



ELECTRONIC TUBE REFERENCE

1039

Rectifier - Half Wave electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION

CONSTRUCTION

RECTIFIER

Directly heated Philips mercury-vapour or gas-filled industrial rectifier for high-current battery charging. Rated for approximately 185 V peak inverse voltage, 7.5 A average current, and 45 A peak current.

GENERAL CHARACTERISTICS

BASE DESIGNATION	—	BASE PINS	—
NOMINAL HEATER	1.9 V / 20 A	PARALLEL HEATER	— / —
HEATING	Direct	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION 1 Rectifier	
PEAK INVERSE VOLTAGE	185 V
NOMINAL OUTPUT CURRENT	7.5 A
PEAK FORWARD CURRENT	45 A
FORWARD VOLTAGE DROP	9 V
WARM-UP TIME	120 s
<i>Directly heated gas-filled rectifier with mercury-vapour/gas filling for battery charging up to 20 lead-acid cells.</i>	

1039 — Double-Anode Rectifying Valve

The **1039** is a mercury vapour and gas-filled, double-anode rectifying valve designed for industrial applications, specifically battery charging. It is capable of delivering up to 15 A per valve and is suitable for charging systems with a maximum of 20 lead-acid (Pb) cells.

Mechanical Design and Physical Dimensions

The 1039 features a robust physical construction designed for vertical, base-down mounting. Its physical dimensions and mechanical characteristics include:

- **Base Type:** Goliath base.
- **Compatible Socket/Support:** 65909 BG/01.
- **Maximum Overall Height:** 264 mm.
- **Maximum Bulb Diameter:** 94 mm.
- **Anode Connections:** Two M6 screw terminals located at the top of the bulb, spaced 18 mm apart.
- **Weight:** Net weight of 340 g, with a shipping weight of approximately 1100 g.

The valve must always be operated in a vertical position with the base down to ensure proper distribution of the mercury fill.

Filament and Heating Requirements

The valve utilizes a directly heated, oxide-coated filament. Due to the mercury-vapour fill, strict heating and timing protocols must be observed to prevent damage to the cathode during start-up:

- **Filament Voltage (V_f):** 1.9 V (A.C. heating).
- **Filament Current (I_f):** 20 A.
- **Recommended Preheating Time (T_w):** 2 minutes. Under urgent conditions, this preheating time may be decreased to a minimum of 1 minute.
- **Special Preheating Conditions:** After transport or a long interruption of service, the preheating time (T_w) must be extended to 5 minutes.
- **Control Auxiliary:** A type [4152](#) time delay switch can be utilized to ensure the proper delay is maintained before anode voltage is applied.

Electrical and Operating Characteristics

The electrical behavior of the 1039 is characterized by low internal voltage drops typical of gas and mercury-vapour rectifiers. Its primary electrical parameters include:

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

Typical Battery Charging Operation

When operated in a typical charging circuit (designated as Circuit a) with an AC transformer voltage (V_{tr}) of 60 V_{eff} and a series resistance (R_t) of 0.85 Ω , the operating parameters vary depending on the charge state of the battery bank:

Battery State	Battery Voltage (V_{bat})	Output Current (I_O)	Peak Anode Current (I_{ap})
Discharged	36 V	19 A	—
Nominal	44 V	13.5 A	37 A
Charged	54 V	8 A	—

Absolute Maximum Ratings

To ensure safe operation and prevent premature failure of the valve, the following absolute limiting values must not be exceeded:

- **Peak Inverse Anode Voltage (V_{invp}):** Maximum 185 V
- **Average Anode Current (I_a):** Maximum 7.5 A
- **Peak Anode Current (I_{ap}):** Maximum 45 A
- **Series Resistance (R_t):** Minimum $0.75\ \Omega$
- **Mercury Temperature (t_{Hg}):** 30°C to 80°C



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	7.5 A	—
Maximum peak anode current	45 A	—
Application	battery charging up to 20 lead-acid cells	—
Heater voltage	1.9 V	DirectAC
Heater current	20 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	0.75 ohm	—
NominalBatteryVoltage	44 V	BatteryCharger
NominalOutputCurrent	13.5 A	BatteryCharger

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

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