



ELECTRONIC TUBE REFERENCE

1534

Rectifier - Full Wave electronic tube

CONSOLIDATED TECHNICAL DATA

2 SECTIONS

CONSTRUCTION

RECTIFIER-RECTIFIER

Philips double-anode mercury-vapor/gas industrial rectifier for high-current power conversion. Its dual-anode construction provides multiampere output with low arc voltage for heavy industrial supplies.

GENERAL CHARACTERISTICS

BASE DESIGNATION	—	BASE PINS	—
NOMINAL HEATER	— / —	PARALLEL HEATER	— / —
HEATING	Direct	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION1 Rectifier	
PEAK INVERSE VOLTAGE	850 V
NOMINAL OUTPUT CURRENT	15 A
PEAK FORWARD CURRENT	45 A
FORWARD VOLTAGE DROP	15 V
<i>Representative of two identical anode paths.</i>	

SECTION2 Rectifier	
PEAK INVERSE VOLTAGE	850 V
NOMINAL OUTPUT CURRENT	15 A
PEAK FORWARD CURRENT	45 A
FORWARD VOLTAGE DROP	15 V
<i>Physical rectifier section 2; electrical properties populated from the same published ratings applicable to the identical rectifier path.</i>	

1534 — Double-Anode Mercury-Vapour and Gas-Filled Rectifying Valve

An industrial double-anode rectifying valve designed for heavy-duty power rectification and battery charging applications.

Overview

The **1534** is a mercury-vapour and gas-filled double-anode rectifying valve designed primarily for industrial applications. It is capable of delivering a rectified current of up to 15 A per valve and is rated to charge up to 110 lead-acid (Pb) cells. The valve features a directly heated oxide-coated filament, two independent anodes housed in separate bulb chambers, and an auxiliary ignition electrode to facilitate reliable starting.

Mechanical Construction and Physical Dimensions

The 1534 has a specialized physical structure consisting of a central vertical column with two lateral bulb chambers containing the anodes. The valve is designed exclusively for vertical mounting with the base down.

The physical dimensions and mechanical specifications of the valve include:

- **Maximum overall height:** 270 mm
- **Height from the base to the center of the lateral anode chambers:** 150 mm
- **Height of the lower base assembly:** 100 mm
- **Maximum width across the two lateral anode chambers:** 197 mm
- **Maximum diameter of each individual lateral anode chamber:** 74 mm
- **Maximum diameter of the central column:** 42 mm
- **Base plate width:** 145 mm, with mounting holes spaced 125 mm apart (each hole having a diameter of 10 mm)
- **Net weight:** 560 g
- **Shipping weight:** 1900 g

The electrical connections are distributed across the structure:

- **Anodes (a, a'):** Connected via top caps on each of the two lateral bulb chambers.
- **Auxiliary Ignition Electrode (ah):** Connected via an M4 screw terminal on the central column.
- **Filament (f, f):** Connected at the bottom of the base.

Filament and Pre-Heating Requirements

The 1534 utilizes a directly heated, oxide-coated filament. Due to the mercury-vapour and gas filling, strict pre-heating protocols must be observed to prevent damage to the cathode before anode current is drawn.

Filament Parameter	Value
Heating Method	Direct (A.C.)
Filament Voltage (Vf)	1.9 V
Filament Current (If)	23 A
Recommended Pre-heating Time (Tw)	2 minutes
Minimum Pre-heating Time (Urgent)	1 minute
Pre-heating Time after Transport or Long Interruption	5 minutes

To ensure the proper delay, the use of an external time delay switch (such as type [4152](#)) is recommended.

Electrical Characteristics and Auxiliary Ignition

The valve operates with a low internal arc voltage drop and requires an auxiliary ignition circuit to initiate conduction.

- **Arc Voltage Drop (Varc):** 15 V
- **Ignition Voltage (Vign):** 45 V

Auxiliary Ignition Circuit

To reliably achieve the ignition voltage of 45 V, an auxiliary D.C. supply unit must be connected to the valve. This auxiliary supply should deliver approximately 100 V with a current capability of 25 mA. It must be connected between the auxiliary ignition electrode ah (positive terminal) and the cathode (negative terminal) via a current-limiting resistor. An auxiliary ignition unit (such as type E3 108 03) is recommended for this purpose.

Operating Limits and Ratings

The 1534 is rated for industrial service under specified temperature and electrical limits.

Parameter	Limit Value
Maximum Transformer Voltage (Vtr)	275 Veff (RMS)
Minimum Transformer Voltage (Vtr)	60 Veff (RMS)
Maximum Peak Inverse Anode Voltage (Vainvp)	850 V
Maximum Average Anode Current (Ia)	7.5 A (per anode)
Maximum Peak Anode Current (Iap)	45 A

Parameter	Limit Value
Condensed Mercury Temperature Range (tHg)	30 to 80 °C

The maximum average anode current of 7.5 A per anode allows the double-anode valve to deliver a total rectified current of 15 A in typical full-wave configurations. The transformer voltage limits (Vtr) are specified for standard rectifier circuits.

Technical Summary

The **1534** is a robust, directly heated, double-anode mercury-vapour and gas-filled industrial rectifier. Operating with a filament supply of 1.9 V at 23 A, it requires careful pre-heating (typically 2 minutes, or 5 minutes after transport) to safeguard its oxide-coated cathode. With a maximum peak inverse voltage of 850 V and an average anode current rating of 7.5 A per anode (15 A total per valve), it is highly suited for industrial battery charging (up to 110 lead-acid cells) and power rectification. Its operation is supported by an auxiliary ignition electrode (ah) requiring an external 100 V, 25 mA D.C. source to maintain a stable 45 V ignition threshold.

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1999 Philips 0-D

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

1999 PHILIPS 0-D

Section 1 · Rectifier

CONSTRUCTION		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Filling	Mercury vapour and gas	—

CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Arc voltage	15 V	—
Ignition voltage	45 V	—

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum RMS input voltage	275 V RMS	—
Minimum RMS input voltage	60 V RMS	—
Peak inverse voltage	850 V	—
Maximum peak current	45 A	—

1999 PHILIPS 0-D

Section 2 · Rectifier

CONSTRUCTION		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Filling	Mercury vapour and gas	—
Filling	Mercury vapour and gas	—

CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Arc voltage	15 V	—
Arc voltage	15 V	—
Ignition voltage	45 V	—

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Ignition voltage	45 V	—

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum RMS input voltage	275 V RMS	—
Maximum RMS input voltage	275 V RMS	—
Minimum RMS input voltage	60 V RMS	—
Minimum RMS input voltage	60 V RMS	—
Peak inverse voltage	850 V	—
Peak inverse voltage	850 V	—
Maximum peak current	45 A	—

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