

PET1647J2F

Water Cooled Triode
For Industrial RF Heating

Drop in equivalent of BW1647J2F

- Output Power: 118 kW
- Anode voltage: 13 kV max
- Anode dissipation: 50 kW max
- Frequency: 30 MHz max

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.



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PET1647J2F

PET1647J2F is a power triode of coaxial ceramic-metal construction. It is intended primarily for industrial RF heating machines. It comes with a removable water jacket. Anode is water cooled.

Electrical characteristics

Filament	Thoriated tungsten
Filament voltage (see note 1)	8.2 V
Filament Current	238 A
Surge filament current (peak) (See note 2).	1200 A max
Filament cold resistance.	4.0 mΩ
Peak usable cathode current	70 A
Amplification factor ($V_a = 10$ kV, $I_a = 5.0$ A).	28
Mutual conductance ($V_a = 10$ kV, $I_a = 5.0$ A).	51 mA/V
Inter-electrode capacitances:	
Grid to anode	47 pF
Grid to filament	126 pF
Anode to filament	2.0 pF

Mechanical characteristics

Overall dimensions	See outline drawing
Net weight:	12 kg approx, 26.5 pounds approx
Mounting position	Vertical, either way up

Accessories

Water Coupling, supplied	PA709B
Thermal fuse	PA85G
Cathode Connector	PA830

For frequencies above 2 MHz, PA830 should be used in conjunction with a strip connection to provide a low inductance cathode return.

Cooling

PET1608J2F has a removable water jacket. Water cooling requirements are as follows:

Anode plus grid Inlet Dissipation (kW)	temperature (°C)	Minimum rate of water flow (l/min)	Pressure drop (bar)	Outlet temperature (°C)
50	20	30	0.27	45
50	50	73	1.38	60
30	20	20	0.10	43
30	50	45	0.72	60
15	20	10	0.07	45
15	50	24	0.15	60

The inlet water temperature must never exceed 50 °C. The pressure in the water jacket must not exceed 6 bar. The temperature of the seals and envelope must not exceed 200 °C. Cooling of the seals by low velocity air flow is required.

Radio Frequency Oscillator For Industrial Service (Class C conditions, one tube)

MAXIMUM RATINGS (Absolute values)

Frequency	30 MHz
Anode voltage	13 kV max
Anode input power	150 kW max
Anode dissipation	50 kW
Grid voltage (negative value)	2.0 kV max
Grid Current	
On load.	3.0 A max
Off load.	3.8 A max
Grid dissipation	1.8 kW max
Grid Circuit resistance	10 kΩ max
Cathode current.	16 A max



Typical Operating Conditions

Frequency	. . .	30	30	30	MHz
Anode Voltage	. . .	8.0	10	12	kV
Anode current	. . .	8.0	10	12	A
Anode dissipation	. . .	13.6	21.1	26.3	kW
Grid Voltage	. . .	-580	-700	-860	V
Grid resistor	. . .	322	318	318	Ω
Grid current, on load	. . .	1.8	2.2	2.7	A
Grid Current, off load	. . .	2.8	3.4	3.5	A
Grid dissipation	. . .	711	1100	1600	W
Feedback ratio (See note 4)	. . .	13.7	13	12.8	%
Drive Power	. . .	1.7	2.6	3.9	kW
Output Power	. . .	51.9	84.6	121.9	kW
Efficiency	. . .	79.3	80	82.3	%
Oscillator output power (See note 5)	. . .	50.2	82	118	kW

NOTES

1. Temporary fluctuations up to + 5% or –10% in filament voltage are permissible.
2. The filament current must not exceed 1200 A, even momentarily, at any time.
3. If the tube is mounted with the anode uppermost, the water inlet and outlet connections should be reversed.
4. The feedback ratio is defined as $V_g(pk)/V_a(pk) \times 100$ where $V_g(pk)$ = peak R.F grid voltage in volts and $V_a(pk)$ = peak R.F. anode voltage in volts.
5. Oscillator output power = P out – P drive where Pout= 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 using PET devices.



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

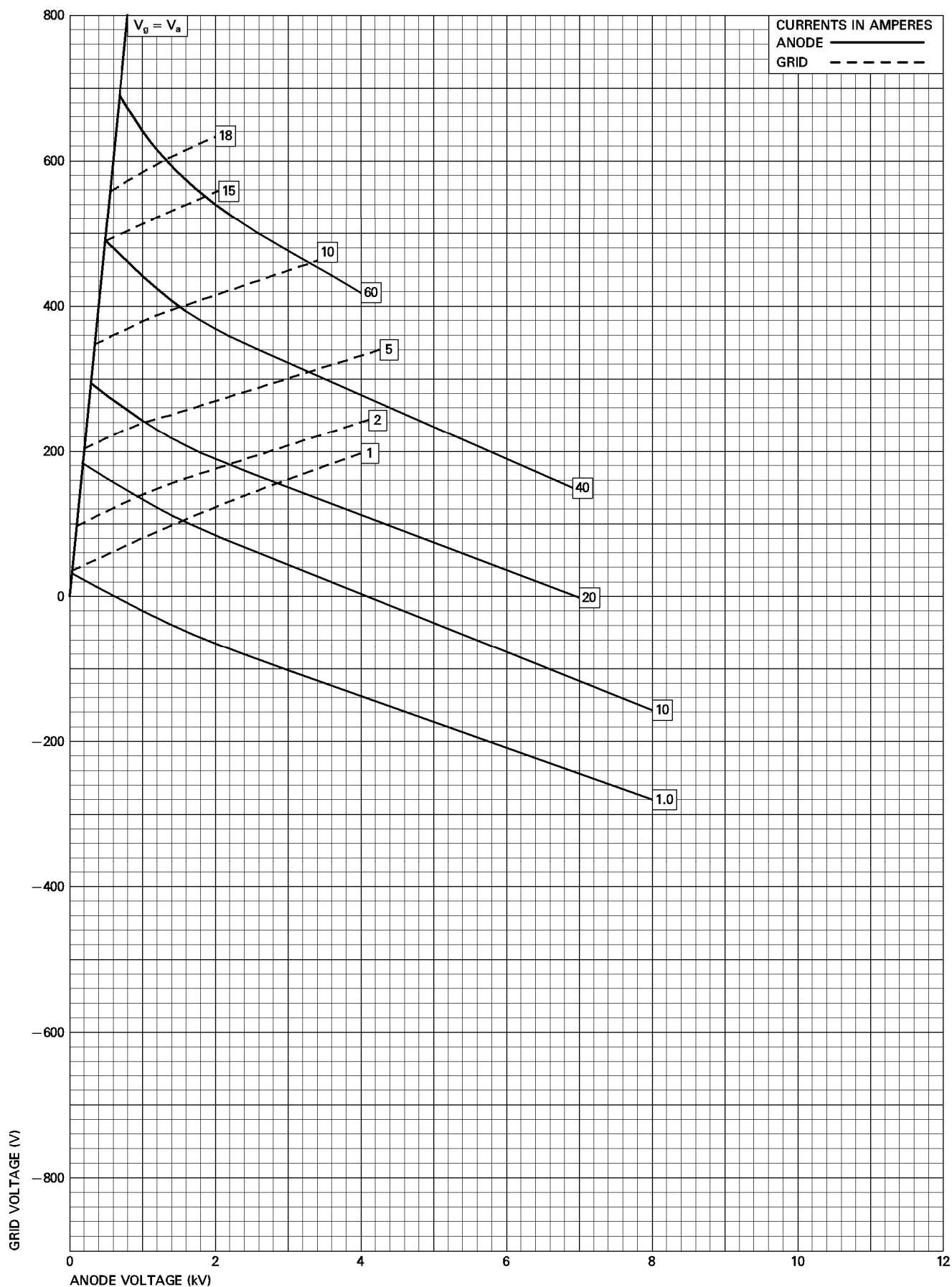
This device, when operating at voltages above 5 kV, produces progressively more dangerous X-rays as the voltage is increased, the radiation varies greatly during life. The device envelope provides only limited protection and further shielding may be required. A metal equipment cabinet with overlapping 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

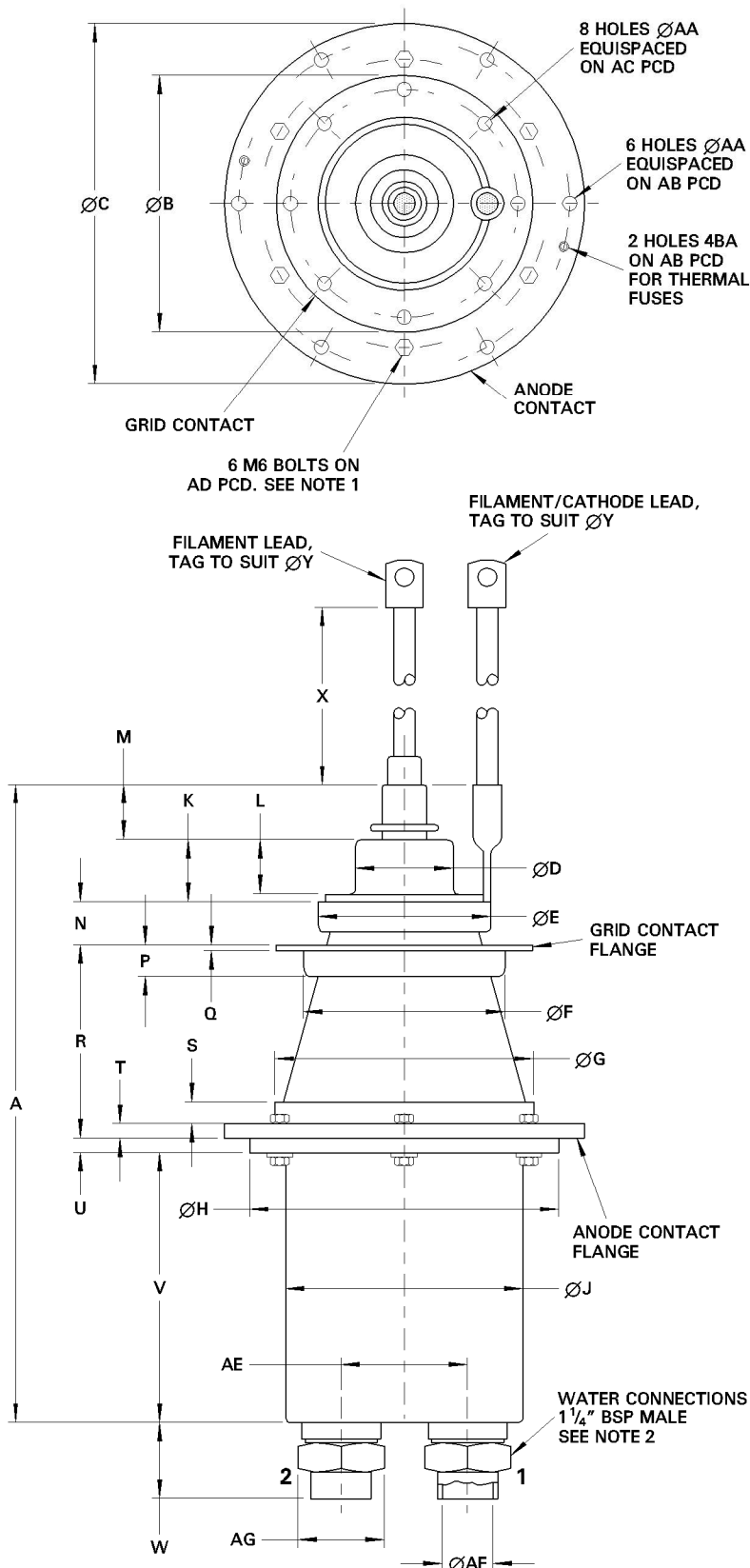
This tube stores potential energy by virtue of its vacuum. The energy level is low, but there is some hazard from flying fragments if the tube is dropped or subjected to violent impact. The tube must be stored and transported in its approved pack. During installation or replacement the tube must not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

Constant Current Characteristics



Outline Drawing

(All dimensions nominal)



Ref	Millimetres
A	370.0
B	142.0
C	200.0
D	54.0
E	96.0
F	112.0
G	145.0
H	172.0
J	133.0
K	33.0
L	29.0
M	36.0
N	24.0
P	18.0
Q	3.0
R	105.0
S	12.5
T	7.0
U	6.3
V	166.7
W	46.0
X	400.0
Y	13.1
AA	6.3
AB	186.0
AC	127.0
AD	160.0
AE	70.0
AF	28.0
AG	46.0

Notes

1. The six M6 bolts enable the water jacket to be removed by the customer if required.
2. The water connections must be made as follows, depending on the mounting position.

	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.