

ELECTRONIC TUBE REFERENCE

16TO4A

Specialized - Cathode Ray electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION
CONSTRUCTION
CATHODERAY

Cathode-ray display tube documented by Cintel, with published modulator, cathode, and first-anode capacitances; available extracted data does not support a narrower application classification.

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	16000 V
Published ratings and characteristics promoted from the approved datasheet.	

16TO4A — Magnetic Focus and Deflection Radar Tube

The **16TO4A** is a specialized cathode ray tube (CRT) with a nominal diameter of 16 inches, designed primarily for radar display applications. It utilizes magnetic focusing and magnetic deflection methods to control and direct the electron beam. The tube features an aluminium-backed screen with long-persistence orange fluorescence and afterglow, making it highly suitable for displaying radar sweeps and target tracks.

Screen and Optical Characteristics

The 16TO4A is equipped with an aluminium-backed screen designed to optimize light output and prevent screen charging. The screen exhibits specific phosphor characteristics tailored for radar applications:

- **Fluorescence:** Orange
- **Afterglow:** Orange
- **Persistence of Afterglow:** Long

The minimum useful screen diameter is 370 mm, providing a large, clear viewing area. Under typical operating conditions, the undeflected focused spot is highly centered; the center of the undeflected focused spot falls within a circle having a 15 mm radius concentric with the physical center of the tube face.

Electrical Characteristics and Operating Points

The 16TO4A operates with an indirectly heated cathode. The heater can be supplied by either alternating current (a.c.) or direct current (d.c.).

Heater Specifications

- **Heater Voltage:** 6.3 V
- **Heater Current:** 0.6 A
- **Calculated Heater Power:** 3.78 W (calculated as 6.3 V % 0.6 A)

Direct Inter-electrode Capacitances

The tube exhibits low direct inter-electrode capacitances, which helps maintain signal integrity:

- **Modulator to all other electrodes:** 9.0 pF
- **Anode 1 to all other electrodes:** 6.0 pF
- **Cathode to all other electrodes:** 8.0 pF

Typical Operating Conditions

For standard operation, the tube is configured with the following typical electrical parameters:

- **Final Anode Voltage:** 15.0 kV
- **Anode 1 Voltage:** 300 V
- **Modulator Voltage for Cut-off:** -30 to -90 V

Mechanical Construction and Base Connections

The 16TO4A is constructed with a robust glass envelope and can be mounted in any position. It features a B12A base and a BSS448/C.T.7 anode cap.

Physical Dimensions

- **Overall Length:** 512 % 5 mm
- **Greatest Diameter of Bulb:** 409 mm
- **Minimum Useful Screen Diameter:** 370 mm

Pin Configuration (B12A Base)

The electrical connections to the internal electrodes are mapped to the B12A base pins as follows:

Pin Number	Connection
Pin 1	Heater
Pin 2	Grid
Pin 6	No connection
Pin 10	Anode 1
Pin 11	Cathode
Pin 12	Heater

Mechanical Alignment and Installation

Precise physical alignment is required for proper operation:

- **Anode Cap and Spigot Key Alignment:** The plane passing through the tube axis and the spigot key may vary from the plane passing through the tube axis and the anode cap by an angular tolerance of up to 10%, measured about the tube axis. The anode cap is located on the same side of the tube as the spigot key.
- **Reference Line Determination:** The reference line of the tube is determined by the position where a cylindrical gauge with an internal diameter (I.D.) of 36 mm and a length of 50 mm rests on the bulb cone.
- **Focusing Coil Positioning:** The focusing coil must be positioned such that the center line of its air gap is approximately 118 mm from the established reference line.

Maximum Ratings

To ensure reliable operation and prevent damage to the tube, the following maximum ratings must not be exceeded:

Parameter	Maximum Rating
Final Anode Voltage	16.0 kV
Anode 1 Voltage	600 V
Modulator Voltage (Negative bias value)	–180 V
Modulator Voltage (Positive bias value)	0 V
Peak Heater-Cathode Voltage (Heater negative with respect to cathode)	150 V

Parameter	Maximum Rating
Peak Heater-Cathode Voltage (Heater positive with respect to cathode)	150 V

Technical Summary

The **16TO4A** is a 16-inch nominal diameter radar cathode ray tube featuring magnetic focus and magnetic deflection. It is characterized by an aluminium-backed screen with long-persistence orange fluorescence and afterglow. Operating with a 6.3 V, 0.6 A heater, the tube typically runs at a final anode voltage of 15.0 kV and an Anode 1 voltage of 300 V, with a modulator cut-off range of –30 to –90 V. Its physical design incorporates a B12A base, a BSS448/C.T.7 anode cap, and strict mechanical alignment tolerances for the focusing coil and anode cap relative to the spigot key.

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

196X Cintel

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

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Section 1 · Cathode Ray

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Modulator to all other electrodes capacitance	9 pF	Published datasheet value
Cathode to all other electrodes capacitance	8 pF	Published datasheet value
Anode 1 to all other electrodes capacitance	6 pF	Published datasheet value

TUBE TINKER

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