



## ELECTRONIC TUBE REFERENCE

1875

Rectifier - Half Wave electronic tube

CONSOLIDATED TECHNICAL DATA

**1 SECTION**  
CONSTRUCTION  
**RECTIFIER**

Philips directly heated high-vacuum half-wave rectifier for high-voltage supplies, providing approximately 14 kV peak inverse-voltage capability at modest DC current.

## GENERAL CHARACTERISTICS

|                     |                   |                      |               |
|---------------------|-------------------|----------------------|---------------|
| BASE DESIGNATION    | —                 | BASE PINS            | —             |
| NOMINAL HEATER      | 4 V / 2.3 A       | PARALLEL HEATER      | — / —         |
| HEATING             | Direct            | SERIES OPERATION     | Not specified |
| CATHODE ARRANGEMENT | Separate cathodes | SECTION CONSTRUCTION | Similar       |

## SECTION RATINGS

|                                                          |         |
|----------------------------------------------------------|---------|
| <b>SECTION 1</b> Rectifier                               |         |
| PEAK INVERSE VOLTAGE                                     | 14000 V |
| NOMINAL OUTPUT CURRENT                                   | 5 mA    |
| <i>Directly heated high-voltage half-wave rectifier.</i> |         |

## 1875 — High-Vacuum Half-Wave Rectifier

*A high-vacuum, half-wave rectifier designed for high-voltage applications, such as cathode ray oscillographs, featuring direct filament heating and high peak inverse voltage capability.*

### Overview

The **1875** is a high-vacuum, single-plate (half-wave) rectifier engineered specifically for high-voltage, low-current applications. It is commonly employed in power supply circuits for cathode ray oscillographs and similar electrostatic display devices. The tube is characterized by its directly heated filament, high peak inverse voltage rating, and a physical design that isolates the high-voltage anode from the low-voltage base connections.

# Construction, Filament, and Mechanical Specifications

The 1875 is constructed with a glass envelope designed to withstand high electrostatic stress. To prevent internal arcing and minimize leakage currents, the anode is connected to a dedicated top cap, while the filament connections are located at the base of the tube.

The filament is directly heated and designed for AC operation. The physical and electrical characteristics of the heating element and envelope include:

| Parameter                        | Value                               |
|----------------------------------|-------------------------------------|
| Filament Voltage ( $V_f$ )       | 4.0 V                               |
| Filament Current ( $I_f$ )       | Approx. 2.3 A                       |
| Heating Method                   | Direct, AC                          |
| Maximum Envelope Diameter        | 48.5 mm to 50.0 mm (excluding pins) |
| Maximum Envelope Length / Height | 137 mm to 145 mm                    |

The variations in maximum dimensions reflect different manufacturing standards, with some specifications defining a compact 137 mm by 48.5 mm envelope, and others permitting up to 145 mm in length and 50 mm in diameter.

## Pinout and Base Connections

The electrical connections of the 1875 are split between the base pins and the top cap. The anode ( $a$ ) is consistently terminated at the top cap to ensure maximum physical separation from the filament circuit.

The base configuration and pin assignments vary depending on the specific standard and base type:

- **P35 Base:** One standard specifies a P35 base configuration (utilizing connection reference 42).
- **8-Pin Base (Option A):** In this configuration, the directly heated filament ( $f, f$ ) is connected to **Pins 1 and 8**.
- **8-Pin Base (Option B):** Alternatively, the filament ( $f, f$ ) is assigned to **Pins 1 and 4** (often designated as the top pins of the layout), while Pins 5, 6, 7, and 8 occupy the bottom half of the base diagram.

## Operating Conditions and Limiting Values

The 1875 operates under strict electrical limits to prevent thermal overload of the anode or breakdown of the vacuum insulation. The maximum ratings and required protective circuit parameters are detailed below:

- **Maximum Transformer Voltage ( $V_{tr}$ ):** 5000  $V_{eff}$  (RMS) under normal operating conditions, with a maximum AC no-load voltage rating of up to 7000 V RMS in specific configurations.
- **Maximum DC Output Voltage ( $V_O$ ):** 7000 V

- **Maximum DC Output Current ( $I_o$ ):** 5 mA
- **Maximum Peak Inverse Voltage ( $V_{inv}$ ):** 14000 V
- **Minimum Protective Series Resistance ( $R_t$ ):** 10 k $\Omega$
- **Maximum Filter Capacitance ( $C$ ):** 0.5  $\mu$ F

The inclusion of a minimum **10 k $\Omega$**  series resistance is critical to limit hot-switching surge currents through the tube. Similarly, the filter capacitance must be restricted to a maximum of **0.5  $\mu$ F** to prevent excessive peak currents from degrading the directly heated filament during startup and steady-state operation.

## Electrical and Anode Characteristics

The relationship between the anode voltage ( $V_a$ ) and the resulting anode current ( $I_a$ ) at the nominal filament voltage of 4.0 V defines the internal resistance and efficiency of the rectifier.

The characteristic curve of the 1875 is divided into two distinct operational zones:

- **Continuous Operation Zone (Solid Curve):** For normal continuous service, the characteristic is represented by a solid curve starting at  $V_a = 0$  V ( $I_a = 0$  mA) and extending up to approximately  $V_a \approx 23$  V to 25 V, where the current reaches the maximum continuous rating of  $I_a \approx 5$  mA.
- **Transient/Extended Zone (Dashed Curve):** Beyond the continuous rating, the characteristic is shown as a dashed line. This represents transient or short-duration behavior, extending from  $V_a \approx 23$  V – 25 V up to  $V_a \approx 48$  V, where the current reaches  $I_a \approx 15$  mA.

Specific typical points along this characteristic curve include:

- At  $V_a = 20$  V, the typical anode current is approximately **3.5 mA**.
- At  $V_a = 30$  V, the typical anode current is approximately **7.0 mA** (within the dashed transient region).
- At  $V_a = 40$  V, the typical anode current is approximately **11.5 mA** (within the dashed transient region).

## Technical Summary

The **1875** is a high-vacuum, half-wave rectifier designed for high-voltage, low-current applications such as cathode ray oscillographs. It features a directly heated filament operating at **4.0 V** and approximately **2.3 A** AC. The tube is rated for a maximum transformer voltage of **5000 V RMS** (with some no-load ratings up to **7000 V RMS**), a maximum DC output voltage of **7000 V**, and a maximum DC output current of **5 mA**. It can withstand a peak inverse voltage of up to **14000 V**. Safe operation requires a minimum protective series resistance of **10 k $\Omega$**  and a maximum filter capacitance of **0.5  $\mu$ F**. Physically, the tube features a top-cap anode connection for high-voltage isolation, with a maximum height of 137 to 145 mm and a maximum diameter of 48.5 to 50 mm, utilizing either a P35 or an 8-pin base.

## SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

# 1938 Philips Miniwatt Vacuum Tube Catalog

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

## 1938 PHILIPS MINIWATT VACUUM TUBE CATALOG

## Section 1 · Rectifier

| OTHER                                |                 |                  |
|--------------------------------------|-----------------|------------------|
| PARAMETER                            | PUBLISHED VALUE | CONDITION / NOTE |
| Maximum AC no-load voltage per plate | 7000 V          | HalfWave         |
| Maximum DC output current            | 5 mA            | HalfWave         |

## 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       | 5 mA            | —                |
| Peak Inverse Voltage Maximum    | 14000 V         | —                |
| Output Voltage Maximum          | 7000 V          | —                |

| CAPACITANCE                           |                 |                  |
|---------------------------------------|-----------------|------------------|
| PARAMETER                             | PUBLISHED VALUE | CONDITION / NOTE |
| Interelectrode Capacitance<br>Maximum | 0.5 pF          | —                |



SOURCE DATA APPENDIX

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<br>per plate | 5000 V          | HalfWave         |
| Maximum DC output current               | 5 mA            | HalfWave         |
| Maximum peak inverse voltage            | 14000 V         | HalfWave         |

TUBE TINKER

An independent reference for electronic tubes, vacuum tubes,  
and their source documents.

[Catalog](#)
[Tube types](#)
[Full books](#)
[Blog](#)
[Feedback & corrections](#)

© 2026 Tube Tinker