



ELECTRONIC TUBE REFERENCE

1403AB

Specialized - Cathode Ray electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION
CONSTRUCTION
CATHODERAY

Cathode-ray display tube with electrostatic focusing and magnetic deflection for radar, monitor, and display service. Its green A-type phosphor has ultra-short persistence, favoring rapidly changing traces and high-refresh displays.

GENERAL CHARACTERISTICS

BASE DESIGNATION	—	BASE PINS	—
NOMINAL HEATER	6.3 V / 300 mA	PARALLEL HEATER	— / —
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION 1 Cathode Ray	
MAXIMUM PLATE VOLTAGE	15000 V
<i>Published Ferranti ratings, capacitances, and typical operating data promoted where applicable; additional electrical values retained as parameters.</i>	

1403AB — Flying Spot Scanner Tube

The **1403AB** is a 14-inch diagonal rectangular cathode-ray tube designed primarily for general flying spot scanner applications. Manufactured by Ferranti, it features a metal-backed screen, an external conductive coating, low-voltage electrostatic focusing, and magnetic deflection. The tube is characterized by its Type 'A' phosphor, which provides green fluorescence with ultra-short persistence.

Physical Construction and Base Connections

The 1403AB is constructed with a rectangular glass envelope and has a nominal neck diameter of 37 mm (specified as 36.5 ± 1.5 mm in mechanical drawings). The tube has a maximum overall length of 420 mm

(with a design dimension of 410 ± 10 mm) and can be mounted in any position.

The faceplate features a 686 mm radius of curvature, and the bulb design provides a 65-degree deflection angle. The useful screen area is defined by a minimum width of 292 mm, a minimum height of 218 mm, and a minimum diagonal of 323 mm, with an overall diagonal dimension of 348 ± 3 mm.

An external conductive coating is applied to the envelope, which provides an approximate capacitance of 1100 pF to the anode and may be utilized for extra-high tension (E.H.T.) smoothing. The tube utilizes a **B12A (Duodecal)** base and a **CT8 (Cavity Type)** anode cap.

The B12A base connections, viewed from the underside, are allocated as follows:

Pin	Connection
Pin 1	Heater
Pin 2	Grid
Pin 3	No Pin
Pin 4	No Pin
Pin 5	No Pin
Pin 6	3rd Anode
Pin 7	No Connection
Pin 8	No Pin
Pin 9	No Pin
Pin 10	1st Anode
Pin 11	Cathode
Pin 12	Heater
Side Contact	2nd Anode, 4th Anode

Heater and Electrical Ratings

The 1403AB is equipped with an indirectly heated cathode. The nominal heater requirements and absolute electrical ratings are defined to ensure reliable operation:

Heater Characteristics

- **Heater Voltage:** 6.3 V
- **Heater Current:** 0.3 A
- **Series Operation Limit:** Under series connection, the surge heater voltage must not exceed 9.5 V r.m.s. A current-limiting device must be incorporated in the circuit to restrict the switching surge.

Absolute Maximum and Minimum Ratings

- **Maximum First Anode (A_1) Voltage:** 500 V
- **Minimum First Anode (A_1) Voltage:** 200 V
- **Maximum Combined Second and Fourth Anode ($A_2 + A_4$) Voltage:** 15 kV
- **Minimum Combined Second and Fourth Anode ($A_2 + A_4$) Voltage:** 8 kV
- **Maximum Positive Third Anode (A_3) Voltage:** +500 V
- **Maximum Negative Third Anode (A_3) Voltage:** -500 V
- **Maximum Heater-to-Cathode Voltage (V_{h-k}):** 200 V
- **Maximum Grid-to-Cathode Resistance (R_{g-k}):** 1.5 M Ω
- **Maximum Heater-to-Cathode Resistance (R_{h-k}):** 1.0 M Ω

Typical Operating Conditions and Capacitances

Under typical operating conditions, the electrostatic focusing and grid bias parameters are configured as follows:

- **First Anode (A_1) Voltage:** 300 V
- **Second and Fourth Anode ($A_2 + A_4$) Voltage:** 12 kV
- **Third Anode (A_3) Voltage for Focus:** -300 to +300 V (the point of optimum focus lies within this range)
- **Grid Voltage (V_g) for Visual Cut-off:** -40 to -80 V

The grid must never be allowed to become positive with respect to the cathode during normal operation. An exception is permitted immediately after switching off the device, during which the grid voltage may rise to a maximum of +1 V.

Interelectrode Capacitances

- **Cathode to all other electrodes (C_{k-all}):** < 8 pF
- **Grid to all other electrodes (C_{g-all}):** < 8 pF
- **Anode to external conductive coating ($C_{a-ext.coating}$):** Approximately 1100 pF

Related Phosphor Designations

The 1403AB belongs to a family of closely related flying spot scanner tubes sharing identical physical dimensions, electrical ratings, and base configurations, but differing in screen phosphor characteristics:

- **1403AB:** Features Type 'A' phosphor with green fluorescence and ultra-short persistence.
- **14/03QB:** Features Type 'Q' phosphor with blue/violet fluorescence and killed persistence.
- **14/03Q2B:** Features Type 'Q2' phosphor with magenta fluorescence. For applications utilizing this variant, a blue filter should be provided for the associated photocell to separate the two color peaks, which exhibit different persistence times.

Technical Summary

The **1403AB** is a specialized 14-inch rectangular flying spot scanner tube featuring magnetic deflection and low-voltage electrostatic focusing. Operating with a 6.3 V, 0.3 A heater, the tube is designed for high-voltage operation with a typical anode potential of 12 kV and a first anode potential of 300 V. Its B12A Duodecal base and CT8 cavity cap provide robust connections for its multi-anode configuration. With its Type 'A' green phosphor and ultra-short persistence, the 1403AB is optimized for high-speed optical scanning applications requiring rapid decay times.

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1963 Ferranti

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

1963 FERRANTI

Section 1 · Cathode Ray

CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Focusing method	Electrostatic	—
Deflection method	Magnetic	—
Fluorescence	Green	—
Persistence	Ultra short	—

CONSTRUCTION		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Phosphor type	A	—

APPLICATION		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Application	Radar / monitor / display CRT	—

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
First-anode voltage maximum	500 V	—
Second/fourth-anode voltage maximum	15000 V	—
Third-anode positive voltage maximum	500 V	—
Third-anode negative voltage maximum	-500 V	—
Heater-cathode voltage maximum	200 V	—
First-anode operating voltage	300 V	—

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Second/fourth-anode operating voltage	12000 V	—
Third-anode focus voltage minimum	-300 V	—
Third-anode focus voltage maximum	300 V	—

CAPACITANCE		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Cathode-to-all capacitance maximum	8 pF	—
Grid-to-all capacitance maximum	8 pF	—
External-coating capacitance approximate	1100 pF	—

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