings

The heater-to-cathode voltage limits are identical for both Grid Drive and Cathode Drive services:

- **Heater Negative with Respect to Cathode:**

- During warm-up period (not to exceed 15 seconds): 450 Volts
- After equipment warm-up period: 200 Volts
- **Heater Positive with Respect to Cathode:** 200 Volts

Circuit Values

The maximum allowable Grid No. 1 circuit resistance is **1.5 Megohms**.

Safety and Operational Precautions

Because the 16ANP4 operates at high anode voltages, X-ray radiation shielding may be necessary to protect against potential personal injury from prolonged exposure at close range. This precaution is particularly critical if the tube is operated at voltages higher than the maximum rated anode voltage or 16,000 volts, whichever is less.

Additionally, the external conductive coating must be securely grounded to ensure safe operation and proper filtering of the high-voltage anode supply.

Technical Summary

The **16ANP4** is a 16-inch, 114-degree magnetic deflection television picture tube featuring electrostatic focusing, a bonded safety shield, and an aluminized P4 screen. It operates with a 6.3 V, 0.60 A heater and is designed for either Grid Drive or Cathode Drive service. With an anode voltage rating of up to 18,000 V dc, it provides a bright, high-contrast display suitable for direct-view television applications. The 16ANP4 is identical to the [16AQP4](#), with the latter featuring an anti-reflection treated safety plate.



SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1950 Sylvania

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

1950 SYLVANIA

Section 1 · Cathode Ray

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum Plate Voltage	18000 V	—
Typical Anode Voltage	14000 V	—

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Phosphor	P4	—
Focusing Method	Electrostatic	—
Deflecting Method	Magnetic	—



SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1965 Sylvania Electronic Tubes Vol3

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

1965 SYLVANIA ELECTRONIC TUBES VOL3

Section 1 · Cathode Ray

CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater Voltage	6.3 V	—
Heater Current	600 mA	—
Focusing Method	Electrostatic text	—
Deflection Method	Magnetic text	—
Fluorescence	White text	—

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Persistence	Medium Short text	—
Phosphor	Aluminized P4 text	—
Deflection Angle	114 deg	Diagonal
Light Transmittance	60 percent	Approximate

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum Anode Voltage	18000 V	GridDriveOrCathodeDrive
Minimum Anode Voltage	10000 V	GridDriveOrCathodeDrive
Focus Voltage Minimum	-550 V	GridDrive; Grid4
Focus Voltage Maximum	1100 V	GridDrive; Grid4
Maximum Grid2 Voltage	550 V	GridDrive
Anode Voltage	14000 V	GridDrive
Focus Voltage Minimum	0 V	GridDrive; Grid4
Focus Voltage Maximum	400 V	GridDrive; Grid4
Grid2 Voltage	300 V	GridDrive
Grid1 Cutoff Voltage Minimum	-70 V	GridDrive
Grid1 Cutoff Voltage Maximum	-33 V	GridDrive
Cathode Cutoff Voltage Minimum	31 V	CathodeDrive
Cathode Cutoff Voltage Maximum	57 V	CathodeDrive
Maximum Grid1 Circuit Resistance	1.5 Mohm	—

TUBE TINKER

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