

The data should be read in conjunction with the Power Triode Preamble.

ABRIDGED DATA

The BW1661J2 is a water cooled, high μ power triode of coaxial ceramic/metal construction, intended primarily for industrial service. It has an integral water jacket.

Anode dissipation	20	kW max
Anode voltage	14	kV max
Frequency for full ratings	40	MHz max
Output power (class C oscillator, less drive)	20	kW

GENERAL

Electrical

Filament	thoriated tungsten
Filament voltage (see note 1)	5.7 V
Filament current	135 A

COOLING

Anode

The water cooling requirements are given in the following table.

Anode plus grid dissipation (kW)	Inlet temperature (°C)	Minimum rate of flow of water (l./min)	Pressure drop (kPa)	Outlet temperature (°C)
5.0	35	4.2	2.0	55
10	35	8.0	8.5	55
15	35	11.7	19.0	55
20	35	15.5	30.0	55

The inlet water temperature must never exceed 50 °C.

The water pressure must never exceed 600 kPa.

Seals and Envelope

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.

Filament cold resistance	5.0	m Ω
Peak usable cathode current	25	A
Amplification factor (V _a = 10 kV, I _a = 2.0 A)	120	
Mutual conductance (V _a = 10 kV, I _a = 1.5 A)	50	mA/V
Inter-electrode capacitances:		
grid to anode	21.5	pF
grid to filament	56	pF
anode to filament	0.3	pF

Mechanical

Overall length	247	mm nom
Overall diameter	130	mm nom
Net weight (approx)	4.1	kg
Mounting position (see note 2)	vertical, anode up or down	

RADIO FREQUENCY OSCILLATOR FOR INDUSTRIAL SERVICE

(Class C conditions, one tube)

MAXIMUM RATINGS (Absolute values)

Frequency	40	120	MHz
Anode voltage	14	10	kV
Anode dissipation	20	20	kW
Grid voltage (negative value)	800	800	V max
Grid current:			
on load	1.7	1.3	A
off load	2.1	1.7	A
Grid dissipation	500	330	W
Grid circuit resistance	15	15	kΩ
Cathode current	5.0	5.0	A
Fault current			see note 3

TYPICAL OPERATING CONDITIONS

Frequency	≤ 120	MHz
Anode voltage	10	kV
Anode current	2.5	A
Anode dissipation	4.4	kW
Grid voltage	−290	V
Grid resistor	295	Ω
Grid current, on load	1.0	A
Grid dissipation	210	W
Feedback ratio (see note 4)	5.4	%
Drive power	500	W
Output power	20	kW
Efficiency (oscillator)	78.4	%

NOTES

1. Temporary fluctuations up to +5% or −10% in filament voltage are permissible.
2. If the tube is mounted with the anode uppermost, the water inlet and outlet connections should be reversed (see outline).
3. A fast-acting over-current cut-out, acting on the anode supply, is essential for protecting the tube in the event of an internal flashover. The following test on the anode power supply may be used to check that the over-current cut-out is fast enough; the applied anode voltage is short-circuited by means of a high voltage switch directly at the tube anode and the short-circuit current flows through a length of copper wire (approximately 2 to 3 cm/kV of applied anode voltage). A copper wire of 0.3 mm diameter should not fuse.
4. The feedback ratio is defined as $\frac{V_{g(pk)}}{V_{a(pk)}} \times 100$
 where $V_{g(pk)}$ = peak RF grid voltage in volts
 and $V_{a(pk)}$ = peak RF anode voltage in volts

HEALTH AND SAFETY HAZARDS

e2v technologies electronic devices are safe to handle and operate, provided that the precautions stated are observed. e2v technologies 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 e2v technologies 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.

RF Radiation

Personnel must not be exposed to excessive RF radiation. A properly designed equipment cabinet with good RF 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.

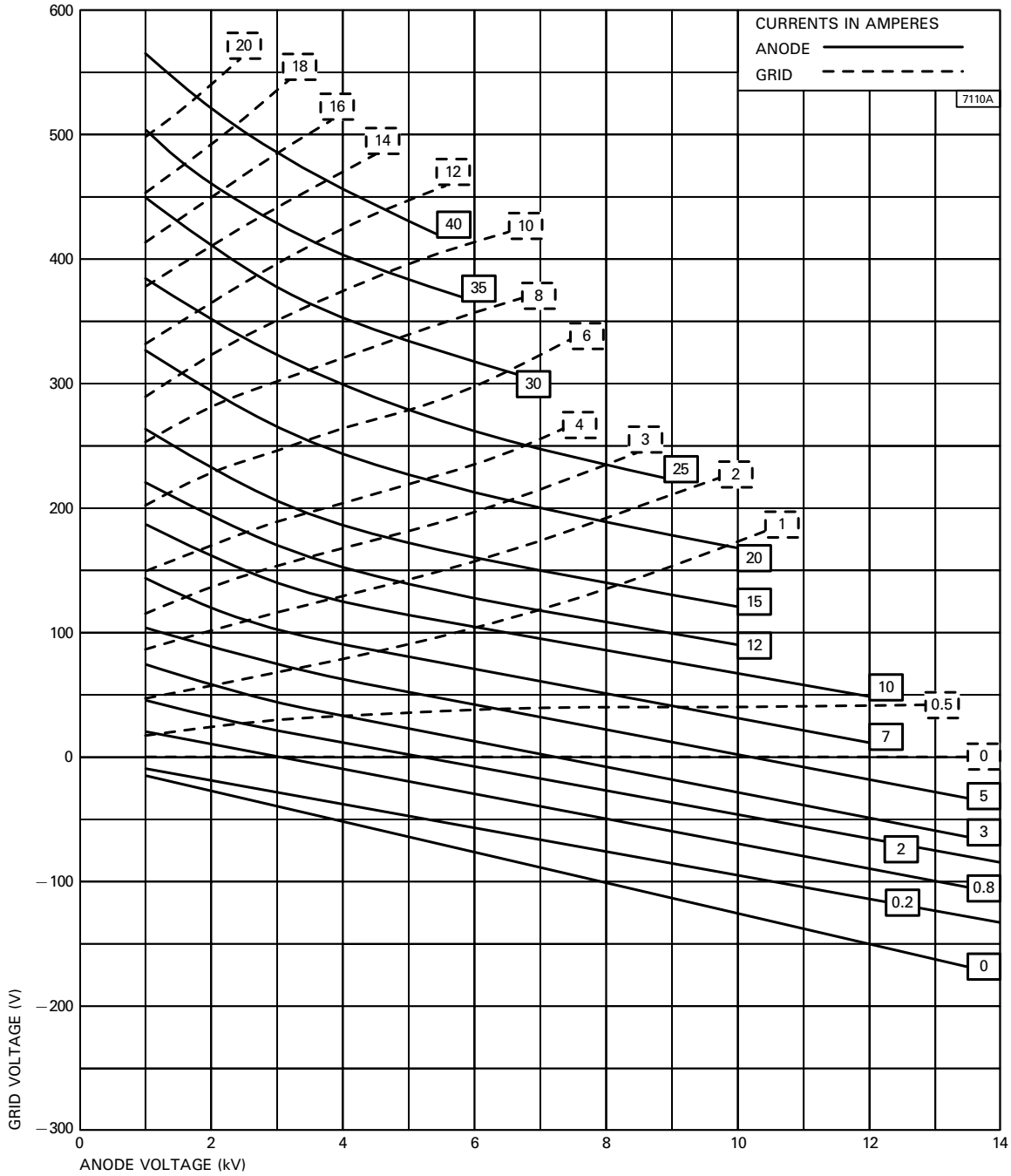
Implosion

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.

References

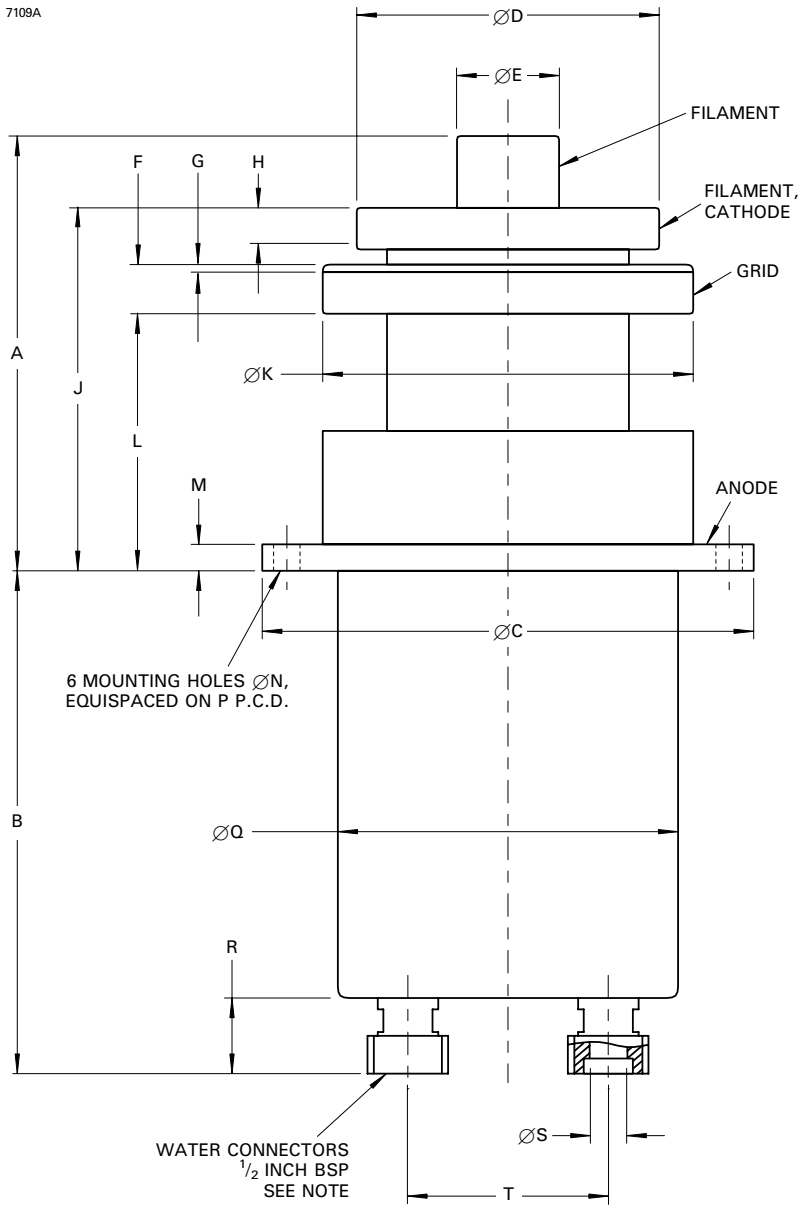
1. BS 3192. Specification for safety requirements for radio (including television) transmitting apparatus.
2. TEPAC Publication no. 181. Recommended practice on X-radiation detection and measurement for high power tubes.

TYPICAL CONSTANT CURRENT CHARACTERISTICS



OUTLINE (All dimensions nominal)

7109A



Ref	Millimetres
A	115.0
B	132.0
C	130.0
D	78.0
E	25.8
F	13.0
G	2.0
H	9.0
J	96.0
K	98.0
L	67.0
M	7.0
N	7.0
P	117.0
Q	90.0
R	21.5
S	10.0
T	53.0

Outline Note

The water connectors are numbered 1 and 2; they must be connected as follows to give the correct direction of water flow.

Water Connections

	Anode down	Anode up
Inlet	1	2
Outlet	2	1

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