

ELECTRONIC TUBE REFERENCE

CONSOLIDATED TECHNICAL DATA

1059

1 SECTION
CONSTRUCTION
RECTIFIER

Rectifier - Half Wave electronic tube

Directly heated Philips mercury-vapour or gas-filled industrial rectifier for heavy-duty battery charging. Rated for approximately 185 V peak inverse voltage, 20 A average current, and 120 A peak current.

GENERAL CHARACTERISTICS

BASE DESIGNATION	—	BASE PINS	—
NOMINAL HEATER	1.9 V / 40 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	20 A
PEAK FORWARD CURRENT	120 A
WARM-UP TIME	120 s
Mercury-vapour and gas-filled industrial rectifier with directly heated oxide-coated filament.	

1059 — Double-Anode Mercury-Vapour and Gas-Filled Rectifying Valve

The **1059** is a heavy-duty, double-anode, mercury-vapour and gas-filled rectifying valve designed primarily for industrial battery charging applications. It is capable of delivering up to 40 A per valve, making it suitable for charging systems containing a maximum of 20 lead-acid (Pb) cells. The tube features an oxide-coated filament and is designed for direct heating by an alternating current (A.C.) supply.

Mechanical Design and Physical Dimensions

The 1059 is a physically robust valve with a substantial glass envelope and specialized terminal connections designed to handle high currents.

- **Mounting Position:** The valve must be mounted strictly in a vertical position with the base down.
- **Weight:** The net weight of the valve is 900 g, while its shipping weight is 3150 g.
- **Physical Dimensions:**
 - Overall height: 330 to 350 mm
 - Seated height (base to top cap shoulder): 240 ± 4 mm
 - Maximum bulb diameter: 111 mm
 - Base diameter: 99 mm
- **Connections:**
 - The filament connections (f, f) are located at the bottom of the base, featuring pins with a diameter of 10 mm spaced 33 mm apart.
 - The top of the bulb features an anode connection cap with an M6 threaded terminal.
 - Two side terminals are provided for the double-anode configuration, spaced 125 mm to 145 mm apart, positioned 32 mm above the bottom of the base.

Filament Heating and Preheating Protocol

The oxide-coated filament requires precise heating conditions to ensure the longevity of the cathode and proper vaporization of the mercury fill before high voltage is applied.

Parameter	Value
Filament Voltage	1.9 V (A.C.)
Filament Current	40 A
Calculated Filament Power	76 W
Heating Method	Direct
Cathode Type	Oxide-coated

Preheating Times

Under normal operating conditions, a preheating time (t_w) of at least **2 minutes** is recommended before anode voltage is applied. In urgent circumstances, this preheating period may be reduced to a minimum of **1 minute**. To automate and ensure a suitable delay, the use of a type **4152** time delay switch is recommended.

After transport or following a prolonged interruption of service, the preheating time (T_w) must be extended to **5 minutes** to ensure proper distribution of the mercury fill before operation.

Electrical Characteristics and Limiting Values

The electrical operation of the 1059 is characterized by low internal voltage drops typical of gas and mercury-vapour rectifiers.

Typical Characteristics

- **Arc Voltage (V_{arc}):** 9 V
- **Ignition Voltage (V_{ign}):** 11 V

Limiting Values (Absolute Maxima)

Parameter	Limit Value
Maximum Transformer Voltage (V _{tr})*	60 V _{eff}
Minimum Transformer Voltage (V _{tr})*	10 V _{eff}
Maximum Peak Inverse Anode Voltage (V _{ainvp})	185 V
Maximum Continuous Anode Current (I _a)	20 A
Maximum Peak Anode Current (I _{ap})	120 A
Minimum Series Resistance (R _t)	0.2 Ohm
Operating Temperature Range (t _{Hg})	30–80 °C

Note: The transformer voltage limits apply under specified circuit conditions (Circuit a).

The minimum series resistance (R_t) of 0.2 Ohm is a critical safety parameter required in the anode circuit to limit surge currents and protect the tube from damage during operation.

Technical Summary

The **1059** is an industrial, double-anode rectifying valve utilizing a mercury-vapour and gas mixture to achieve low internal losses, as demonstrated by its typical arc voltage of 9 V and ignition voltage of 11 V. Operating with a directly heated 1.9 V, 40 A oxide-coated filament, it requires careful preheating (typically 2 minutes, or 5 minutes after transport) to safeguard the cathode. With a maximum peak anode current rating of 120 A and a continuous anode current rating of 20 A, the 1059 is optimized for vertical installation in industrial battery chargers servicing up to 20 lead-acid cells.

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

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
MinimumSeriesResistance	0.2 ohm	—

CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
TypicalArcVoltage	9 V	—