

ELECTRONIC TUBE REFERENCE

CONSOLIDATED TECHNICAL DATA

1049

1 SECTION
CONSTRUCTION
RECTIFIER

Rectifier - Half Wave electronic tube

Directly heated Philips mercury-vapour or gas-filled industrial rectifier for high-current battery charging. Rated for approximately 185 V peak inverse voltage, 12.5 A average current, and 75 A peak current.

GENERAL CHARACTERISTICS

BASE DESIGNATION	—	BASE PINS	—
NOMINAL HEATER	1.9 V / 25.5 A	PARALLEL HEATER	— / —
HEATING	Direct	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION1 Rectifier	
PEAK INVERSE VOLTAGE	185 V
NOMINAL OUTPUT CURRENT	12.5 A
PEAK FORWARD CURRENT	75 A
FORWARD VOLTAGE DROP	9 V
WARM-UP TIME	120 s
Directly heated gas-filled rectifier with mercury-vapour/gas filling for battery charging up to 20 lead-acid cells.	

1049 — Double-Anode Mercury Vapour and Gas-Filled Rectifying Valve

The **1049** is a double-anode, mercury vapour and gas-filled rectifying valve designed primarily for industrial battery charging applications. It is capable of delivering up to 25 A per valve and is rated to charge up to a maximum of 20 lead-acid (Pb) cells.

Filament and Heating Requirements

The 1049 features a directly heated, oxide-coated filament. Due to the mercury-vapour and gas filling, strict adherence to filament heating times is required to prevent damage to the cathode during start-up.

Parameter	Value
Filament Voltage (Vf)	1.9 V
Filament Current (If)	28.5 A
Calculated Filament Power (Pf)	54.15 W
Heating Method	Direct by A.C.
Recommended Preheating Time (Tw)	2 minutes

Note: The calculated filament power is derived from the formula $P_f = V_f * I_f$ using the nominal values of 1.9 V and 28.5 A.

The preheating time (Tw) is subject to specific operational conditions:

- **Standard Operation:** A recommended preheating time of 2 minutes is standard.
- **Urgent Operation:** If urgently required, the preheating time may be decreased to a minimum of 1 minute. To automate this delay, a type [4152](#) time delay switch can be integrated into the control circuitry.
- **Post-Transport or Long Interruption:** After transport or following a long interruption of service, the preheating time must be extended to $T_w = 5$ minutes to ensure proper distribution of the mercury vapour before anode voltage is applied.

Mechanical and Physical Specifications

The 1049 is a physically robust valve designed for vertical installation. It features top-cap anode connections and flexible filament leads at the base.

- **Mounting Position:** Vertical, base down.
- **Maximum Overall Height:** 280 mm.
- **Maximum Bulb Diameter:** 101 mm.
- **Anode Connections:** Two top-mounted terminals with M6 threading, spaced 25 mm apart.
- **Filament Connections:** Flexible leads at the base, with a spacing of 125 mm to 145 mm between mounting points.
- **Net Weight:** 520 g.
- **Shipping Weight:** 2400 g.

Electrical and Operating Characteristics

The electrical behavior of the 1049 is characterized by a low arc voltage drop and a low ignition voltage, typical of gas and mercury-vapour rectifiers.

- **Arc Voltage (V_{arc}):** 9 V
- **Ignition Voltage (V_{ign}):** 16 V

Operating Conditions in Charger Service

When operating in a typical charging circuit (designated as "Circuit a") with a transformer voltage (V_{tr}) of 60 Veff and a limiting resistance (R_t) of 0.5 Ohm, the valve exhibits the following characteristics across different states of battery charge:

Battery State	Battery Voltage (V _{bat})	Output Current (I _o)	Peak Anode Current (I _{ap})
Discharged	36 V	32 A	—
Nominal	44 V	22 A	60 A
Charged	54 V	13 A	—

Absolute Maximum Ratings

Operating limits are specified as absolute maxima and must not be exceeded under any service conditions.

- **Peak Inverse Anode Voltage (V_{ainvp}):** max. 185 V
- **Average Anode Current (I_a):** max. 12.5 A per anode
- **Peak Anode Current (I_{ap}):** max. 75 A
- **Minimum Limiting Resistance (R_t):** min. 0.3 Ohm
- **Mercury Temperature Range (t_{Hg}):** 30 to 80 °C

The minimum limiting resistance (R_t) of 0.3 Ohm must be maintained in the anode circuit to protect the valve from excessive current surges during operation. The operating temperature of the condensed mercury (t_{Hg}) must be kept strictly within the 30 to 80 °C range to ensure stable ionization and prevent backfiring or premature cathode degradation.



SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1963 Philips Electron Tubes Handbook V3

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

1963 PHILIPS ELECTRON TUBES HANDBOOK V3

Section 1 · Rectifier

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Arc voltage drop	9 V	GasFilled

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum peak inverse anode voltage	185 V	—
Maximum average anode current	12.5 A	—
Maximum peak anode current	75 A	—
Application	battery charging up to 20 lead-acid cells	—
Heater voltage	1.9 V	DirectAC
Heater current	25.5 A	DirectAC



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

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
MinimumSeriesResistance	0.3 ohm	—
NominalBatteryVoltage	44 V	BatteryCharger
NominalOutputCurrent	22 A	BatteryCharger

CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
TypicalArcVoltage	9 V	—
IgnitionVoltage	16 V	—

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