Amperex

AX5186

High Voltage Regulator or Switch Tube Power Tetrode
For X-Ray and CT Applications

Oil cooled power tetrode in metal-glass constnuction intended for use as a high voltage regulator or switch tube for voltages up to 100 kV and anode dissipations up to 1.5 kW average.

Heating: direct; thoriated tungsten filament, mesh type.

Filament voltage	V_f		7.5	V±5%
Filament current	I_f		17	A
Filament peak starting current	I_{fp}	max.	85	A
Cold filament resistance	R_{fo}		53	mΩ

Typical Characteristics

Measured at:	V_a		5	kV
	V_{g2}		1000	V
	I_a		1.5	A
	S		10	mA/V
Transconductance	μ_{g2g1}		6.5	
Amplification factor				

Capacitances

Cathode to grid 1	C_{cg1}	=	14	pF
Grid 1 to grid 2	C_{g1g2}	=	22	pF
Grid 2 to anode	C_{g2a}	=	7.5	pF

Limiting Values (Absolute maximum rating system)

Anode voltage in oil	Va		100	kV
Grid 2 voltage (+ and -)	V_{g2}		1000	V
Grid 1 voltage	$-V_{g1}$		1000	V
Peak cathode current	I_{kp}		5	A
Anode dissipation	W_a		1.5	kW
Grid 2 dissipation*	W_{g2}		75	W
Grid 1 dissipation*	W_{g1}		25	W

* - Average value.
* - For pulse operation the dissipation depends on voltage and current during pulse and duty cycle.

Temperature

Bulb temperature	T_{env}	max.	150	°C
Temperature of pin seals	T_{pin}	max.	150	°C
Temperature of anode	T_{anode}	max	250	°C
Cooling - immersed in oil				

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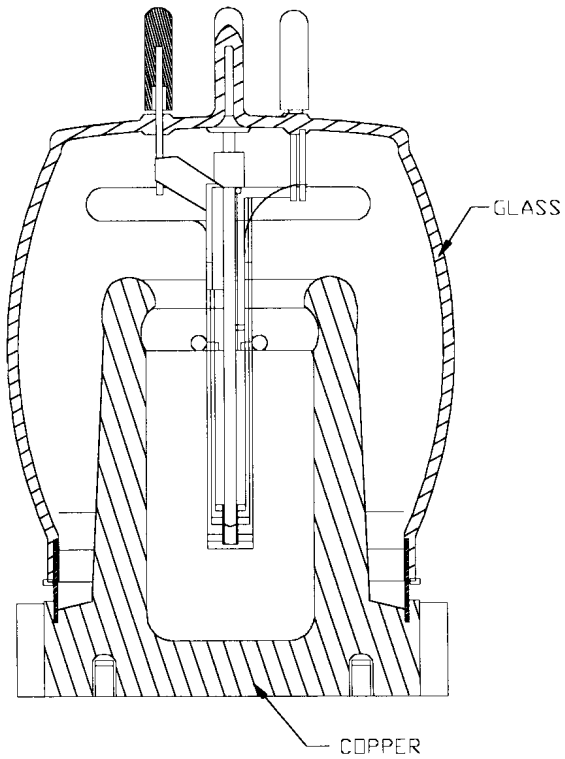
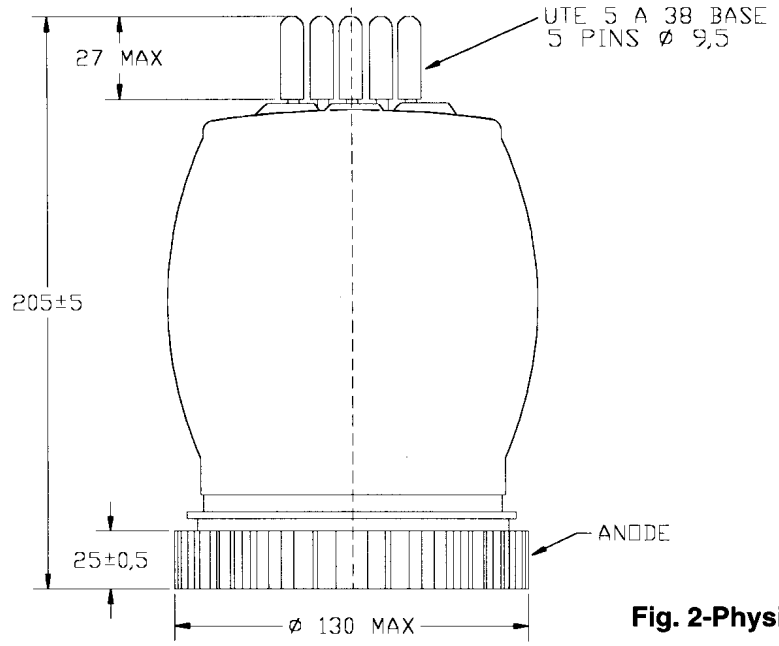
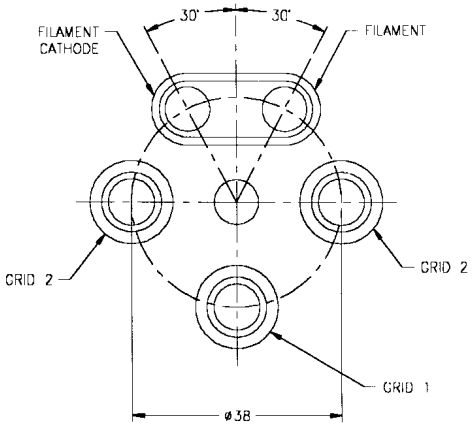


Fig. 1-Cross-Section

Mechanical Data

Mounting position:	vertical with anode up or down
Net Mass:	approx. 5.2 kg
Base:	super giant
Socket:	2422 512 00001





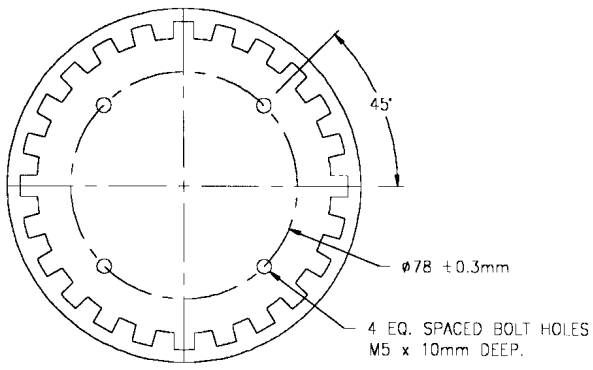


Fig. 2-Physical dimensions

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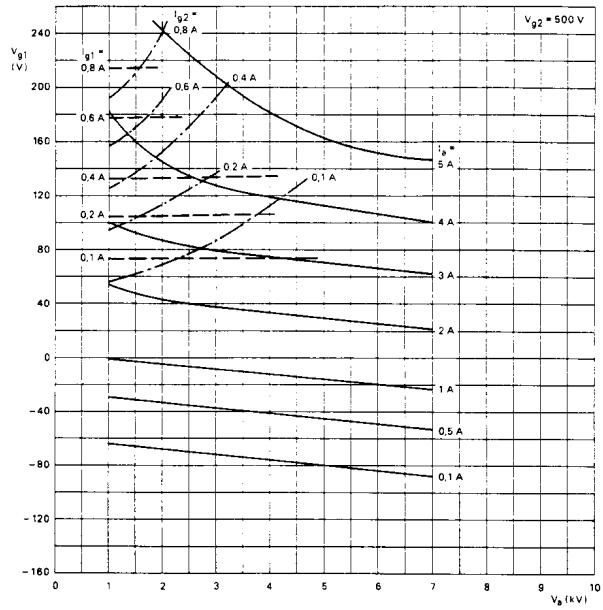

Fig. 3 Constant current characteristics for a grid 2 voltage of 500 V.

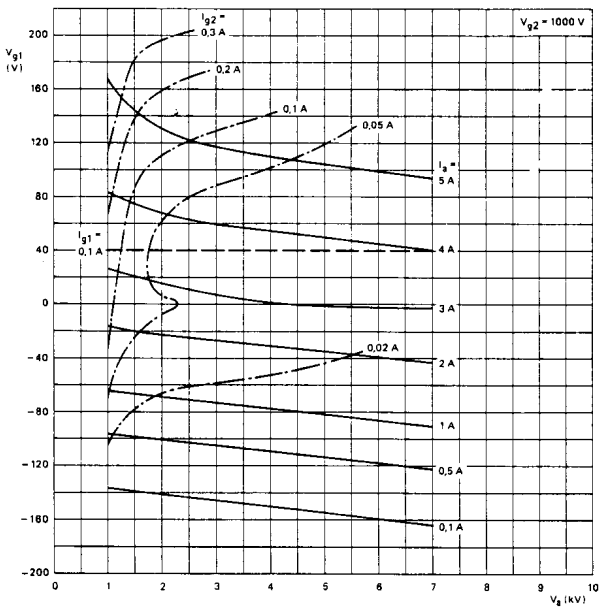

Fig. 4 Constant current characteristics for a grid 2 voltage of 1000 V.

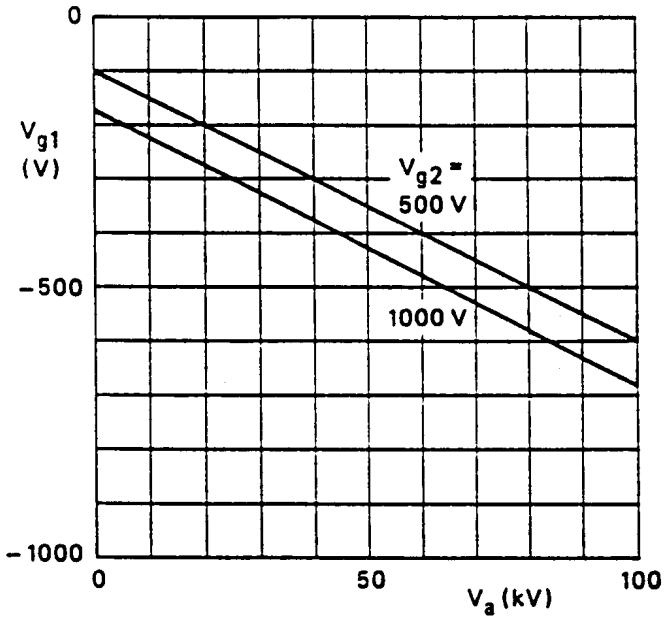

Fig. 5 Anode cut-off characteristics for a grid 2 voltage of 500 V and 1000 V.

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Handling Instructions AX5186

Please read carefully before removing tube from shipping container.

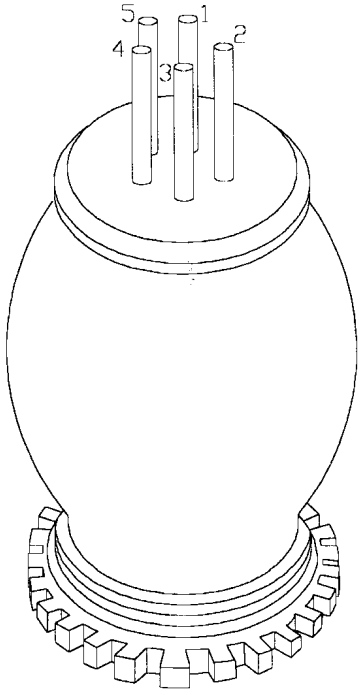
1. Carefully remove the foam upper shock absorber as shown in illustration.
2. Use an ohmmeter to check the pins shown on the illustration for short circuits.
3. In the event of any damage to container or tube, please process a claim to your insurance company and the shipping carrier immediately.
4. The AX5186 is very sensitive to shock. It has been fastened to a wooden plate resting on top of foamed cushioning material.
5. Please be careful when removing the tube from the wooden plate. When resting the tube upon a table, use the plate with the felt sides down or lay other shock-absorbing material under the tube.
6. We strongly recommend that the tube be kept in its container during storage.
7. If the tube has to be returned for warranty consideration, then please reverse the above procedure. Save all the original packing/shipping material. We can only accept returns in authorized shipping containers.

Installation Instructions

1. Heater voltage must be measured directly at connection using true RMS meter.
2. Carefully align the tube in its socket along the vertical axis and make sure the pin alignment is correct to avoid undue stress and shock.
3. Clean and remove all dust very carefully from tube and socket. If the tube had previously been in the tank, then carefully clean and remove all traces of oil.
4. Consult data sheet for more information concerning voltages, start-up procedures.

Checking Open Filament and Short Circuit

Pin #	Description
1	Filament
2	Grid 2
3	Grid 1
4	Grid 2
5	Filament Cathode



1. Open filament: place ohmmeter between pins 1 and 5.
   The filament resistance must exist.

2. Short circuit: place the ohmmeter between:
   pins 1 & 2 pins 5 & 2 pins 2 & 4
   pins 1 & 3 pins 5 & 3 pins 4 & 3
   pins 1 & 4 pins 5 & 4 pin 4 & anode
   pin 2 & anode
   No deviation must happen on the ohmmeter.

3. Continuity of grid 2: place the ohmmeter between pins 2 & 4, deviation must happen.

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AX5186 General Conditions of Limited Warranty

Limited Warranty:

Our AX5186 pulse tetrode is warranted to be free from defects in material and workmanship only. If any defects due to material and workmanship appear and the tube has been operated within the published ratings, an adjustment will be made in accordance with the general conditions set out below:

1. Shelf life 6 months. This starts from the date of shipment from Richardson.
2. 500 hours full warranty—within the 12 months operational life after the maximum 6 months shelf life.
3. 2,000 hours pro-rata—within the 12 months operational life after the maximum 6 months shelf life. Warranty involves both calendar time and operational time, whichever elapses first concludes the warranty. Pro-rated credit is determined as follows:
   Elapsed warranty=Operation hours/Warranty hours=Credit %.
4. CT Application - 100,000 Slices Pro-Rata
   Less than 50,000 = 100% credit
   50,000 - 75,000 = 50% credit or 12 months after installation,
   75,000 - 100,000 = 25% credit whichever elapses first.

Conditions

1. The right of access to equipment installation for the purpose of inspection of operating conditions and tube life records shall be accorded to a representative of the manufacturer or any agent appointed by him, if so desired.
2. The liabilities under this warranty are strictly limited, at Richardson's option, to replacement of the tube(s) involved or the granting of a credit in lieu of replacement. Richardson Electronics, Ltd. shall, in no cases, be liable for any consequential damage. Customer shall have no other remedies.
3. If the tube fails within the warranty period, this has to be reported to Richardson Electronics, Ltd. immediately after failure with full information as called for in the questionnaire form supplied with the tube; and in any event so that Richardson Electronics, Ltd. actually receives written notice no later than 5 days after the expiration of 18 months from the date of shipment from Richardson Electronics, Ltd.
4. Tube may be returned at the sender's risk and expense only after receipt of return authorization. To ensure receipt in their condition at the time of rejection, tubes must be adequately packed, preferably in the original packing and shipped by means accepted by Richardson Electronics, Ltd.
5. Customer shall be responsible in case tubes returned by customer are lost in transit or received in damaged condition, notwithstanding any defect or non-conformity of the tube and, in such event, no replacement or credit shall be given.
6. Examination of the tube may necessitate dismantling, after which it cannot be returned.
7. Acceptance of tubes for examination and test does not imply any obligation on the part of the manufacturer to replace or give credit for them.
8. Tubes found by the manufacturer's engineers to work satisfactorily according to the published ratings will be returned at the owner's risk and expense and with a charge for testing and examination at Richardson Electronics, Ltd.'s discretion.
9. Richardson Electronics, Ltd. has sole responsibility for determining the cause or nature of failure and Richardson Electronics, Ltd.'s determination with regard thereto shall be final.
10. This warranty is expressly in lieu of all other warranties, expressed or implied, including but not limited to warranties of merchantability, fitness for particular purpose, use or application, and any warranty arising out of a course of dealing or of performance, custom or usage of trade, or other obligation or liability on the part of Richardson Electronics, Ltd. unless such other warranties, obligations or liabilities are expressly agreed to in writing by Richardson Electronics, Ltd.

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