



ELECTRONIC TUBE REFERENCE

1069K

Rectifier - Half Wave electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION
CONSTRUCTION
RECTIFIER

Directly heated Philips mercury-vapour or gas-filled industrial rectifier for heavy-duty welding service. Rated for approximately 170 V peak inverse voltage, 30 A average current, and 200 A peak current.

GENERAL CHARACTERISTICS

BASE DESIGNATION	—	BASE PINS	—
NOMINAL HEATER	3.25 V / 70 A	PARALLEL HEATER	— / —
HEATING	Direct	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION 1 Rectifier	
PEAK INVERSE VOLTAGE	170 V
NOMINAL OUTPUT CURRENT	30 A
PEAK FORWARD CURRENT	200 A
FORWARD VOLTAGE DROP	10 V
WARM-UP TIME	120 s
Directly heated gas-filled rectifier with mercury-vapour/gas filling for welding rectifier service.	

1069K — Double-Anode Mercury Vapour and Gas-Filled Rectifying Valve

The **1069K** is a heavy-duty, double-anode rectifying valve designed for industrial applications, specifically welding rectifiers where it is rated to deliver 60 A per valve. It features a mercury vapour and gas filling, combining the characteristics of both media to facilitate high-current rectification.

Construction and Physical Dimensions

The 1069K is constructed with a robust glass envelope and is designed to be operated exclusively in a vertical position with the base down. The physical dimensions of the valve are substantial, reflecting its high-power industrial rating:

- **Overall Height:** 355 ± 10 mm
- **Seated Height:** 248 ± 4 mm (measured to the top of the anode terminals)
- **Maximum Body Diameter:** 99 mm
- **Maximum Width (including anode terminals):** 114 mm
- **Net Weight:** 1000 g
- **Shipping Weight:** 3200 g

The valve features two separate anode connections at the top of the envelope, designated as 'a' and 'a''. These anodes are spaced 35 mm apart and terminate in M8 threaded connections. The base of the tube incorporates a mounting flange with a total width of 145 mm and mounting slots spaced 125 mm apart. The mounting slots are 10 mm wide. The filament connections ('f' and 'f') are located at the bottom of the structure.

Filament and Heating Requirements

The 1069K utilizes a directly heated, oxide-coated filament. Due to the high current requirements of the device, the filament must be supplied with low-voltage, high-current AC power. The electrical specifications for the filament are as follows:

- **Filament Voltage (V_f):** 3.25 V
- **Filament Current (I_f):** 70 A
- **Preheating Time (T_w):** A minimum preheating time is required before anode voltage is applied to allow the filament to reach operating temperature and the mercury to vaporize correctly. The recommended preheating time is 2 minutes. In urgent circumstances, this preheating period may be reduced to a minimum of 1 minute.

Electrical and Operating Characteristics

The typical electrical characteristics of the 1069K during operation include:

- **Arc Voltage (V_{arc}):** 10 V
- **Ignition Voltage (V_{ign}):** 16 V

The valve can be configured in several standard industrial rectifier circuits (designated as circuits e, f, and g). Under these specific operating conditions, the performance parameters are defined as follows, assuming the use of forced fan cooling:

Circuit Configuration	Transformer Voltage (V_{tr})	Output Voltage (V_o)	Output Current (I_o)
Circuit e	55 V_{eff}	50 V	120 A
Circuit f	55 V_{eff}	55 V	180 A
Circuit g	55 V_{eff}	45 V	180 A

The output current ratings (I_o) of 120 A and 180 A are strictly contingent upon the application of active fan cooling to manage the thermal load of the valve.

Absolute Maximum Ratings

To ensure the reliable operation and longevity of the 1069K, the following absolute limiting values must not be exceeded:

- **Maximum Peak Inverse Anode Voltage (V_{ainvp}):** 170 V
- **Maximum Average Anode Current (I_a):** 30 A (calculated over an average integration time, T_{av} , of 15 seconds maximum, and requiring active fan cooling)
- **Maximum Peak Anode Current (I_{ap}):** 200 A
- **Minimum Surge Limiting Resistance (R_t):** 0.12 Ω
- **Operating Mercury Temperature Range (t_{Hg}):** 30°C to 75°C

Technical Summary

The **1069K** is a high-power, double-anode, mercury vapour and gas-filled rectifying valve designed for demanding industrial service such as welding rectifiers. It features a directly heated 3.25 V, 70 A oxide-coated filament requiring a 1 to 2-minute preheating period. Capable of delivering up to 180 A of output current under specific circuit configurations with active fan cooling, the valve operates with a low typical arc drop of 10 V and an ignition voltage of 16 V. Its physical design requires vertical mounting (base down) and features heavy-duty M8 anode terminals to support its high peak current capability of 200 A.



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	10 V	GasFilled

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum peak inverse anode voltage	170 V	—
Maximum average anode current	30 A	—
Maximum peak anode current	200 A	—
Application	welding rectifier service	—
Heater voltage	3.25 V	DirectAC
Heater current	70 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	0.12 ohm	—

CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
TypicalArcVoltage	10 V	—
IgnitionVoltage	16 V	—

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