

ELECTRONIC TUBE REFERENCE

CONSOLIDATED TECHNICAL DATA

1089

Rectifier - Half Wave electronic tube

1 SECTION
CONSTRUCTION
RECTIFIER

Directly heated Philips mercury-vapour or gas-filled industrial rectifier for battery-charger service. Rated for approximately 185 V peak inverse voltage, 5 A average output, and 30 A peak current.

GENERAL CHARACTERISTICS

BASE DESIGNATION	—	BASE PINS	—
NOMINAL HEATER	1.9 V / 11 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	5 A
PEAK FORWARD CURRENT	30 A
WARM-UP TIME	120 s
Mercury-vapour and gas-filled industrial rectifier with directly heated oxide-coated filament.	

1089 — Double-Anode Mercury Vapour and Gas-Filled Rectifying Valve

The **1089** is a double-anode, mercury vapour and gas-filled rectifying valve designed primarily for industrial battery charging applications. It is capable of delivering a charging current of 10 A per valve and is rated for charging a maximum of 20 lead-acid (Pb) cells.

Design and Mechanical Construction

The 1089 features a robust physical construction designed for vertical, base-down mounting. The valve is built with an oxide-coated filament and utilizes a **Goliath** base. The corresponding socket or support recommended for this base is the type **65909 BG/01**.

Physically, the valve has a net weight of 300 g, while its shipping weight is specified at 3000 g. The envelope design incorporates a top cap terminal designated as M6, alongside separate anode connections (labeled "a") on the shoulders of the bulb, and filament connections (labeled "f") at the base.

Filament and Heating Requirements

The 1089 utilizes a directly heated, oxide-coated filament. The heating must be supplied by alternating current (A.C.). The electrical specifications for the filament are as follows:

- **Filament Voltage (V_f):** 1.9 V
- **Filament Current (I_f):** 11 A

Filament Power Calculation

Using the nominal filament voltage and current, the electrical power required to heat the filament can be calculated:

$$\text{Power} = V_f \times I_f = 1.9 \text{ V} \times 11 \text{ A} = 20.9 \text{ W}$$

Pre-Heating Time (T_w)

To ensure proper vaporization of the mercury and protect the cathode before anode voltage is applied, a pre-heating period (T_w) is mandatory:

- **Recommended Pre-Heating Time:** 2 minutes.
- **Minimum Pre-Heating Time:** Under urgent conditions, the pre-heating time may be decreased to a minimum of 1 minute. To ensure a reliable delay, the use of a type [4152](#) time delay switch is recommended.
- **Post-Transport/Interruption Pre-Heating Time:** After transport or following a long interruption of service, the pre-heating time must be extended to 5 minutes ($T_w = 5$ minutes) to properly distribute the mercury before operation.

Electrical Characteristics and Operating Limits

The 1089 operates with specific typical electrical characteristics and must be run within strictly defined absolute limiting values to prevent damage to the gas-filled structure.

Typical Characteristics

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

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

Limiting Values

- **Transformer Voltage (V_{tr}):** Maximum of 60 Veff and a minimum of 16 Veff (under specified circuit conditions).
- **Anode Peak Inverse Voltage (V_{ainvp}):** Maximum of 185 V.
- **Anode Current (I_a):** Maximum of 5 A.
- **Anode Peak Current (I_{ap}):** Maximum of 30 A.
- **Minimum Total Resistance (R_t):** 1.2 Ω .
- **Mercury Temperature Range (t_{Hg}):** The operating temperature of the mercury must be maintained between 30 °C and 80 °C to ensure stable ionization and prevent backfiring or insufficient emission.



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	1.2 ohm	—

CHARACTERISTICS

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

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