



ELECTRONIC TUBE REFERENCE

10AJP4

Specialized - Cathode Ray electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION
CONSTRUCTION
CATHODERAY

Direct-view P4 cathode-ray picture tube with electrostatic focusing and 90-degree magnetic deflection, typically operated around 16 kV and rated for a maximum accelerator voltage of 20 kV.

GENERAL CHARACTERISTICS

BASE DESIGNATION	B5-57	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

SECTION 0 Cathode Ray

No fixed ratings recorded.

CRT electrode ratings, focusing/deflection data, capacitances, and operating voltages are preserved in parameter rows.

10AJP4 — Electrostatic Focus Cathode Ray Tube

A 10-inch rectangular, all-glass cathode ray tube featuring magnetic deflection, automatic electrostatic focus, and an aluminized white phosphor screen for display applications.

Overview

The **10AJP4** is a 10-inch rectangular cathode ray tube (CRT) designed for reliable display systems. It features a straight electron gun design with automatic electrostatic focusing, which eliminates the need for an external, adjustable focus power supply. The tube utilizes magnetic deflection with a nominal diagonal deflection angle of 90 degrees.

The "P4" designation specifies the use of a standard white-emitting phosphor screen. This screen is fully aluminized to maximize light output and prevent screen charging effects during operation. To enhance display contrast under ambient lighting, the tube is constructed with a gray filter glass faceplate offering approximately 80% light transmission.

Mechanical Design and Physical Dimensions

The 10AJP4 is built around an all-glass rectangular envelope (bulb number J83-A1) with a robust mechanical structure. The physical dimensions and alignment tolerances are tightly controlled to facilitate precise mounting in display chassis:

- **Overall Length:** 10-7/8 ± 5/16 inches
- **Neck Length:** 5-1/2 ± 3/16 inches
- **Greatest Bulb Dimensions:**
 - **Diagonal:** 10-3/8 ± 1/8 inches
 - **Width:** 9-3/4 ± 1/8 inches
 - **Height:** 7-1/2 ± 1/8 inches
- **Minimum Useful Screen Dimensions:** 9-1/16 × 6-5/8 inches
- **Approximate Weight:** 4 pounds

The tube features a recessed small cavity bulb contact (J1-21) for the high-voltage anode connection. This contact is aligned on the same side as pin number 6 of the base, with an alignment tolerance of ±30 degrees relative to the vacant pin 6 position. The reference line of the envelope is determined by the point where a JEDEC G-126 reference gauge stops.

Electrical Characteristics and Basing

The 10AJP4 utilizes an indirectly heated cathode. The heater is designed for AC or DC operation, and the tube features low direct interelectrode capacitances, which minimizes loading on drive circuitry.

Heater and Capacitance Ratings

Parameter	Value
Nominal Heater Voltage	6.3 V
Nominal Heater Current	0.6 A ± 10%
Cathode to All Other Electrodes Capacitance	5 pF (approx.)
Grid No. 1 to All Other Electrodes Capacitance	6 pF (approx.)

Basing Configuration

The tube uses a **Small Shell Duodecal 5-Pin base (B5-57)** with a **12-S** basing arrangement. The electrical connections, viewed from the bottom of the base, are assigned as follows:

Pin Number	Element
1	Heater
2	Grid No. 1 (Control Grid)
6	Vacant (No connection; used for alignment reference)
10	Grid No. 2 (Screen Grid)
11	Cathode
12	Heater
Cap	Anode (J1-21 Recessed Cavity)

Typical Operating Conditions and Performance

Under typical operating conditions, the focusing electrode is internally connected to Grid No. 2, simplifying external circuitry by removing the need for a dedicated focus voltage source. This configuration provides excellent focus across the entire screen at normal drive levels.

The typical operating parameters and performance metrics are defined as follows:

- **Anode Voltage:** 16,000 V DC
- **Grid No. 2 Voltage:** 300 V DC
- **Grid No. 1 Voltage (for visual extinction of focused raster):** -35 to -72 V DC
- **Spot Position:** The undeflected and focused spot will fall within a 1/4-inch radius circle concentric with the physical center of the tube face, provided the tube is adequately shielded from external magnetic and electrical influences.
- **Line Width:** Typically 0.010 inch, measured at an anode current of 100 μ Adc.
- **Resolution Capability:** The tube is capable of resolving a minimum of 600 lines, ensuring high-definition rendering of text and graphics.

Maximum Ratings and Circuit Limits

The following limits are specified under the Design Maximum Rating System. Operating the tube beyond these limits may impair reliability or cause permanent damage.

Electrode Voltage Limits

- **Anode Voltage:** 20,000 V DC maximum
- **Grid No. 2 Voltage:** 550 V DC maximum
- **Grid No. 1 Voltage:**
 - **Negative Bias Value:** 155 V DC maximum
 - **Positive Bias Value:** 0 V DC maximum

- **Positive Peak Value:** 2 V maximum

Heater-Cathode Voltage Limits

To prevent insulation breakdown between the heater and the cathode, the potential difference must be kept within the following limits:

- **Heater Negative to Cathode:**
 - **During the 15-second warm-up period:** 450 V maximum
 - **After warm-up:** 200 V maximum
- **Heater Positive to Cathode:** 200 V maximum

Circuit Impedance Limits

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

Related Phosphor Designations

The 10AJP- family of cathode ray tubes is available with alternative phosphor screens to suit different display requirements. While the **10AJP4** features a medium-persistence white screen optimized for standard television and general-purpose displays, other variants include:

- **10AJP7:** Features a long-persistence screen with white fluorescence and yellow phosphorescence, suitable for radar or slow-scan applications.
- **10AJP31:** Features a medium-short persistence screen with yellow-green fluorescence and yellow-green phosphorescence, optimized for high-contrast visual displays and photographic recording.

These variants share identical mechanical dimensions, basing, and electrical ratings, differing only in their optical persistence and emission color characteristics.

Technical Summary

The **10AJP4** is a 10-inch rectangular, magnetic deflection CRT featuring an automatic electrostatic focus straight gun and a fully aluminized P4 white phosphor screen. Operating at a typical anode voltage of 16,000 V DC and a Grid No. 2 potential of 300 V DC, it delivers a typical line width of 0.010 inch and is capable of resolving at least 600 lines. Its design simplifies system integration by internally connecting the focusing electrode to Grid No. 2, eliminating the need for an external focus supply. Housed in a J83-A1 glass bulb with a B5-57 Duodecal 5-pin base, the 10AJP4 provides a robust, high-resolution display solution within a compact 10-7/8 inch overall length.

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1951 Thomas Electronics

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

1951 THOMAS ELECTRONICS

Section 0 · Cathode Ray

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
FocusingMethod	Electrostatic	—
DeflectionMethod	Magnetic	—
Deflection Angle	90 degree	—
Heater Voltage	6.3 V	—
Heater Current	600 mA	—
LineWidth	0.01 in	Typical

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
MaximumMainAnodeOrAcceleratorVoltage	20000 V	—
TypicalMainAnodeOrAcceleratorVoltage	16000 V	—
Maximum Grid2 Voltage	550 V	—
Typical Grid2 Voltage	300 V	—
Grid1CutoffVoltage	-72--35 V	—
WarmupHeaterCathodeVoltage	450 V	15SecondWarmup
Maximum Heater Cathode Voltage	200 V	AfterWarmup

CAPACITANCE		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Cathode To All Capacitance	5 pF	—
Grid1 To All Capacitance	6 pF	—

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