



ELECTRONIC TUBE REFERENCE

12AZP4

Specialized - Cathode Ray electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION
CONSTRUCTION
CATHODERAY

Cathode-ray display tube documented by manufacturer data for type 12AZP4; available extracted source information is sparse, so no more specialized application or construction claim is made.

GENERAL CHARACTERISTICS

BASE DESIGNATION	B7-208	BASE PINS	7
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	14000 V
MAXIMUM SCREEN VOLTAGE	550 V

12AZP4 — 110° Deflection Squared Corner Picture Tube

The **12AZP4** is a directly viewed, rectangular 12-inch glass picture tube designed for television applications. It features a squared-corner screen geometry, an aluminized screen, and a wide 110-degree diagonal deflection angle. The design incorporates a relatively flat, compound radius faceplate to minimize outer light reflection and improve picture clarity. Additionally, the tube utilizes a highly compact electron gun structure that minimizes deflection distortion and eliminates the need for an external ion trap magnet.

Mechanical and Optical Design

The 12AZP4 is constructed with a rectangular glass envelope and a specialized faceplate designed to optimize the viewing area while reducing glare. The mechanical and optical specifications of the tube include:

- **Overall Length:** $9\text{-}5/16 \pm 1/4$ inches
- **Neck Length:** $4\text{-}1/8 \pm 1/8$ inches
- **Neck Diameter:** $1\text{-}1/8$ inches
- **Weight:** Approximately 5.3 pounds
- **Screen Dimensions (Projected Minimum):**
 - **Diagonal:** $11\text{-}5/16$ inches
 - **Horizontal Axis:** $9\text{-}13/16$ inches
 - **Vertical Axis:** $7\text{-}11/16$ inches
 - **Useful Area:** Approximately 71 square inches
- **Phosphor:** P4-Sulfide type, aluminized
- **Light Transmittance:** Approximately 78% at the center of the faceplate
- **Bulb Contact:** JEDEC No. J1-21
- **Base:** JEDEC No. B7-208 ("neoceight" 7-pin integral glass button type with straight-through leads and an indexing plug)
- **Basing Designation:** 8HR

The bulb contact (anode terminal) is aligned with pin position No. 7 at an angle of 30 degrees. The plane passing through the tube axis and pin No. 4 may vary from the plane through the tube axis and the ultor terminal by an angular tolerance of ± 30 degrees, with the ultor terminal positioned on the same side as pin No. 4.

Electrical Characteristics and Heater Ratings

The 12AZP4 utilizes electrostatic focusing and magnetic deflection. Its internal structure and heater are designed for reliable operation under standard television receiver conditions.

Heater Specifications

- **Heater Voltage:** 6.3 V
- **Heater Current:** 0.6 A
- **Heater Warm-up Time:** 11 seconds

Direct Interelectrode Capacitances

- **Cathode to All Other Electrodes:** Approximately 5 pF
- **Grid No. 1 to All Other Electrodes:** Approximately 6 pF
- **External Conductive Coating to Anode:** 400 pF minimum, 900 pF maximum

Deflection Angles

- **Diagonal:** 110 degrees
- **Horizontal:** 101 degrees
- **Vertical:** 82 degrees

Maximum Ratings (Design Maximum Values)

The following maximum and minimum limits are established under the Design Maximum Rating System. Unless otherwise specified, all voltage values are positive and measured with respect to the cathode.

- **Anode Voltage:** 14,000 V maximum, 9,000 V minimum
- **Grid No. 4 (Focusing Electrode) Voltage:** -550 V to +1,100 V
- **Grid No. 2 Voltage:** 200 V minimum, 550 V maximum
- **Grid No. 1 Voltage:**
 - **Maximum Negative DC Value:** 154 V
 - **Maximum Negative Peak Value:** 200 V
 - **Maximum Positive DC Value:** 0 V
 - **Maximum Positive Peak Value:** 2 V
- **Maximum Heater-Cathode Voltage:**
 - **Heater Negative with Respect to Cathode (Warm-up period not to exceed 15 seconds):** 450 V
 - **Heater Negative with Respect to Cathode (After warm-up):** 200 V
 - **Heater Positive with Respect to Cathode:** 200 V
- **Maximum Grid No. 1 Circuit Resistance:** 1.5 Megohms

Typical Operating Conditions and Drive Services

The 12AZP4 can be operated in either Grid Drive Service or Cathode Drive Service. The operating parameters for each configuration are detailed below.

Grid Drive Service

In this configuration, all voltage values are positive and measured with respect to the cathode:

- **Anode Voltage:** 10,000 V
- **Grid No. 4 (Focusing Electrode) Voltage:** 0 to 400 V
- **Grid No. 2 Voltage:** 400 V
- **Grid No. 1 Voltage (for visual extinction of focused raster):** -36 to -94 V

Cathode Drive Service

In this configuration, all voltage values are positive and measured with respect to Grid No. 1:

- **Anode Voltage:** 10,000 V

- **Grid No. 4 (Focusing Electrode) Voltage:** 0 to 400 V
- **Grid No. 2 Voltage:** 400 V
- **Cathode Voltage (for visual extinction of focused raster):** 36 to 78 V

Focus and Performance Notes

Individual tubes achieve satisfactory electrostatic focus at a specific voltage value between 0 and +400 V. This focus range is determined with the combined Grid No. 1 bias voltage and video-signal voltage adjusted to produce an anode current of 100 microamperes on a 7-11/16" x 9-13/16" pattern (such as that from an RCA [2F21](#) Monoscope or equivalent).

Installation and Handling Precautions

When installing and operating the 12AZP4, several physical and electrical precautions must be observed:

1. **Socket Mounting:** The socket for the "neoceighter" base must not be rigidly mounted. It should have flexible leads and be allowed to move freely so that the circuit wiring does not impress lateral strains on the base pins. The bottom circumference of the base wafer falls within a 1-3/4 inch diameter circle concentric with the bulb axis.
2. **Grounding:** The external conductive coating must be grounded to ensure proper electrical operation and safety.
3. **Cleaning:** The insulating coating area of the bulb must be kept clean. If cleaning is required, it should be wiped only with a soft, dry, lintless cloth.
4. **Reference Line:** The reference line of the tube is determined using a JEDEC No. 126 reference-line gauge. When the tube neck is inserted through the flared end of the gauge and seated, the reference line is defined by the intersection of the CC' plane of the gauge with the glass funnel.
5. **X-ray Radiation Warning:** If the tube is operated at voltages higher than the maximum rated anode voltage (14,000 V) or 16,000 V (whichever is less), X-ray radiation shielding may be necessary to protect against potential personal injury from prolonged close-range exposure.

Technical Summary

The **12AZP4** is a 12-inch, 110-degree deflection rectangular picture tube featuring electrostatic focusing, magnetic deflection, and a short electron gun design that eliminates the need for an ion trap magnet. Operating with a standard 6.3 V, 0.6 A heater, it provides a 71-square-inch useful screen area utilizing an aluminized P4-sulfide phosphor. With design maximum ratings supporting anode voltages up to 14,000 V, the tube is highly adaptable to both grid-drive and cathode-drive circuitry, making it a versatile component for compact television receiver designs.



SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1963 Hitachi

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

1963 HITACHI

Section 1 · Cathode Ray

CAPACITANCE

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Interelectrode capacitances published	1	See source table

CHARACTERISTIC

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater Warm-up Time	11 s	—

OTHER

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum Anode Voltage	14000 V	—

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