

# E2V Technologies

## CW1603J2

### RF Power Tetrode

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

### ABRIDGED DATA

Water cooled tetrode of metal-ceramic construction, with an integral water jacket, intended primarily for class C amplifiers and oscillators.

Anode dissipation . . . . .	300	kW max
Anode voltage (class C unmodulated) . . . . .	15	kV max
Maximum operating frequency . . . . .	100	MHz

### GENERAL

#### Electrical

Filament . . . . .	thoriated tungsten
Filament voltage (see note 1) . . . . .	18.0 ± 2% V
Filament current . . . . .	430 A
Filament surge current (see note 2) . . . . .	1100 A max
Filament cold resistance . . . . .	4.8 mΩ
Peak cathode current ( $V_a = V_{g2} = V_{g1} = 600$ V) . . . . .	400 A
Grid-screen amplification factor . . . . .	4.3
Transconductance ( $I_a = 25$ A, $V_{g2} = 1000$ V) . . . . .	400 mA/V
Inter-electrode capacitances, approx:	
cathode to grid 1 . . . . .	310 pF
cathode to grid 2 . . . . .	28 pF
cathode to anode . . . . .	0.6 pF
grid 1 to grid 2 . . . . .	515 pF
grid 1 to anode . . . . .	4.5 pF
grid 2 to anode . . . . .	75 pF

#### Mechanical

Overall length . . . . .	547 mm max
Overall diameter . . . . .	310 mm max
Net weight . . . . .	55 kg approx
Mounting position . . . . .	vertical, anode up

#### Cooling

Water cooling of anode:

water flow at maximum dissipation . . . . .	150	l/min
inlet temperature . . . . .	60	°C max
outlet temperature . . . . .	100	°C max
inlet pressure . . . . .	5 bar	max

Air cooling of electrode terminals:

airflow . . . . .	1.5	m <sup>3</sup> /min
pressure . . . . .	15	mbar
seal temperature . . . . .	200	°C max

### ANODE, GRID AND SCREEN MODULATED RF POWER AMPLIFIER

(Class C Telephony, carrier conditions per tube)

#### MAXIMUM RATINGS (Absolute values)

Anode voltage . . . . .	12	kV
Cathode current (peak) . . . . .	400	A
Anode dissipation . . . . .	300	kW
Screen voltage . . . . .	1200	V
Screen dissipation . . . . .	5.0	kW
Grid bias voltage . . . . .	-800	V
Grid dissipation . . . . .	2.0	kW

#### TYPICAL OPERATING CONDITIONS (below 30 MHz)

Anode voltage . . . . .	11	kV
Screen voltage . . . . .	1000	V
Grid voltage . . . . .	-550	V
Peak RF drive voltage . . . . .	700	V
Anode current . . . . .	36	A
Screen current . . . . .	1.3	A
Screen dissipation . . . . .	4.0	kW
Grid current . . . . .	2.0	A
Grid dissipation . . . . .	600	W
Anode dissipation . . . . .	90	kW
Nominal driving power . . . . .	2.4	kW
Output power into circuit . . . . .	305	kW

#### NOTES

1. In some applications, operation at a lower filament voltage may give enhanced tube life. The equipment design should allow for operation in the range 16 to 20 V; E2V Technologies should be consulted regarding optimum filament voltage.
2. The filament current must not exceed 1100 A, even momentarily, at any time.

## 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.



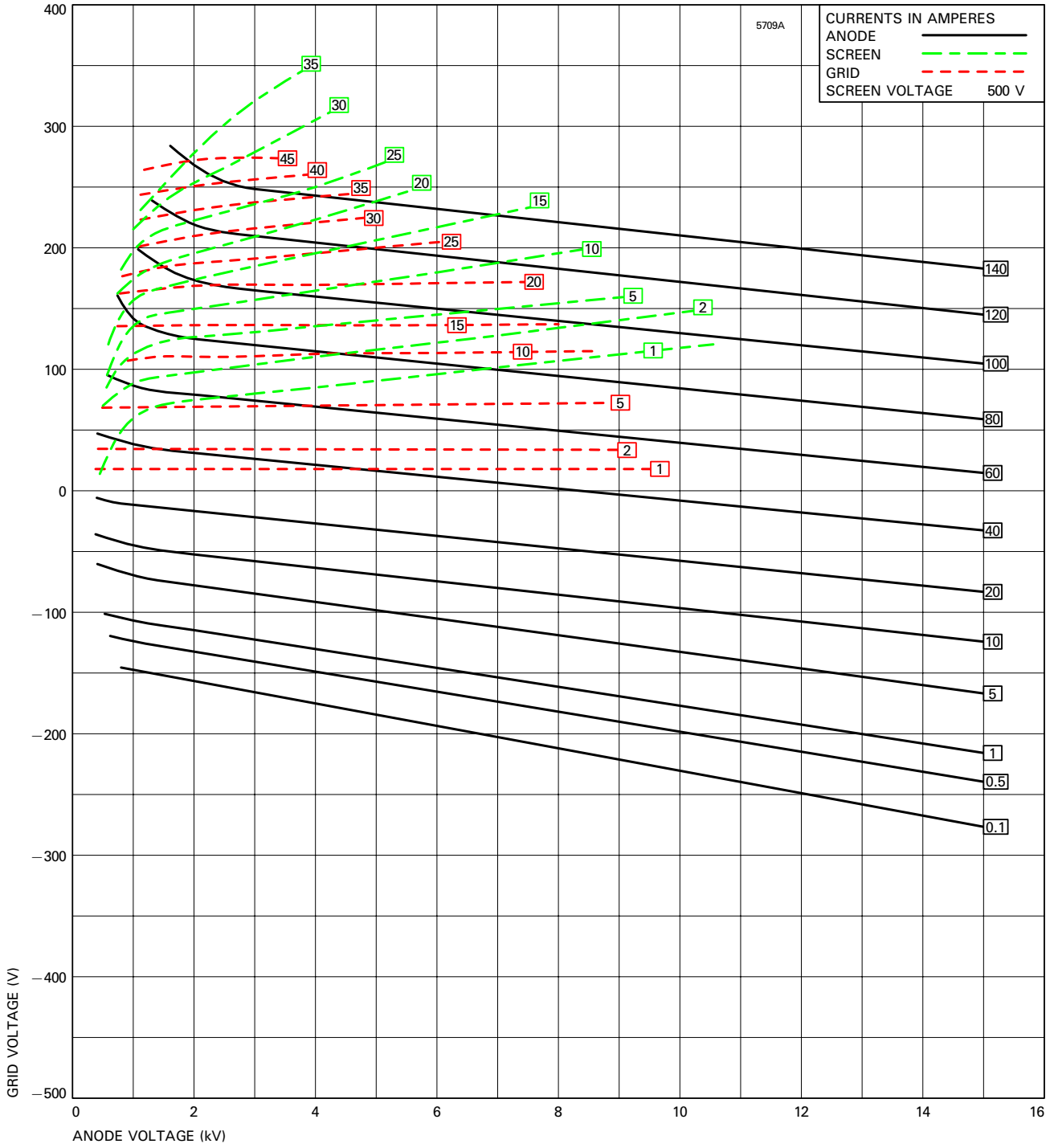
### Implosion

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.

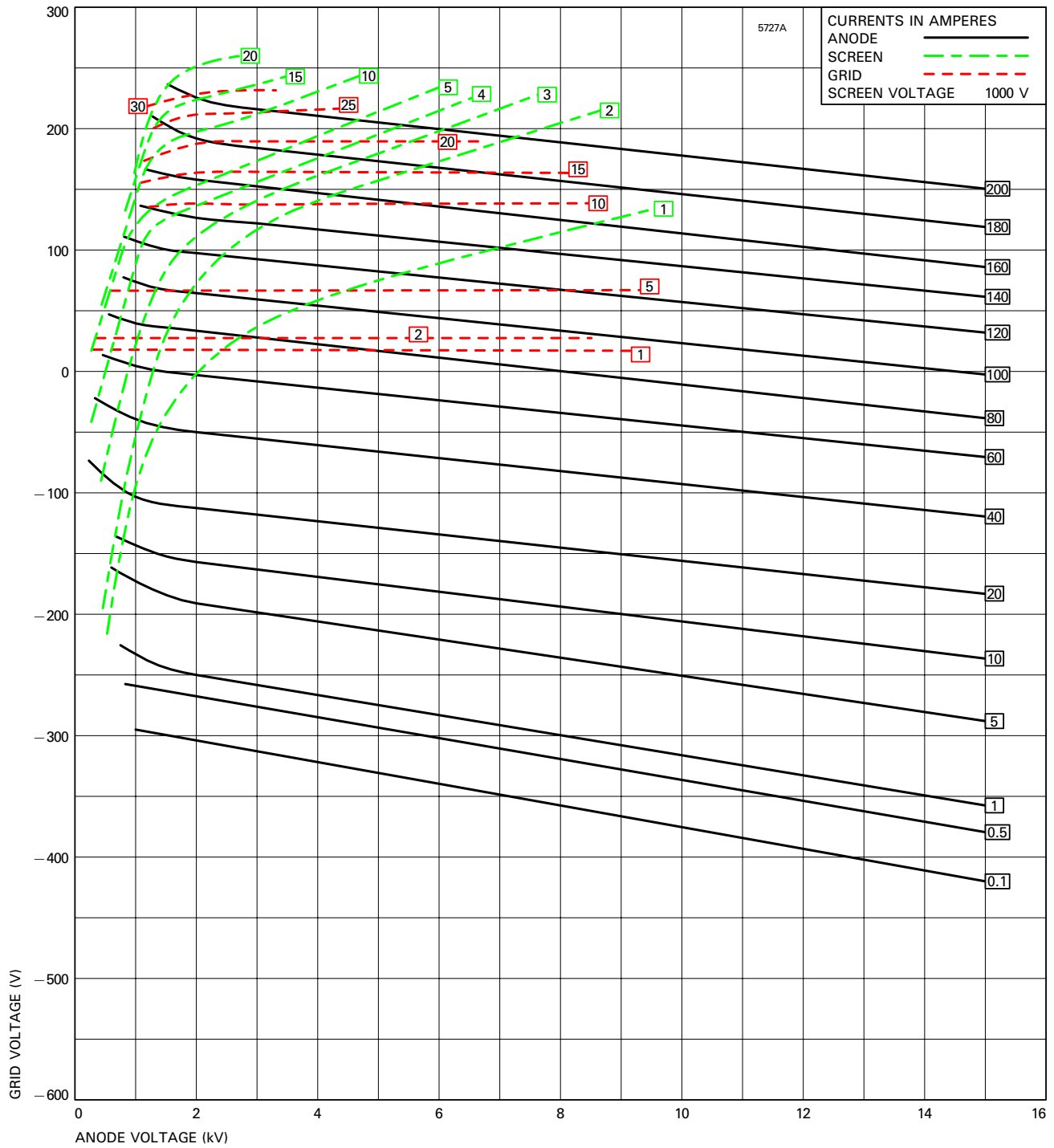
## References

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 power tubes

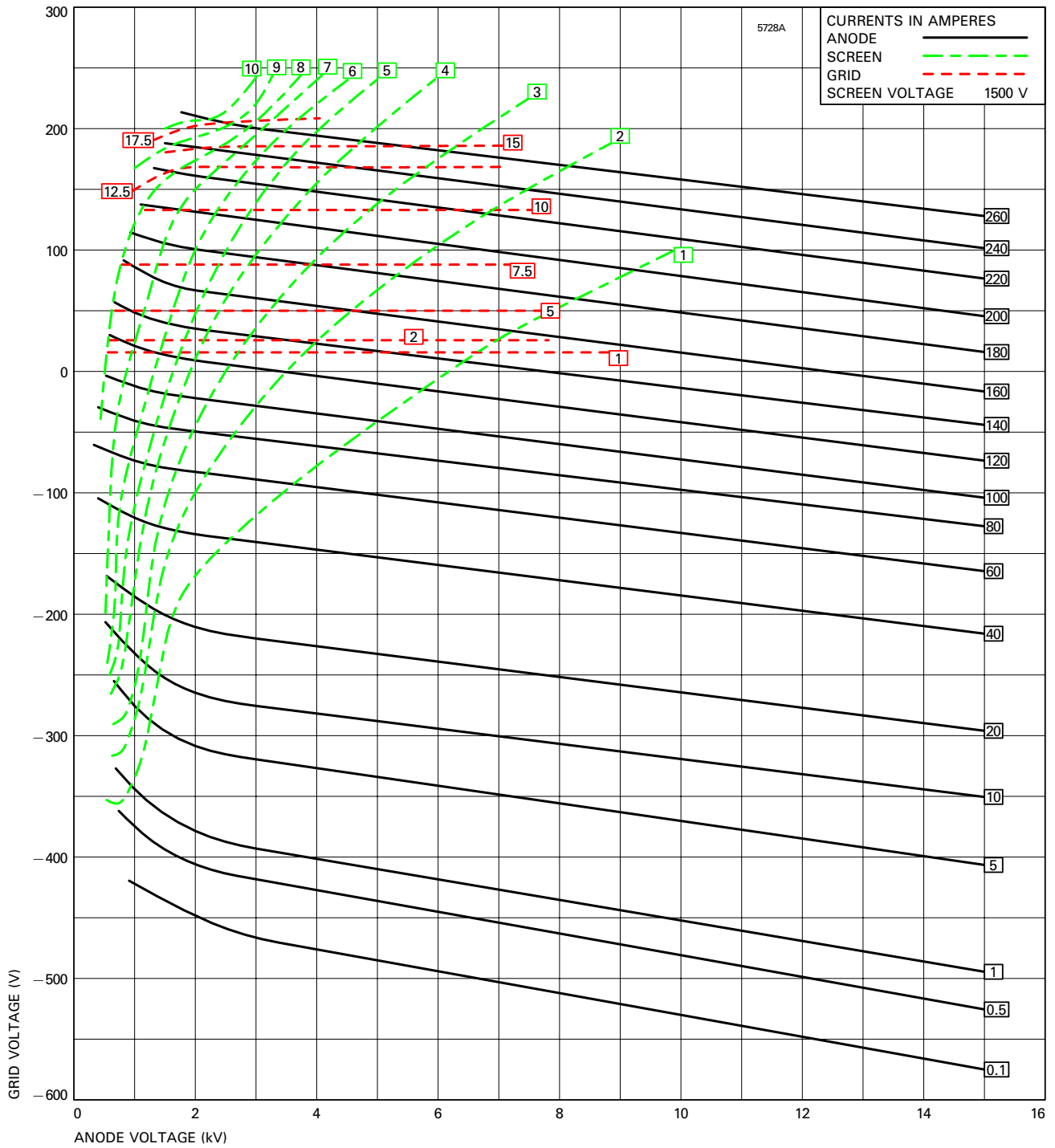
# TYPICAL CONSTANT CURRENT CHARACTERISTICS



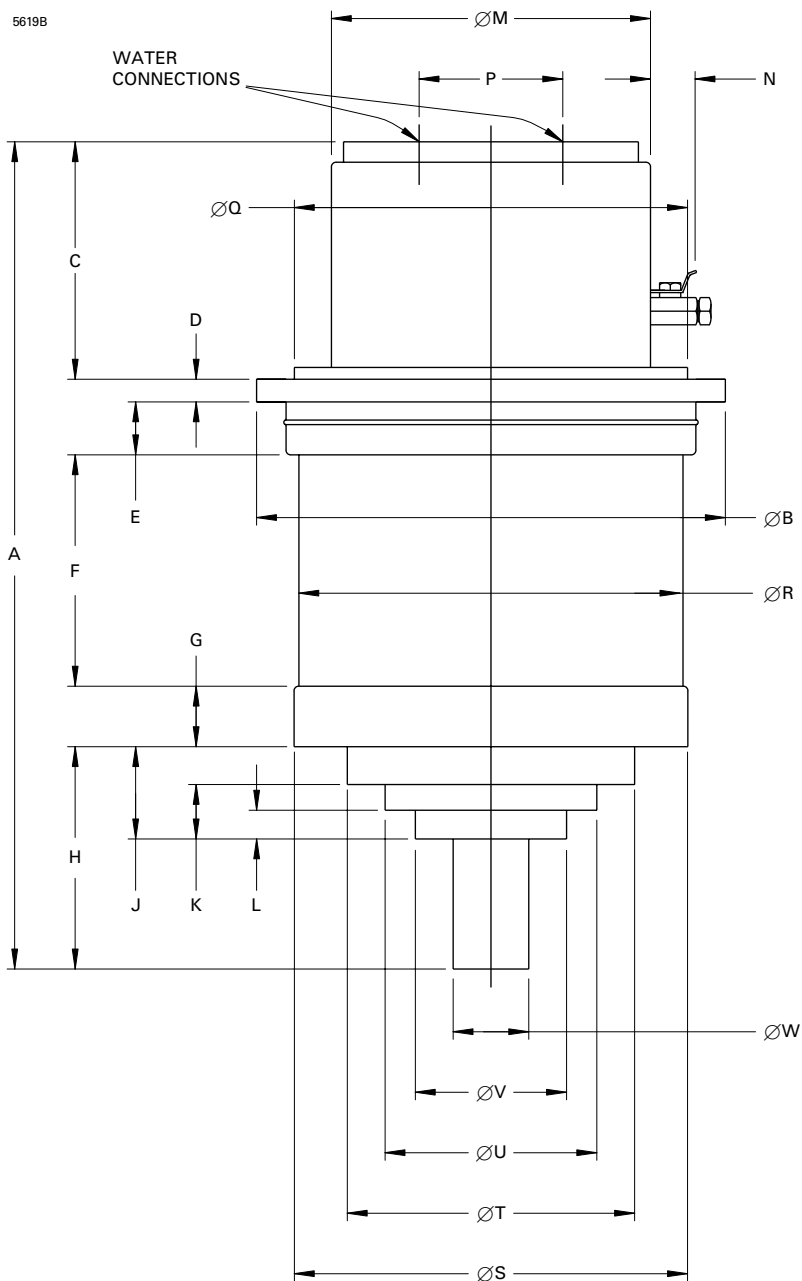
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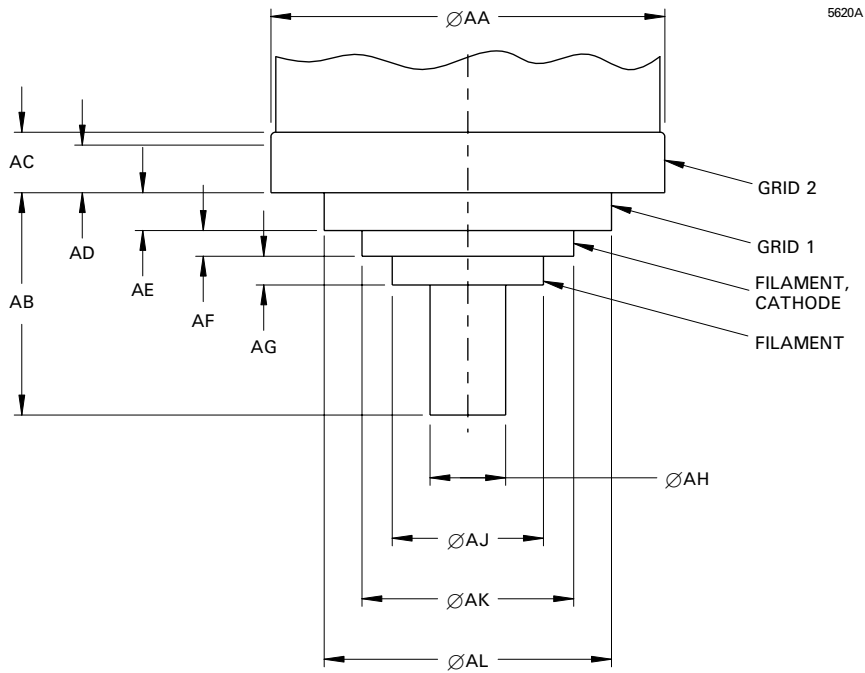


# OUTLINE (All dimensions nominal)



Ref	Millimetres
A	547
B	310
C	172
D	15
E	35
F	153
G	40
H	131
J	61
K	36
L	19
M	211
N	40
P	95
Q	260
R	254
S	260.5
T	190
U	140
V	100
W	50

## Detail of Electrode Terminals



Ref	Millimetres
AA	260.0 ± 1.0
AB	135.0 max
AC	38.5 ± 2.5
AD	30.0 ± 0.5
AE	26.0 ± 3.0
AF	17.4 ± 1.0
AG	18.4 ± 1.0
AH	60.0 max
AJ	100.0 ± 0.3
AK	140.0 ± 0.3
AL	190.0 ± 0.3

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