ELECTRONIC TUBE REFERENCE

1904

Specialized - Ballast electronic tube

CONSOLIDATED TECHNICAL DATA
1 SECTION
CONSTRUCTION
BALLAST

Philips current-regulator ballast tube designed to maintain approximately 100 mA over a 30–80 V operating range.

General characteristics

BASE DESIGNATION	_	**BASE PINS**	_
NOMINAL HEATER	_ / _	**PARALLEL HEATER**	_ / _
HEATING	Indirect	**SERIES OPERATION**	Not specified
CATHODE ARRANGEMENT	Separate cathodes	**SECTION CONSTRUCTION**	Similar

Section ratings

SECTION1 Ballast

MINIMUM REGULATOR CURRENT	96 mA
MAXIMUM REGULATOR CURRENT	104 mA
MAINTAINING VOLTAGE	60 V

Published ratings and characteristics promoted semantically from the approved Philips source.

1904 — Current Regulator Tube

A current regulator tube, also known as a barretter, designed to maintain a stable current of approximately 0.1 A across a wide range of operating voltages.

Overview

The **1904** (also designated as the **Philips 1904**) is a current regulator (régulateur de courant / Stromregler). Its primary function is to stabilize current in electrical circuits by compensating for supply voltage fluctuations. The device exhibits a characteristic flat current-versus-voltage curve over its active

operating region, where its internal resistance increases dynamically with temperature and voltage to maintain a constant current of approximately **0.1 A**.

Physical Construction and Base Configurations

The 1904 is constructed with a glass envelope having a maximum diameter of **39 mm**. To accommodate different installation requirements, the tube was manufactured with two distinct base options, which also dictate the overall length of the device:

- **3-p (40465) Base**: This configuration has a maximum length (excluding pins) of **110 mm**.
- **S.B.C. (Swan Bayonet Cap) Base**: This configuration has a maximum length (excluding pins) of **100 mm**.

Pinout and Connections

For the 3-p (40465) base configuration, the internal filament/resistor element is connected between the pins designated as **'f'**. The base diagram also indicates connections or positions for pins **3** and **10**.

Electrical Characteristics and Regulation Range

The 1904 is designed to operate within a specified voltage window to achieve its current-limiting behavior. Its nominal ratings and tolerances are as follows:

Parameter	Value
Nominal Current (I)	0.1 A (100 mA)
Operating Voltage Range (V)	30 V to 80 V
Minimum Current (at $V = 60$ V)	96 mA
Maximum Current (at $V = 60$ V)	104 mA

At a standard operating point of 60 V, the current is tightly controlled within a tolerance of 96 mA to 104 mA, ensuring stable performance despite line voltage variations.

Regulation Curve and Behavior

The current-versus-voltage characteristics of the 1904 illustrate how the device transitions from a resistive state into its active regulation region.

Startup Region (0 V to 30 V)

At low voltages, the filament has not yet reached its active regulating temperature. The current rises rapidly from **0 mA at 0 V** to approximately **80 mA at 25 V**.

Active Regulation Region (30 V to 100 V)

As the voltage increases beyond 30 V, the thermal regulation mechanism takes effect, and the current curve flattens significantly:

- **At 30 V**: The current starts at approximately **0.095 A** (95 mA).
- **At 35 V**: The current is approximately **90 mA**.
- **At 45 V to 50 V**: The current rises to a broad peak of approximately **0.101 A** (101 mA) or **100 mA**.
- **At 60 V**: The current remains within the specified tolerance of **96 mA to 104 mA**.
- **At 80 V**: The current gently decreases to approximately **0.099 A** (99 mA).
- **At 100 V**: If operation is extended to 100 V, the current reaches approximately **110 mA**, showing that the regulating action continues to limit current rise even beyond the nominal 80 V limit.

Technical Summary

The **1904** is a **current regulator tube** designed to stabilize current at a nominal **0.1 A** over an operating voltage range of **30 V to 80 V**. It features a **39 mm diameter** envelope and is available with either a **3-p (40465)** base (110 mm length) or an **S.B.C.** base (100 mm length). With a specified current tolerance of **96 mA to 104 mA at 60 V**, the 1904 provides reliable current regulation through its thermally sensitive filament element.

SOURCE OPERATING CONDITIONS

SOURCE PDF

1957 Philips Receiving and Amplifying Tubes

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

1957 PHILIPS RECEIVING AND AMPLIFYING TUBES

Section 1 · Ballast

CHARACTERISTIC		
PARAMETER	**PUBLISHED VALUE**	**CONDITION / NOTE**
Nominal Regulating Current	**100 mA**	—
Operating Voltage Minimum	**30 V**	—
Operating Voltage Maximum	**80 V**	—
Current-Tolerance Test Voltage	**60 V**	—
Current Tolerance Minimum	**96 mA**	From tube to tube
Current Tolerance Maximum	**104 mA**	From tube to tube

TUBE TINKER

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