

ELECTRONIC TUBE REFERENCE

1877

Rectifier - Half Wave electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION
CONSTRUCTION
RECTIFIER

Indirectly heated high-vacuum half-wave rectifier for very-high-voltage, low-current service. Its four-volt heater and multi-kilovolt capability suit specialized high-voltage power supplies.

GENERAL CHARACTERISTICS

BASE DESIGNATION	—	BASE PINS	—
NOMINAL HEATER	4 V / 650 mA	PARALLEL HEATER	— / —
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION1 Rectifier	
PEAK INVERSE VOLTAGE	15000 V
NOMINAL OUTPUT CURRENT	3 mA
Indirectly heated high-voltage half-wave rectifier.	

1877 — High-Vacuum High-Voltage Half-Wave Rectifier

Overview

The **1877** is a high-vacuum, half-wave rectifier tube designed specifically for high-voltage applications. It features an indirectly heated cathode, a glass envelope with a top-cap anode connection, and a specialized four-pin base. Operating with a nominal 4 V heater supply, the 1877 is engineered to handle substantial peak inverse voltages up to 15,000 V while delivering a rectified output current suitable for high-voltage, low-current power supplies.

Heater and Electrical Characteristics

The 1877 is equipped with an indirectly heated cathode designed for parallel AC supply operation. The heater ratings are as follows:

Parameter	Value
Heater Voltage (V_f)	4 V
Heater Current (I_f)	0.65 A
Heating Method	Indirect (A.C., parallel supply)

The heater and cathode are internally connected at the base pins, which simplifies the wiring for high-voltage isolation but requires careful consideration of the circuit potential at these nodes.

Physical Construction and Pinout

The mechanical design of the 1877 is optimized for high-voltage isolation. The anode is brought out to a top cap at the apex of the glass bulb, maximizing the physical distance between the high-voltage anode and the low-voltage heater/cathode connections at the base. This physical separation minimizes the risk of external flashover or leakage currents.

Physical Dimensions

- **Maximum Bulb Diameter:** 44 mm
- **Maximum Height (excluding pins):** 113 mm
- **Maximum Pin Length:** 18 mm

Base Configuration and Pin Connections

The tube utilizes a 4-pin base combined with the top cap. The electrical connections are assigned as follows:

Pin / Terminal	Connection	Description
Top Cap	a	Anode
Pin 1	f, k	Heater / Cathode
Pin 2	f	Heater
Pin 3	f, k	Heater / Cathode
Pin 4	NC	No Connection

Pins 1 and 3 both serve as common heater/cathode (f, k) connection points, while Pin 2 provides the remaining heater (f) connection. Pin 4 has no internal connection.

Operating Conditions and Limiting Values

To ensure reliable operation and prevent internal arc-over or cathode damage, the 1877 must be operated within strictly defined limiting values. The typical operating parameters and absolute maximum ratings include:

- **Maximum Transformer Voltage (V_{tr}):** 5000 V_{eff} (RMS)
- **Maximum Peak Inverse Voltage (V_{inv}):** 15000 V
- **Maximum Rectified Current (I_o):** 3 mA
- **Minimum Protective Series Resistance (R_t):** 20 k Ω
- **Maximum Filter Capacitance (C):** 0.5 μ F

The minimum protective series resistance (R_t) of 20 k Ω is a critical requirement to limit peak inrush currents during startup or transient conditions, protecting the indirectly heated cathode from excessive emission stress. Similarly, the filter capacitance must not exceed 0.5 μ F to prevent excessive repetitive peak currents through the rectifier.

Technical Summary

The **1877** is a specialized high-vacuum half-wave rectifier designed for high-voltage, low-current applications. By utilizing an indirectly heated 4 V, 0.65 A cathode and a physical layout that isolates the anode via a top cap, the tube safely supports a peak inverse voltage of up to 15,000 V and an RMS transformer voltage of 5,000 V. When configured with a minimum protective series resistance of 20 k Ω and a maximum filter capacitance of 0.5 μ F, it provides a stable rectified output current of up to 3 mA.



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 · Rectifier

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
RMS Transformer Voltage Maximum	5000 V	—
DC Output Current Maximum	3 mA	—
Peak Inverse Voltage Maximum	15000 V	—

CAPACITANCE		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Interelectrode Capacitance Maximum	0.5 pF	—



SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1963 Philips Electron Tubes Handbook V1

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

1963 PHILIPS ELECTRON TUBES HANDBOOK V1

Section 1 · Rectifier

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum AC no-load voltage per plate	5000 V	HalfWave

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum DC output current	3 mA	HalfWave
Maximum peak inverse voltage	15000 V	HalfWave

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