



ELECTRONIC TUBE REFERENCE

1629

Tuning Indicator electronic tube

CONSOLIDATED TECHNICAL DATA

2 SECTIONS

CONSTRUCTION

TRIODE-TUNING INDICATOR

Magic-eye tuning indicator combining a triode control section with a fluorescent electron-ray display for receiver tuning indication.

GENERAL CHARACTERISTICS

BASE DESIGNATION	7AL	BASE PINS	7
NOMINAL HEATER	12.6 V / 150 mA	PARALLEL HEATER	– / –
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Dissimilar

SECTION RATINGS

SECTION 1 Triode

MAXIMUM PLATE VOLTAGE	250 V
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Internal control-amplifier triode section.

SECTION 2 Tuning Indicator

MAXIMUM PLATE VOLTAGE	250 V
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Circular fluorescent target indicator section.

1629 — Electron-Ray Tuning Indicator Tube

An indirectly heated, octal-based "Magic Eye" visual indicator tube containing a triode unit and a fluorescent target, designed for voltage indication and tuning applications.

Overview

The **1629** is a specialized electron-ray tube, commonly referred to as a "Magic Eye" tuning indicator. It integrates a triode amplifier and a circular fluorescent target within a single T-9 glass envelope. The primary function of the 1629 is to provide a visual representation of voltage changes, making it highly useful as a tuning indicator in radio receivers and as a voltage indicator in specialized equipment, such as aircraft electronics.

The 1629 is closely related to the **6E5** electron-ray tube. Physically and electrically, the 1629 and **6E5** are identical in their indicator behavior, operating curves, and internal structure, with the sole exception of their heater ratings. While the **6E5** operates on a standard 6.3 V, 0.3 A heater, the 1629 is designed for a 12.6 V, 0.15 A heater supply, making it suitable for series-string heater chains or higher-voltage mobile and aviation power systems.

Construction, Mechanical Specifications, and Pinout

The 1629 features a **coated unipotential cathode** that is indirectly heated. The tube is housed in a T-9 glass bulb and utilizes a small shell octal base. The physical construction is designed to allow mounting in **any position**. To assist with physical alignment in equipment, the plane of the ray-control electrode is aligned such that it passes directly through the tube axis and the base key.

Mechanical Dimensions

- **Overall Length:** 3-15/16 inches $\pm$ 3/16 inch (up to a maximum of 4-3/16 inches)
- **Seated Height:** 3-3/8 inches $\pm$ 3/16 inch
- **Maximum Diameter:** 1-3/16 inches (or 1.165 inches maximum)

Heater Characteristics

- **Heater Voltage (AC or DC):** 12.6 V
- **Heater Current:** 0.15 A
- **Heater Supply:** AC or DC

Heater Power Calculation

Using the nominal heater voltage of 12.6 V and the nominal heater current of 0.15 A, the calculated power consumption of the heater is:

$$12.6 \text{ V} * 0.15 \text{ A} = 1.89 \text{ W}$$

Base Connections (7AL Bottom View)

The 1629 utilizes a small shell octal 7-pin base. The pin assignments, viewed from the bottom of the tube, are as follows:

Pin Number	Connection	Description
Pin 1	NC	No Connection
Pin 2	h	Heater
Pin 3	p	Triode Plate
Pin 4	t	Target
Pin 5	g	Triode Grid
Pin 6	NP	No Pin (omitted in 7-pin octal configuration)
Pin 7	h	Heater
Pin 8	k	Cathode

Electrical Ratings

The maximum and minimum ratings for the 1629 are established under the design-center rating system for indicator service:

Parameter	Rating Value
Maximum Plate-Supply Voltage	250 V
Maximum Target Voltage	250 V
Minimum Target Voltage	100 to 125 V
Maximum DC Heater-Cathode Potential	90 V

The minimum target voltage limit (specified as 125 V by some manufacturers and 100 V by others) is necessary to ensure adequate brightness and definition of the fluorescent pattern on the target.

Typical Operating Conditions and Indicator Characteristics

The 1629 operates by varying the shadow angle of the circular fluorescent target. This shadow angle is controlled by the voltage applied to the triode grid. When the grid bias is zero, the shadow angle is at its maximum of approximately 90° (open eye). As the grid is biased more negatively, the shadow narrows until it reaches 0° (closed eye).

Typical operating parameters across different supply voltages are outlined below:

Parameter	100 V Supply	200 V Supply	250 V Supply
Plate and Target Supply Voltage	100 V	200 V	250 V
Series Triode Plate Resistor	0.5 MΩ	1.0 MΩ	1.0 MΩ
Target Current (at grid bias of 0 V)	1 mA	3 mA	2 to 4 mA
Triode Plate Current (at grid bias of 0 V)	0.19 to 0.2 mA	0.19 to 0.2 mA	0.24 mA
Grid Voltage for 0° Shadow Angle	-3.3 V	-6.5 V	-7.5 to -8.0 V
Grid Voltage for 90° Shadow Angle	0 V	0 V	0 V

Note: The target current is subject to wide variations in practical operation.

Circuit Operation and Curve Interpretation

In a typical indicator circuit, the triode plate of the 1629 is connected to the plate supply voltage through a high-value series resistor (typically 0.5 to 1.0 megohm), often designated as resistor R. The triode plate is also internally connected to the ray-control electrode.

When the triode grid voltage is at 0 V, the triode section conducts maximum current. This current flows through the series plate resistor, causing a significant voltage drop across it. As a result, the potential on the triode plate (and thus the ray-control electrode) falls well below the target voltage. The electrostatic field of the ray-control electrode repels the electrons flowing toward the target, casting a wide shadow (approximately 90°) on the circular fluorescent screen.

When a negative control voltage (such as an automatic volume control voltage) is applied to the triode grid, the triode plate current is reduced. This decreases the voltage drop across the series plate resistor, raising the potential of the ray-control electrode closer to the target potential. The electrostatic deflecting field weakens, allowing electrons to strike the target in the shadow area, thereby narrowing the shadow angle toward 0°.

Because the internal triode and indicator structure of the 1629 is identical to that of the [6E5](#), the characteristic curves—including plate current versus grid voltage and shadow angle versus grid voltage—are identical to those published for the [6E5](#).

Technical Summary

The **1629** is an octal-based, indirectly heated **electron-ray tuning indicator** featuring a **12.6 V, 0.15 A heater** and a unipotential cathode. It combines a control triode and a circular fluorescent target in a T-9 glass envelope. Designed for visual voltage indication, it operates with a maximum plate and target supply

of **250 V** and controls a shadow angle from **90° to 0°** using a grid control voltage range of **0 V to -8.0 V** (with a 1.0 megohm series plate resistor). Except for its 12.6 V heater, the 1629 is identical to the [6E5](#) and is particularly suited for aircraft and series-string applications.



SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1958 Brimar Radio Valve No 7

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

1958 BRIMAR RADIO VALVE NO 7

Section 2 · Tuning Indicator

CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Anode Supply Voltage	250 V	—
Anode Current	0.24 mA	—
Target Voltage	250 V	—
Target Current	4 mA	—
Grid Voltage for Zero Shadow Angle	-8 V	—



SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

195X General Electric Essential Characteristics

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

195X GENERAL ELECTRIC ESSENTIAL CHARACTERISTICS

Section 2 · Tuning Indicator

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Target voltage maximum	250 V	TuningIndicator
Target voltage minimum	125 V	TuningIndicator
Plate voltage	250 V	TuningIndicator
Plate series resistance	1000000 Ω	TuningIndicator
Target voltage	250 V	TuningIndicator

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Grid voltage	-8 V	Shadow0Degrees
Grid voltage	0 V	Shadow90Degrees
Plate current	0.24 mA	Shadow90Degrees
Target current	4 mA	TuningIndicator



SOURCE DATA APPENDIX

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1960 RCA Industrial and Communications Types

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

1960 RCA INDUSTRIAL AND COMMUNICATIONS TYPES

Section 1 · Triode

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Triode plate resistor	1 Mohm	—
Triode plate current	0.2 mA	GridBias=0V

1960 RCA INDUSTRIAL AND COMMUNICATIONS TYPES

Section 2 · Tuning Indicator

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate and target supply	250 V	—
Shadow angle	90 deg	GridBias=0V
Shadow angle	0 deg	GridBias=-7V



SOURCE DATA APPENDIX

1961 Tung Sol

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

1961 TUNG SOL

Section 1 · Triode

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum Plate Supply Voltage	250 V	—
Plate And Target Supply Voltage	200 V	—
SeriesTriodePlateResistor	1 Mohm	—

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
TriodePlateCurrent	0.19 mA	GridVoltage=0V;Supply=200V

1961 TUNG SOL

Section 2 · Tuning Indicator

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum Target Voltage	250 V	—
Minimum Target Voltage	100 V	—



SOURCE DATA APPENDIX

1971 RCA HB3 Binder 3 of 7

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

Section 2 · Tuning Indicator

CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Voltage	12.6 V	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
Current	0.15	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
Pin 1 - No Connection – published value 1	1	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
Pin 1 - No Connection – published value 2	5	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
Pin 2 - Heater – published value 1	2	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
Pin 2 - Heater – published value 2	7	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
Pin 3 - Plate – published value 1	3	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
Pin 3 - Plate – published value 2	8	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
Plate and Target Supply Voltage – published value 1	200 V	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
Plate and Target Supply Voltage – published value 2	250 V	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
Series Triode Plate Resistors – published value 1	1 Mohm	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
Series Triode Plate Resistors – published value 2	1 Mohm	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
Target Current t_0 – published value 1	0 mA	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Target Current I_0 – published value 2	3 mA	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
Target Current I_0 – published value 3	4 mA	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
Triode-Plate Current – published value 1	0.19 mA	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
Triode-Plate Current – published value 2	0.24 mA	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
~ For triode-grid bias of 0 volts	0 V	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate-Supply Voltage	250 V	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
Target Voltage	250 V	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.
D-C Heater-Cathode Potential	90 V	Published datasheet value; multiple numbers on one source row represent separate limits or operating conditions.