

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

ABRIDGED DATA

RF power triode of coaxial ceramic/metal construction, intended primarily for industrial service.

Anode cooling	water; integral jacket
Anode dissipation	50 kW max
Anode voltage	14 kV max
Frequency for full ratings	30 MHz max
Output power (class C oscillator, less drive)	130 kW

GENERAL

Electrical

Filament	thoriated tungsten
Filament voltage (see note 1)	11 V
Filament current	240 A
Surge filament current (peak) (see note 2)	1200 A max
Filament cold resistance	5.4 m Ω
Peak usable cathode current	90 A
Amplification factor ($V_a = 10$ kV, $I_a = 5.0$ A)	24
Mutual conductance ($V_a = 10$ kV, $I_a = 5.0$ A)	95 mA/V
Inter-electrode capacitances:	
grid to anode	47 pF
grid to filament	126 pF
anode to filament	2.0 pF

Mechanical

Overall dimensions	see outline
Net weight	12 kg approx
Mounting position (see note 3)	vertical, either way up

Accessories

Water coupling	MA709B
Thermal fuse	MA85E or MA85G
Cathode connector	MA830

For frequencies above 2 MHz, MA830 should be used in conjunction with a strip connection to provide a low inductance cathode return.



COOLING

Anode

The BW1665J2F has an integral water jacket. See table for water cooling requirements. The inlet water temperature must never exceed 50 °C. The BW1665J2F can be supplied fitted with a thermal fuse MA85G if required.

Seals and Envelope

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

Water Cooling Requirements

Anode plus grid dissipation (kW)	Inlet temperature (°C)	Minimum rate of water flow (l/min)	Pressure drop (kPa)	Outlet temperature (°C)
50	20	30	27.36	45
50	50	73	137.8	60
30	20	20	10.3	43
30	50	45	71.9	60
15	20	10	7.09	45
15	50	24	15.20	60

RADIO FREQUENCY OSCILLATOR FOR INDUSTRIAL SERVICE (Class C conditions, one tube)

MAXIMUM RATINGS (Absolute values)

Frequency	30	MHz
Anode voltage	14	kV max
Anode input power	175	kW max
Anode dissipation	50	kW max
Grid voltage (negative value)	1.5	kV max
Grid current:		
on load	3.0	A max
off load	5.0	A max
Grid dissipation	1.8	kW max
Grid circuit resistance	10	kΩ max
Cathode current	19	A max

TYPICAL OPERATING CONDITIONS

Frequency	30	30	30	MHz
Anode voltage	10	12	12	kV
Anode current	11	10	14.5	A
Anode dissipation	21.3	20.8	39.0	kW
Grid voltage	-780	-870	-790	V
Grid resistor	260	335	360	Ω
Grid current, on load	3.0	2.6	2.2	A
Grid dissipation	1500	1200	900	W
Feedback ratio (see note 4)	14	12	12	%
Drive power	3.8	3.4	2.6	kW
Output power	89	99.6	135.0	kW
Efficiency	80.7	82.7	76	%
Oscillator output power (see note 5)	85.2	96.2	132.4	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 BW1665J2F is mounted with the anode uppermost, the water inlet and outlet connections should be reversed (see page 5).

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

5. 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

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.



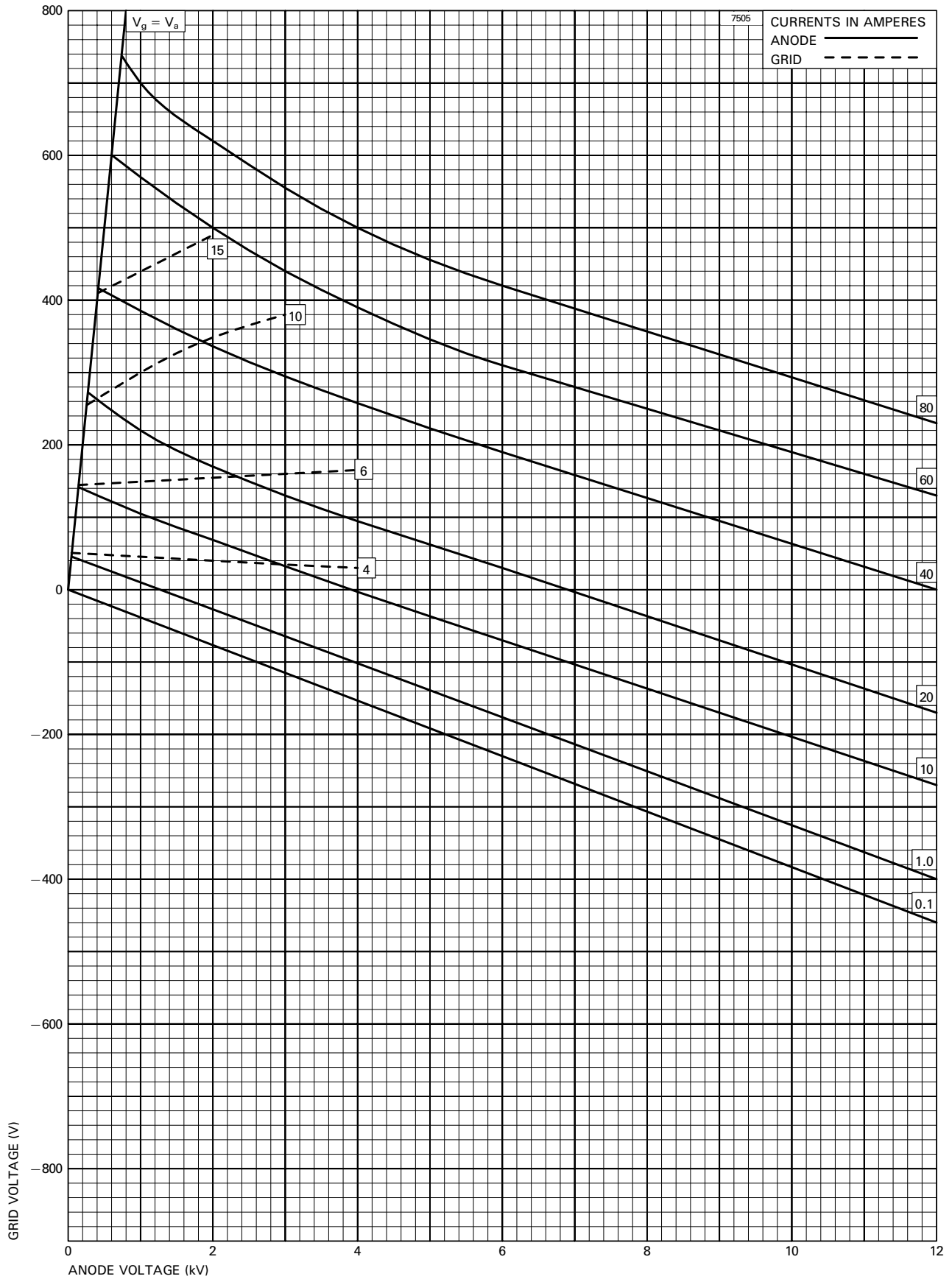
Implosion

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.

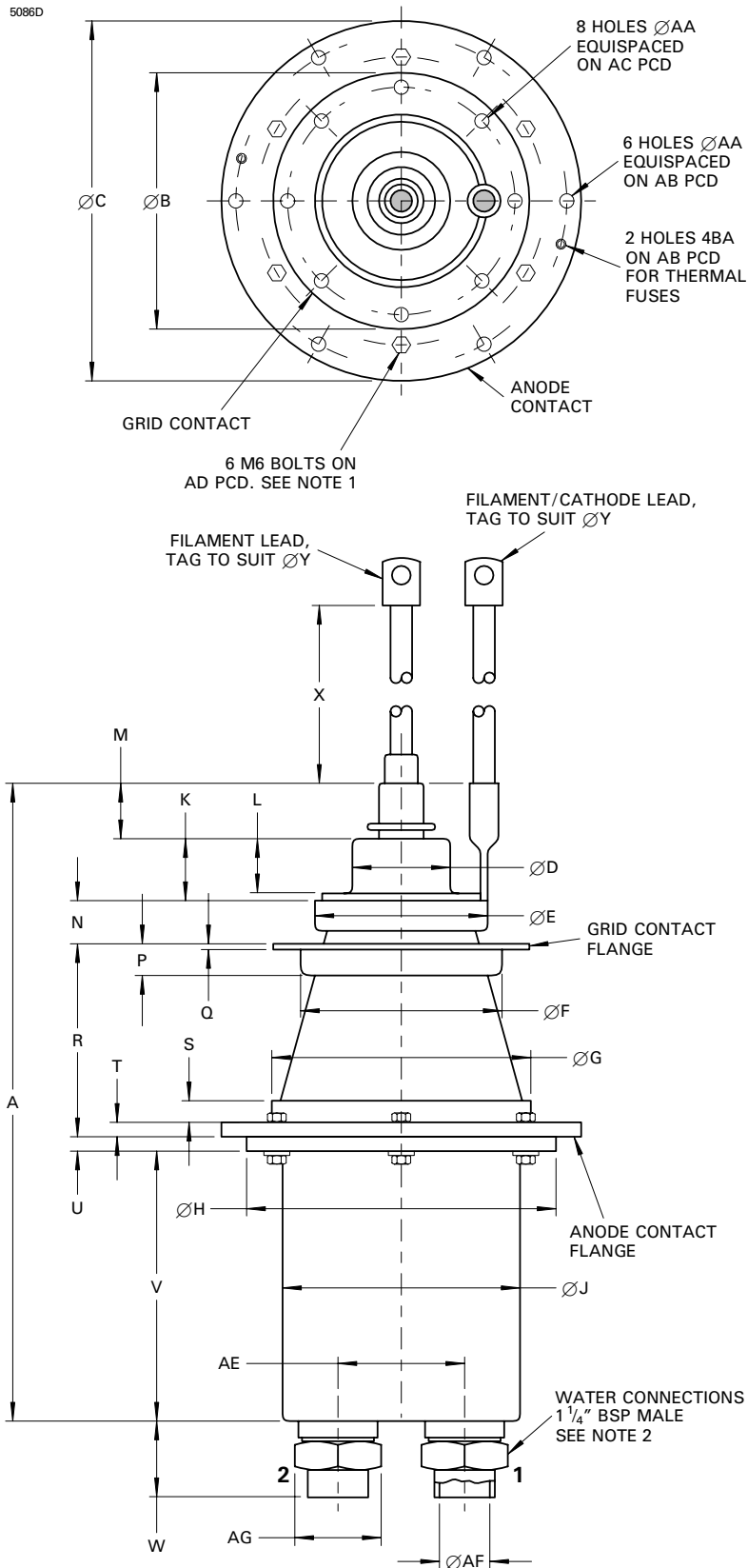
References

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

TYPICAL CONSTANT CURRENT CHARACTERISTICS



OUTLINE FOR BW1665J2F (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	330.0
Y	13.1
AA	6.3
AB	186.0
AC	127.0
AD	160.0
AE	70.0
AF	28.0
AG	46.0

Outline 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

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