

# 7T69RB

## Triode

The 7T69RB is a forced air-cooled, triode built for use in continuous industrial services with anodes capable of dissipating 4.5 kW. Furthermore, ceramic to metal construction improves mechanical strength.

### General Characteristics

#### Electrical:

Filament: Thoriated tungsten

Voltage .....	12.6	V
Current .....	35	A
Transconductance (I <sub>b</sub> = 0.8 A) .....	13	mS
Amplification factor .....	21	-

Direct interelectrode capacitances:

Grid-Plate .....	13	pF
Grid-Filament .....	18	pF
Plate-Filament .....	0.7	pF
Frequency for maximum ratings .....	110	MHz

#### Mechanical:

Overall dimensions: (see outline)

Length .....	235	mm
Diameter .....	128	mm
Weight (Approx.) .....	2.8	kg
Operating position: .....	Vertical	



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## Cooling:

Anode: Forced air (1)

Min. air flow .....	7	m <sup>3</sup> / min
Min. static flow loss .....	35	mm water
Max. incoming air temperature .....	45	°C
Max. temperature of ceramic to metal seals (2) .....	250	°C
Max. temperature of radiator .....	250	°C

## Absolute Maximum Ratings

Class C Telegraphy

	Continuous	Intermittent (3)	
DC plate voltage .....	8	8	kV
DC plate current .....	2	2	A
DC grid current .....	0.5	0.6	A
Plate dissipation .....	4500	5500	W
Grid dissipation .....	150	230	W

## Typical Operation: Value for oscillation

	Continuous	Intermittent (3)	
DC plate voltage .....	6	7	8 kV
DC plate current .....	1.6	1.8	1.8 A
Plate output (Approx.) .....	7.1	9	10 kW
DC grid current (Approx.) .....	250	320	310 mA
Grid resistor .....	3500	3500	4000 Ω

## Notes:

- (1) The specified air flow should be delivered through radiator onto each terminals before the application of filament voltage, and may stop simultaneously with the removal of all voltage.
- (2) Filament and grid terminals will be cooled by the air flow through the radiator.
- (3) Values for intermittent service are those for 30 seconds of operating time and 50% of duty factor.



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All personnel who work with transmitting tubes must have a thorough understanding of correct operating procedures to prevent damage and must handle tubes with extreme care.

System designers and personnel involved in performing work are responsible for ensuring worker safety.

1. Applications and objectives
  - (1) This product is intended for use in industrial equipment only. It is not to be sold or used by the general public.
  - (2) This product is not designed or intended for use in combination with equipment in which malfunction or incorrect operation could lead to personal injury or death. Such use is strictly prohibited.
  - (3) Refer to delivery specifications and engineering information issued by Penta to ensure safe operation of this product.
  
2. Ambient conditions
  - (1) Store this product in a dry location (relative humidity <60%). Do not store this product in a location where the temperature or humidity may change rapidly because condensation may form on the surface of the product.
  - (2) A filter should be used because accumulated dust will lead to deterioration of the withstand voltage and may generate smoke or catch fire.
  
3. Precautions against incorrect or inappropriate operation
  - (1) If this product is operated with an excessively high voltage or current, X-rays exceeding the standard may be generated. Never use this product with a voltage or current exceeding the rated values.
  - (2) Prior consultation with Penta is required if this product is to be used under conditions other than those specified or if it is used for a new type of equipment.
  - (3) Before using this product, determine whether or not it can be used for industrial heating applications.
  - (4) Only qualified engineers are permitted to use, assemble, maintain, or check this product. Other personnel are prohibited from handling this product.
  
4. Precautions for operation and maintenance

To ensure that the end user is aware of the safety precautions, include the descriptions given in the safety precautions in the operations manual provided with the equipment or take other appropriate actions.



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### 4.1 High voltage

The voltage to the electrodes of the power tube can exceed 10 kV, which is deadly, and the equipment must be designed properly and operating precautions must be followed.

#### (1) Safety Features to be incorporated in the Design

The following safety features should be incorporated in the system design:

\*The equipment must be designed to prevent personnel from coming in contact with high circuit.

\*Interlock switches must be provided on access doors, so that when these are opened for inspection or replacement of the tube, the power supply is turned off and high-voltage capacitors are discharged.

\*The power supply cannot be turned on again unless the access door is fully closed.

#### (2) Safety Precautions for inspection and Replacement of Tube

It is preferable to request that the system manufacturer send an engineer to inspect and replace the tube; if this is not possible, two or more qualified persons well trained in electrical work can perform the inspection and replacement. In either case, all power supplies must be turned off before beginning any service procedure, and parts being inspected or replaced must be grounded with a ground bar.

### 4.2 High Temperature

Although a cooling system is used, the electrode terminals are very hot both during and after operation. Do not touch the tube just after turn off the power; wait until the temperature decreases enough not to be dangerous.

### 4.3 X-ray radiation

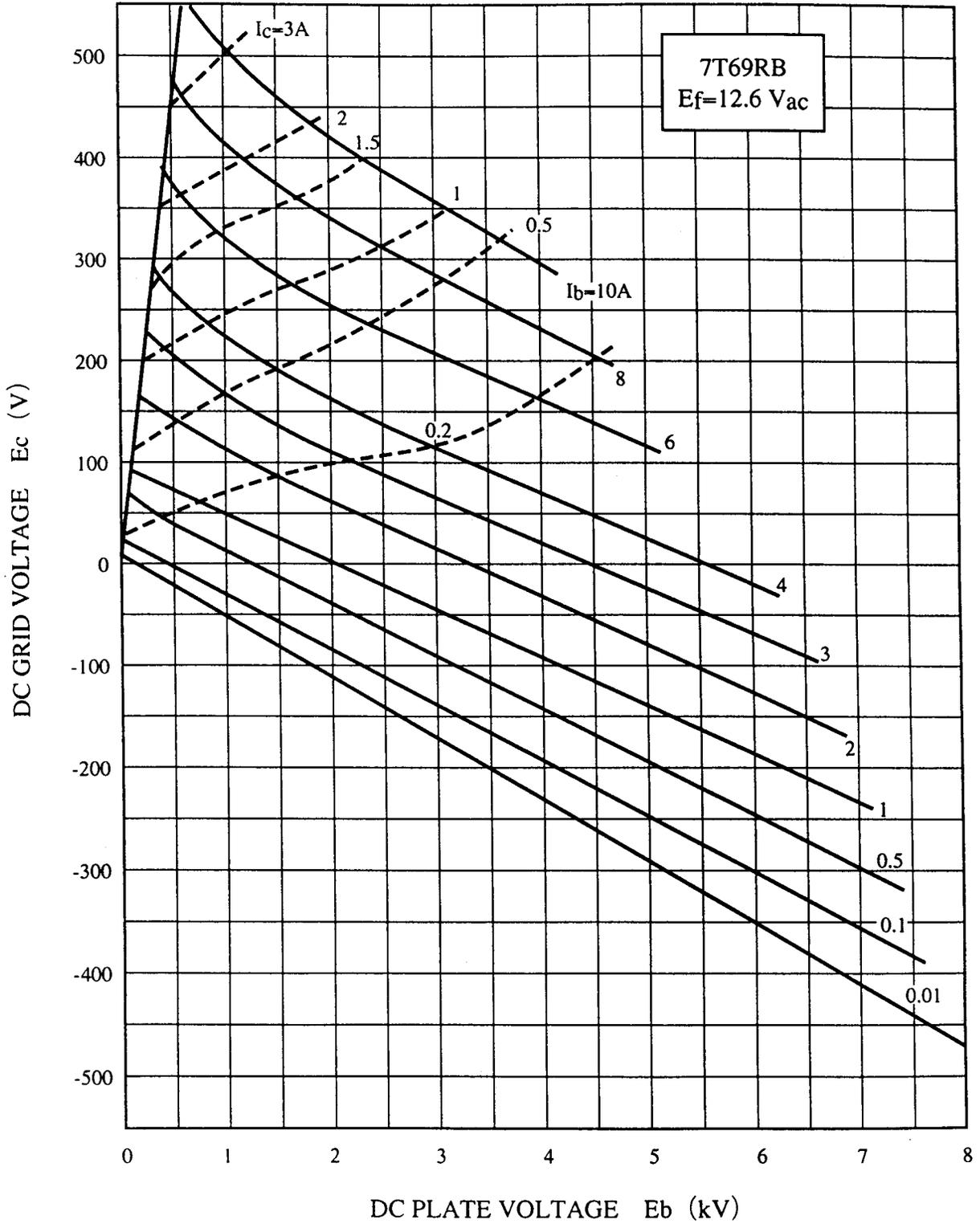
At voltage over 10 kV, X-rays are generated. X-ray radiation at voltages up to 20 kV~30kV is soft X-ray with low penetration, therefore, it is absorbed and contained by the metal cabinet and by the glass bulb and metal parts of the tube. However, the intensity of the radiation could become high enough to leak outside, adequate evaluation of X-ray radiation for personal protection is necessary when designing the equipment.

### 4.4 Operating the tube

When the tube is operated for the first time or after long intermission, it is desirable to preheat for more than 15 minutes and to increase the high voltage gradually. This operation is effective to improve and stabilize the vacuum level and ensure stable operation.

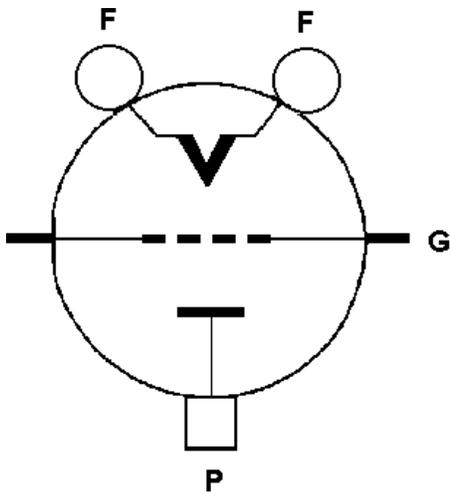


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**P : Plate**  
**G : Grid**  
**F : Filament**

