

PET1184J2 / PET1184J2F

Water Cooled Triode
For Industrial R.F. Heating

Drop in equivalent of:

- YD1202
- BW1184J2
- BW1184J2F

- Output Power: 166 kW
- Anode voltage: 14.4 kV max
- Anode dissipation: 80 kW max
- Frequency up to 30 MHz

Manufactured in India, in a world-class facility equipped with high quality machinery, materials and components sourced from reputed suppliers in America, Europe and Japan.

Fifty-two weeks warranty against manufacturing defects irrespective of the number of hours of operation.



PET1184J2 / PET1184J2F

The PET1184J2 and PET1184J2F are water cooled power triodes of coaxial ceramic-metal construction, intended primarily for industrial RF heating machines. They have removable water jackets. PET1184J2F has integral filament leads.

Electrical Characteristics

Filament	thoriated tungsten
Filament voltage (see note 1)	12.2 V
Filament Current	255 A
Surge filament current (peak) (see note 2)	1500 A max
Filament cold resistance.	5.3 mΩ
Peak usable cathode current	106 A
Amplification factor ($V_a = 10$ kV, $I_a = 8.0$ A)	30
Mutual conductance ($V_a = 10$ kV, $I_a = 8.0$ A)	150 mA/V
Inter – electrode capacitances:	
Grid to anode	55 pF
Grid to filament	170 pF
Anode to filament	2.7 pF

Mechanical Characteristics

Overall length:	
PET1184J2.	446 mm
PET1184J2F	475 mm
Overall diameter	190.5mm (7.500 inches) max
Net weight:	
PET1184J2.	11.5 kg approx
PET1184J2F	12 kg approx
Mounting position (See note 3).	Vertical, anode up or down

Accessories

Water coupling, 2 supplied with tube.	PA709B
Grid connector	PA342
Thermal fuse	PA85G

Radio Frequency Oscillator For Industrial Service

(Class C Conditions, One Tube)

Maximum Ratings (Absolute Values)

Frequency	30 MHz
Anode voltage	14.4 kV max
Anode input power	220 kW max
Anode dissipation	80 kW max
Grid voltage (negative value)	2.0 kV max
Grid current:	
on load	4.0 A max
off load	5.5 A max
Grid dissipation	2.3 kW max
Grid circuit resistance	10 kΩ max
Cathode current.	22 A max



Cooling

The water cooling requirements are given in the table.

Anode plus grid dissipation (kW)	inlet temperature (°C)	minimum rate of flow of water		inlet pressure (atm)	Outlet temperature (°C)
		l. /min	imp.gal/min		
80	20	40	8.8	0.35	50
80	50	60	13.2	0.65	70
60	20	28	6.2	0.18	52
60	50	42	9.2	0.32	72
40	20	18	4.0	0.08	54
40	50	27	6.0	0.15	73

The inlet water temperature must never exceed 50 °C.

The temperature of the seals and envelope must not exceed 200 °C. Cooling of the seals by low velocity air flow or water cooled filament connectors is required.

Typical Operating Conditions

Frequency	.	.	.	.	.	.	.	30	30	MHz
Anode voltage	.	.	.	.	.	.	.	12	10	kV
Anode current	.	.	.	.	.	.	.	18	16	A
Anode dissipation	.	.	.	.	.	.	.	45	36	kW
Grid voltage	.	.	.	.	.	.	.	-1080	-700	V
Grid resistor	.	.	.	.	.	.	.	360	200	Ω
Grid current, on load	.	.	.	.	.	.	.	3.0	3.5	A
Grid current, off load	.	.	.	.	.	.	.	3.8	4.8	A
Grid dissipation	.	.	.	.	.	.	.	1.6	1.5	kW
Feedback ratio (see note 4)	.	.	.	.	.	.	.	15	12	%
Drive power	.	.	.	.	.	.	.	4.8	4.0	kW
Output power	.	.	.	.	.	.	.	171	124	kW
Efficiency	.	.	.	.	.	.	.	79.5	77.5	%
Oscillator output power (see note 5)	.	.	.	.	.	.	.	166	120	kW

Notes

- Temporary fluctuations up to +5% or -10% in filament voltage are permissible.
- The filament current must not exceed 1500 A, even momentarily, at any time.
- If the tube is mounted with the anode uppermost, the water inlet and outlet connections should be reversed (see outline).
- The feedback ratio is defined as $\frac{V_{g(pk)}}{V_{a(pk)}} \times 100$
 where $V_{g(pk)}$ = peak R.F. grid voltage in volts
 and $V_{a(pk)}$ = peak R.F. anode voltage in volts
- Oscillator output power = $P_{out} - P_{drive}$
 where P_{out} = output power of tube to anode circuit
 and P_{drive} = drive power fed back to grid circuit

Health And Safety Hazards

PET electronic devices are safe to handle and operate, provided that the precautions stated are observed. PET does not accept responsibility for damage or injury resulting from the use of electronic devices it produces. Equipment manufacturers and users must ensure that adequate precautions are taken. Appropriate warning labels and notices must be provided on equipments incorporating PET devices and in operating manuals.



High voltage

Equipment must be designed so that personnel cannot come into contact with high voltage circuits. All high voltage circuits and terminals must be enclosed and fail-safe interlock switches must be fitted to disconnect the primary power supply and discharge all high voltage capacitors and other stored energy before allowing access. Interlock switches must not be bypassed to allow operation with access doors open.



R.F. Radiation

Personnel must not be exposed to excessive R.F. radiation. A properly designed equipment cabinet with good R.F. electrical connection between panels will normally provide sufficient protection.



X-Ray Radiation

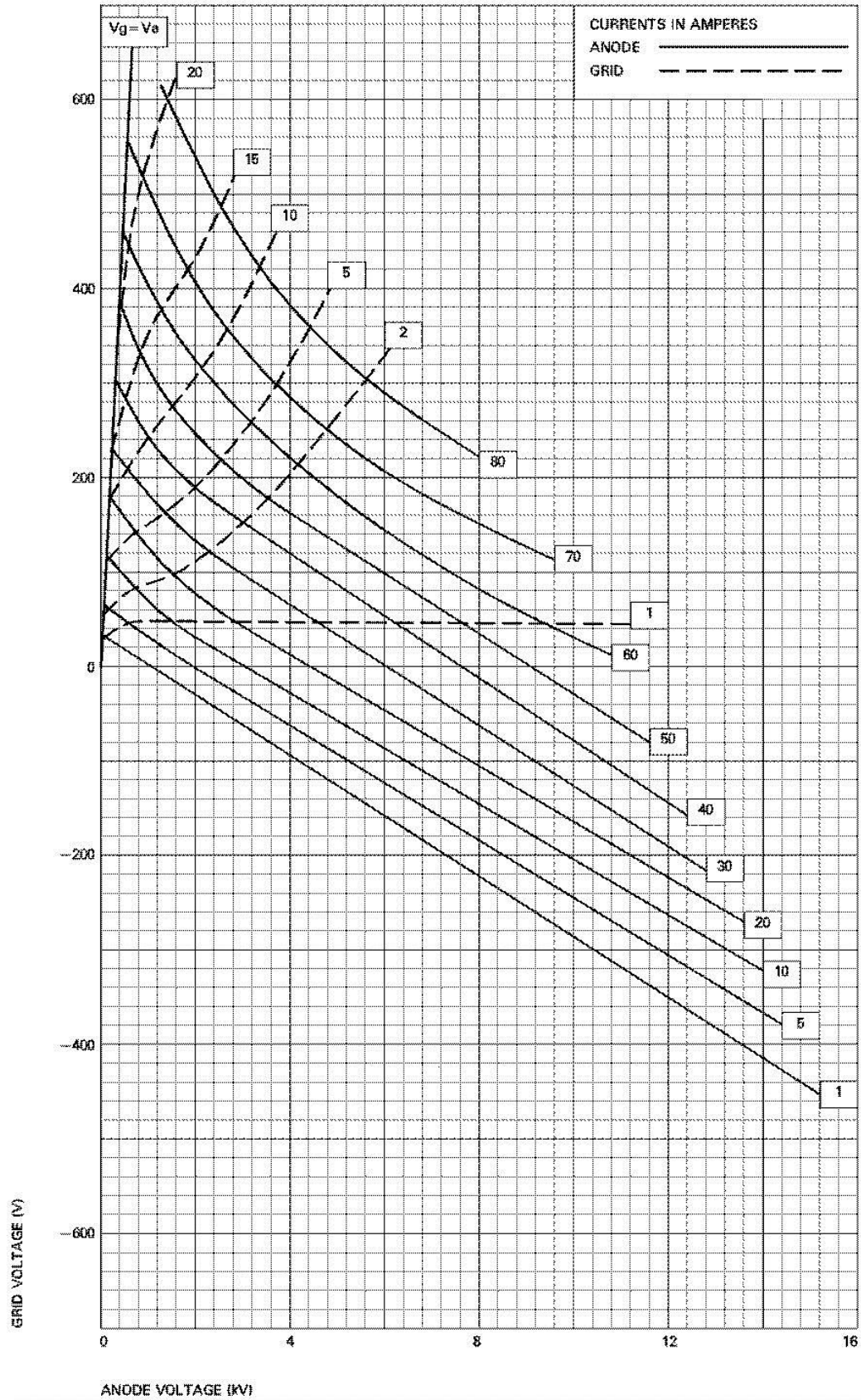
This device, when operating at voltages above 5 kV, produces progressively more dangerous X-rays as the voltage is increased, the radiation varies greatly during life. The device envelope provides only limited protection and further shielding may be required. A metal equipment cabinet with overlapping joints will usually provide sufficient shielding, but if there is any doubt an expert in this field should perform an X-ray survey of the equipment.



Implosion

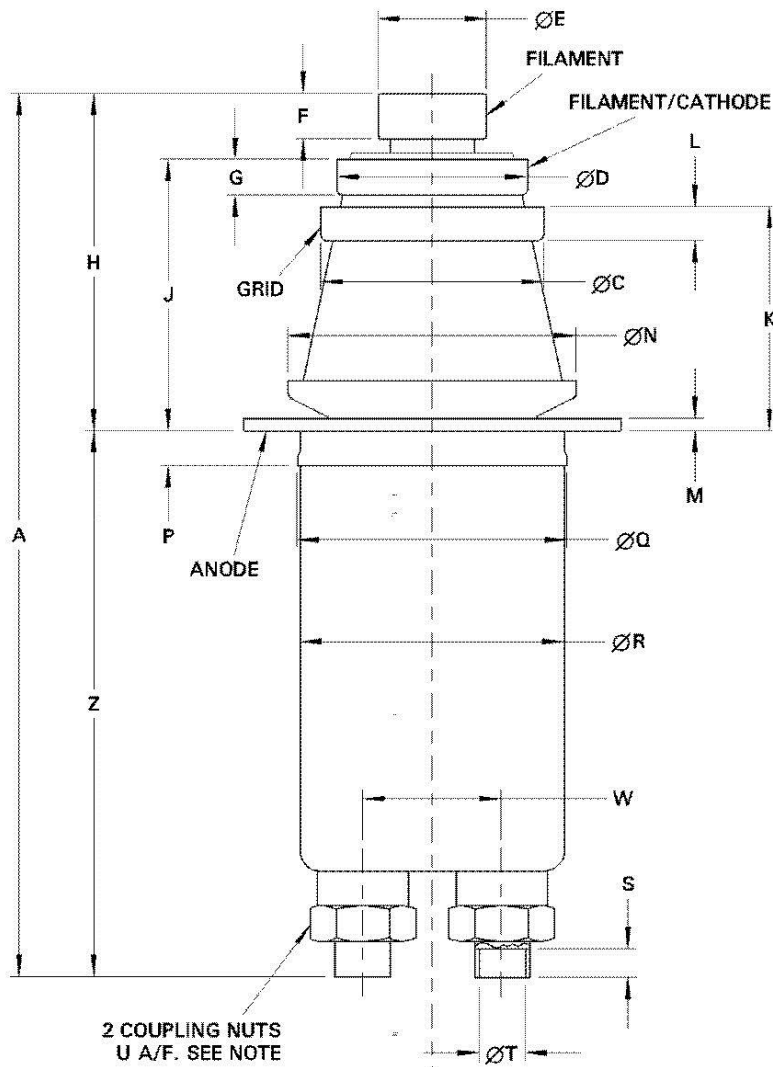
This tube stores potential energy by virtue of its vacuum. The energy level is low, but there is some hazard from flying fragments if the tube is dropped or subjected to violent impact. The tube must be stored and transported in its approved pack. During installation or replacement the tube must not be scratched or damaged in any way likely to reduce the strength of the ceramic envelope.

Constant Current Characteristics



Outline of PET1184J2

(All dimensions without limits are nominal)



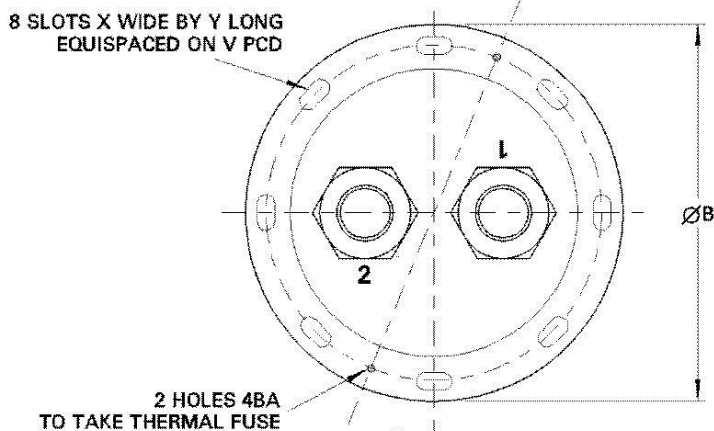
Ref	Millimetres
A	446.0 max
B	190.5 max
C	112.0 ± 0.2
D	96.0 ± 0.2
E	54.00 ± 0.15
F	23.0
G	15.0
H	171.5 max
J	137.0
K	113.0
L	14.0
M	6.3
N	145.0 max
P	17.5
Q	148.0 max
R	143.0 ± 1.0
S	18.5
T	28.0
U	46.0
V	170.0
W	70.0
X	9.0
Y	18.0
Z	270.0

Outline Note

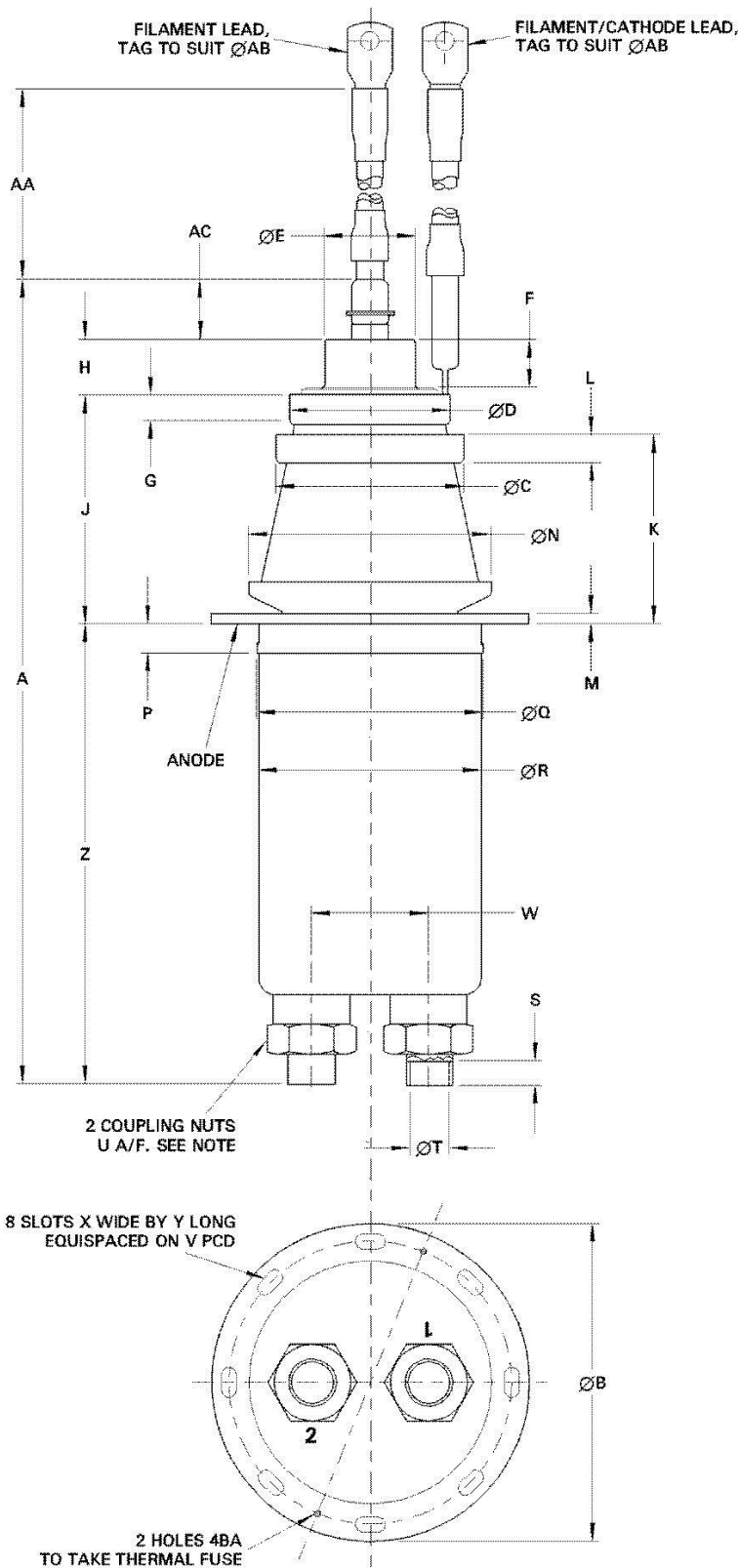
Suitable water pipe connectors are supplied with the tube.

Water Connections

	Anode down	Anode up
Inlet	1	2
Outlet	2	1



Outline of PET1184J2F
 (All dimensions without limits are nominal)



Ref	Millimetres
A	475.0 max
B	190.5 max
C	112.0 ± 0.2
D	96.0 ± 0.2
E	54.00 ± 0.15
F	29.0
G	15.0
H	32.0
J	137.0
K	113.0
L	14.0
M	6.3
N	145.0 max
P	17.5
Q	138.0 max
R	133.0 ± 1.0
S	18.5
T	28.0
U	46.0
V	170.0
W	70.0
X	9.0
Y	18.0
Z	270.0
AA	330.0
AB	13.1
AC	36.0

Outline Note

Suitable water pipe connectors are supplied with the tube.

Water Connections

	Anode down	Anode up
Inlet	1	2
Outlet	2	1

This document cannot be considered to be a contractual specification. The information given herein may be modified without notice due to product improvement or further development. Consult Pilani Electron Tubes and Devices before making use of this information for equipment design.