



BR1181 BW1181J3

R.F. POWER TRIODES

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

ABRIDGED DATA

Two r.f. power triodes of coaxial ceramic/metal construction, intended primarily for industrial service. They differ only in the method of anode cooling and in anode dissipation. BR1181 and BW1181J3 have higher ratings for anode dissipation and current than BR1169 and BW1169J3 respectively but are otherwise electrically identical with, and may be used as replacements for, the latter tubes.

Anode cooling:

BR1181	forced-air
BW1181J3	water; integral jacket

Anode dissipation:

BR1181	10	kW max
BW1181J3	12	kW max

Anode voltage 8.0 kV max

Frequency for full ratings 100 MHz max

Output power (class C unmodulated) 26 kW

GENERAL

Electrical

Filament	thoriated tungsten
Filament voltage (see note 1)	6.6 V
Filament current	103 A
Filament cold resistance	7.5 mΩ
Peak usable cathode current	25 A
Perveance	3.6 mA/V ^{3/2}
Amplification factor ($V_a = 2.0\text{kV}$, $I_a = 1.0\text{A}$)	11
Mutual conductance ($V_a = 2.0\text{kV}$, $I_a = 2.75\text{A}$)	43.5 mA/V
Inter-electrode capacitances:	
grid to anode	36.5 pF
grid to filament	47.5 pF
anode to filament	2.35 pF

Mechanical

Overall dimensions	see outline drawings
Net weight:	
BR1181	9½ pounds (4.3kg) approx
BW1181J3	5½ pounds (2.5kg) approx
Mounting position	vertical, either way up

Accessories

Outer filament connector	MA208A
Inner filament connector	MA208B
Grid connector	MA208
Thermal fuse, available for BW1181J3	MA85E

COOLING

Anode

The BR1181 air cooling requirements are shown on pages 7 and 8. The required air flow should be delivered through the radiator immediately before and during the application of any voltages. Filament power, anode power and air flow may be removed simultaneously.

BW1181J3 has an integral water jacket. Minimum water cooling requirements are shown on page 9; higher rates of flow should be used where possible.

A thermal fuse, part number MA85E, is available for BW1181J3, to give protection against anode overheating. The fuse should be screwed into one of the two threaded holes in the end of the anode (see page 12). The fuse should be connected by a non-conducting cord to a suitable switching device; a tension of about 1 pound (450g) should be applied to the fuse via the cord. If the temperature exceeds the safe limit, the fuse core is pulled outwards; this should actuate the switching device and remove all electrical supplies to the valve. Replacement fuses can be supplied to order.

Filament and Grid Seals

The temperature of the filament and grid seals must not exceed 180°C. A flow of air of 15 to 20ft³/min (0.43 to 0.57m³/min) directed onto the terminals via a 1-inch (25mm approx) diameter nozzle before and during the application of any voltages is usually adequate for limiting the temperature of the seals.

R.F. POWER AMPLIFIER AND OSCILLATOR

(Class C unmodulated conditions, one valve)

MAXIMUM RATINGS (Absolute values)

Anode voltage	8.0	kV max
Anode current	4.5	A max
Anode dissipation:		
BR1181	10	kW max
BW1181J3	12	kW max
Grid dissipation	250	W max
Frequency	100	MHz max

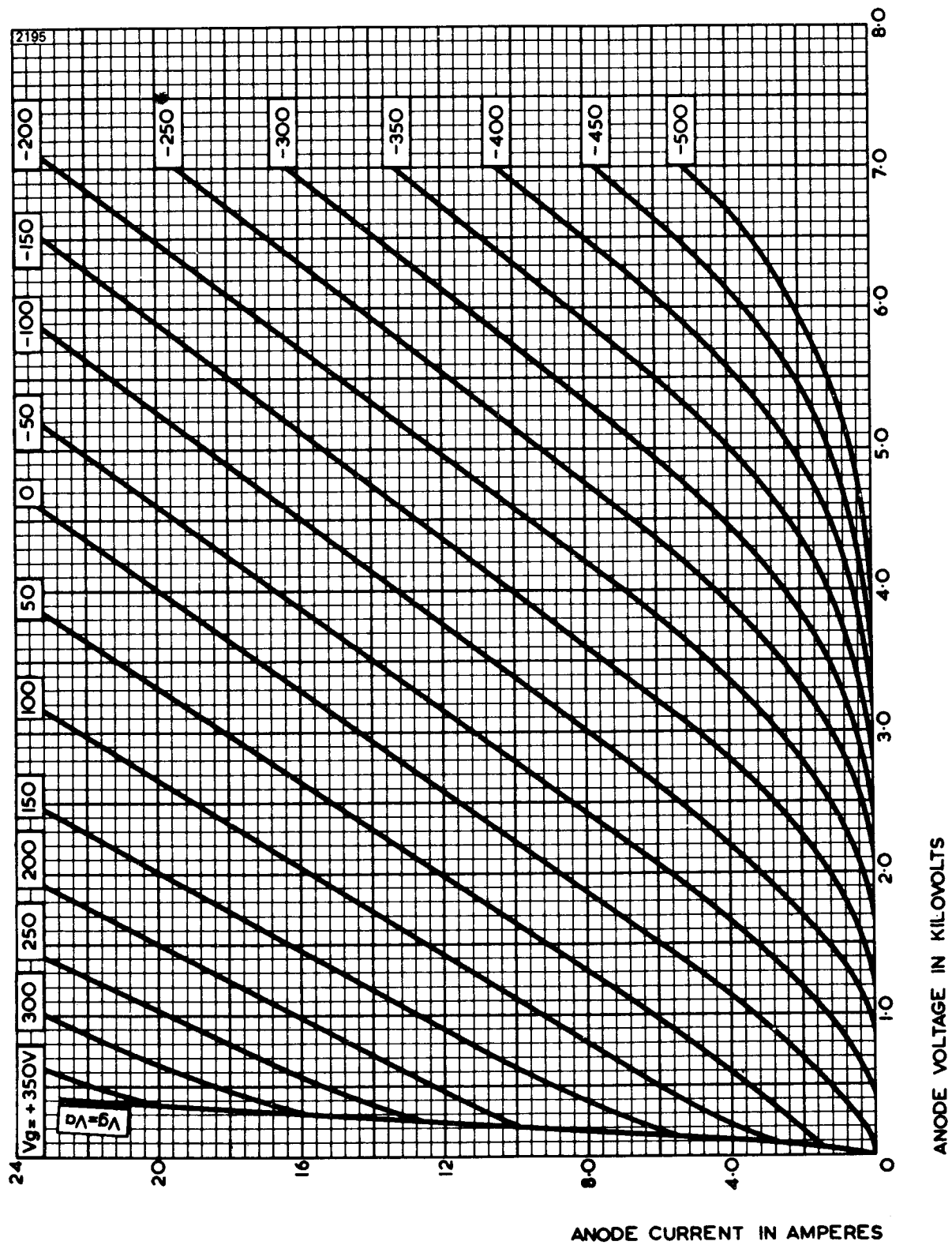
TYPICAL OPERATING CONDITIONS

Anode voltage	8.0	kV
Grid voltage	−1000	V
from grid resistor	2050	Ω
Peak r.f. grid drive voltage	1290	V
Anode current	4.0	A
Grid current	485	mA
Anode dissipation	5.5	kW
Grid dissipation	145	W
Driving power	630	W
Output power (see note 2)	26	kW
Efficiency	81	%
Load resistance	1000	Ω

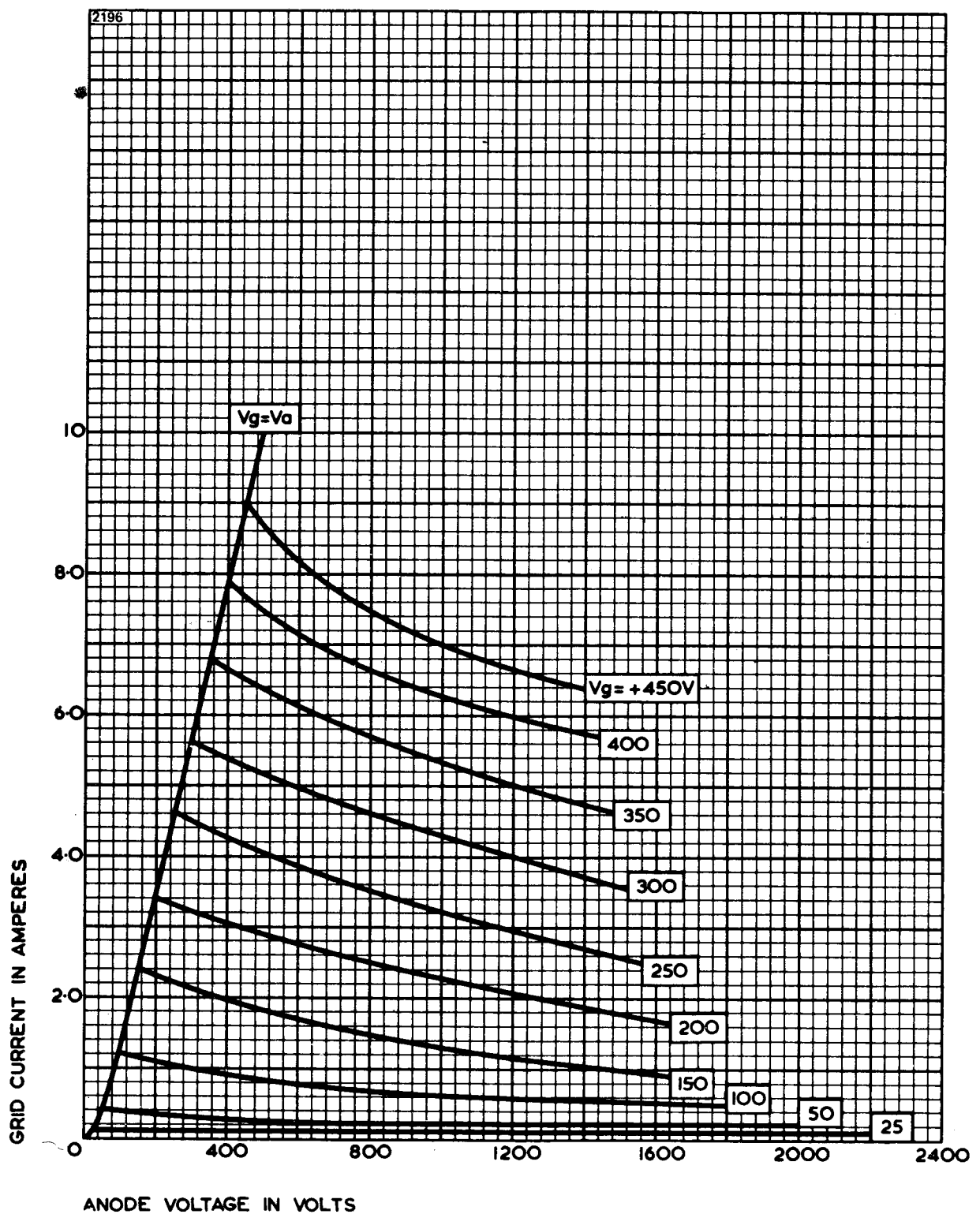
NOTES

1. The valve must be operated at the stated filament voltage. Fluctuation in filament voltage must not exceed $\pm 5\%$. The filament may be switched on at its operating voltage and no surge limiting devices need be incorporated in the filament circuit.
2. This is the output power from the valve after the grid drive power has been deducted. With 85% circuit efficiency the power to the load is 22kW.

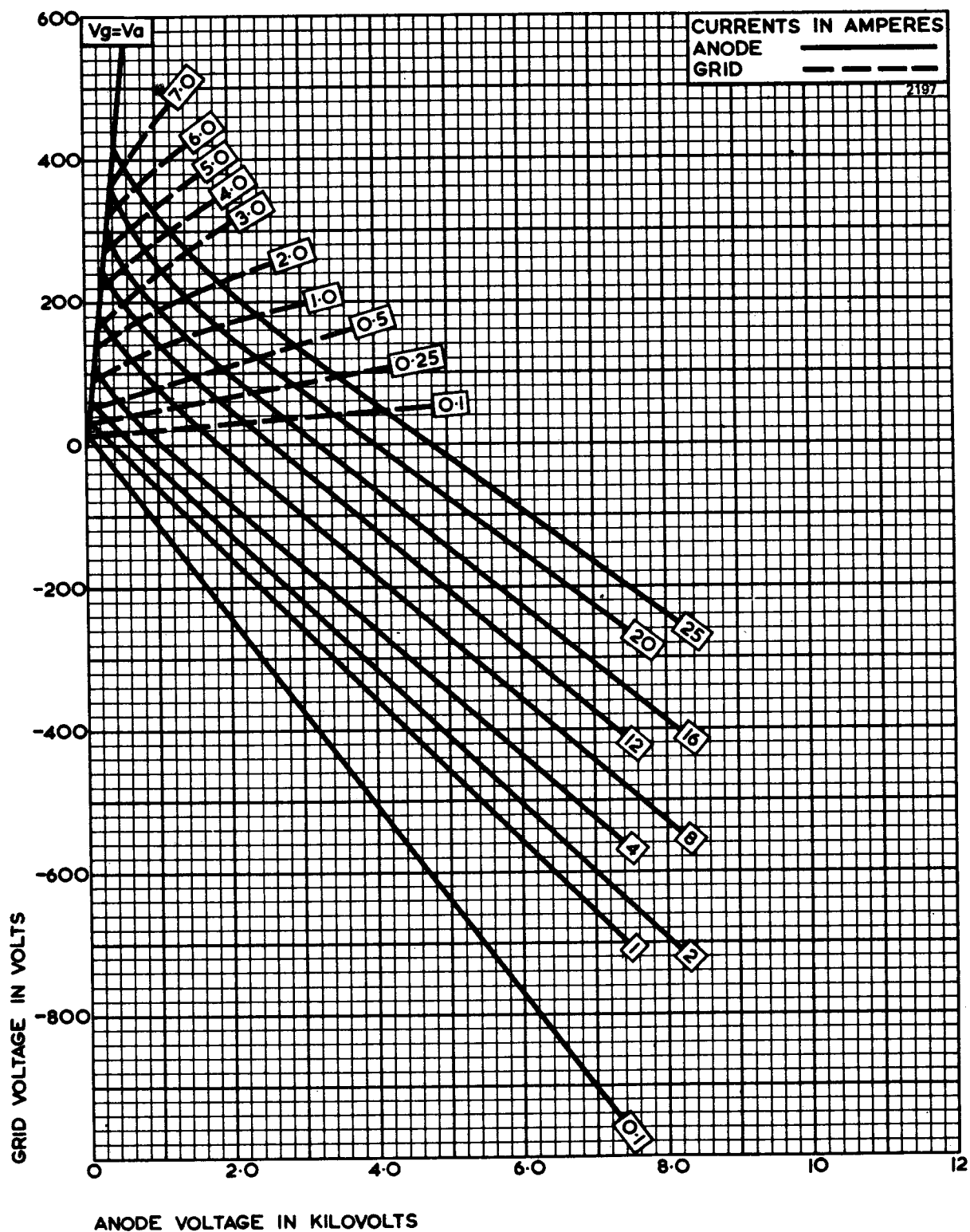
TYPICAL ANODE CHARACTERISTICS



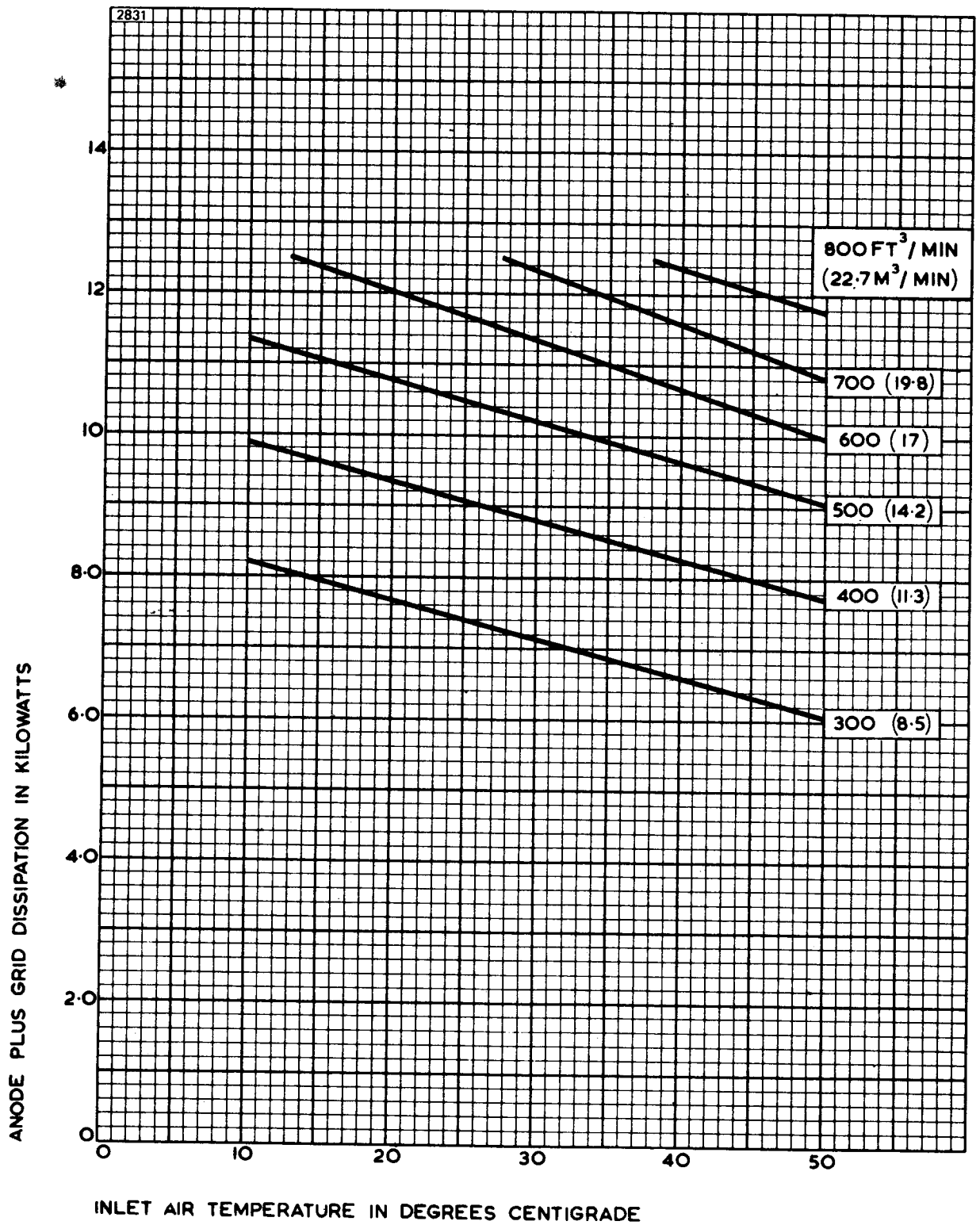
TYPICAL GRID CHARACTERISTICS



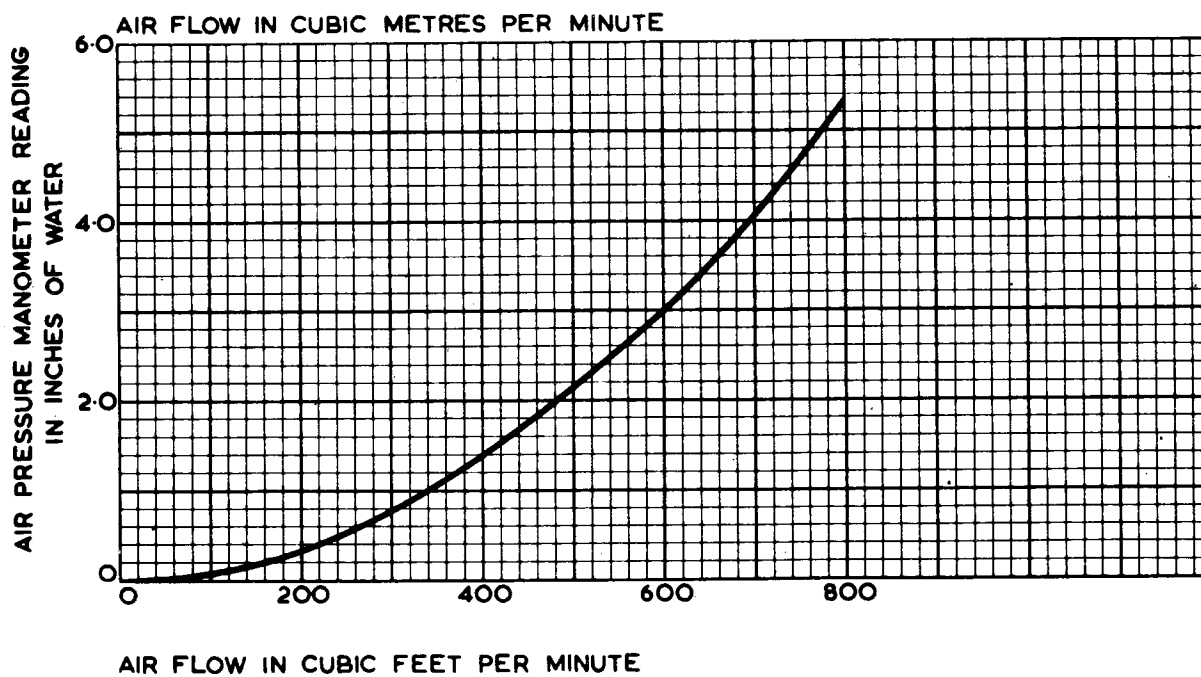
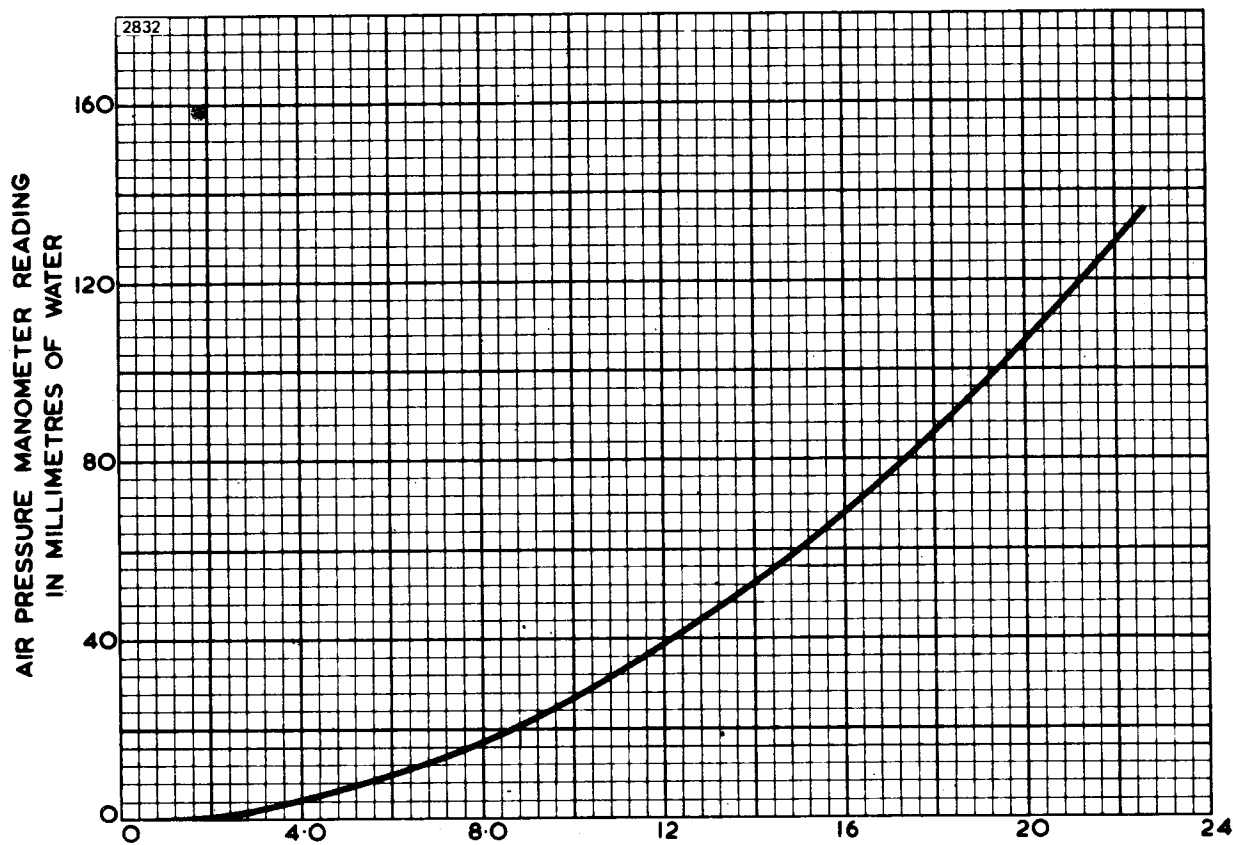
TYPICAL CONSTANT CURRENT CHARACTERISTICS



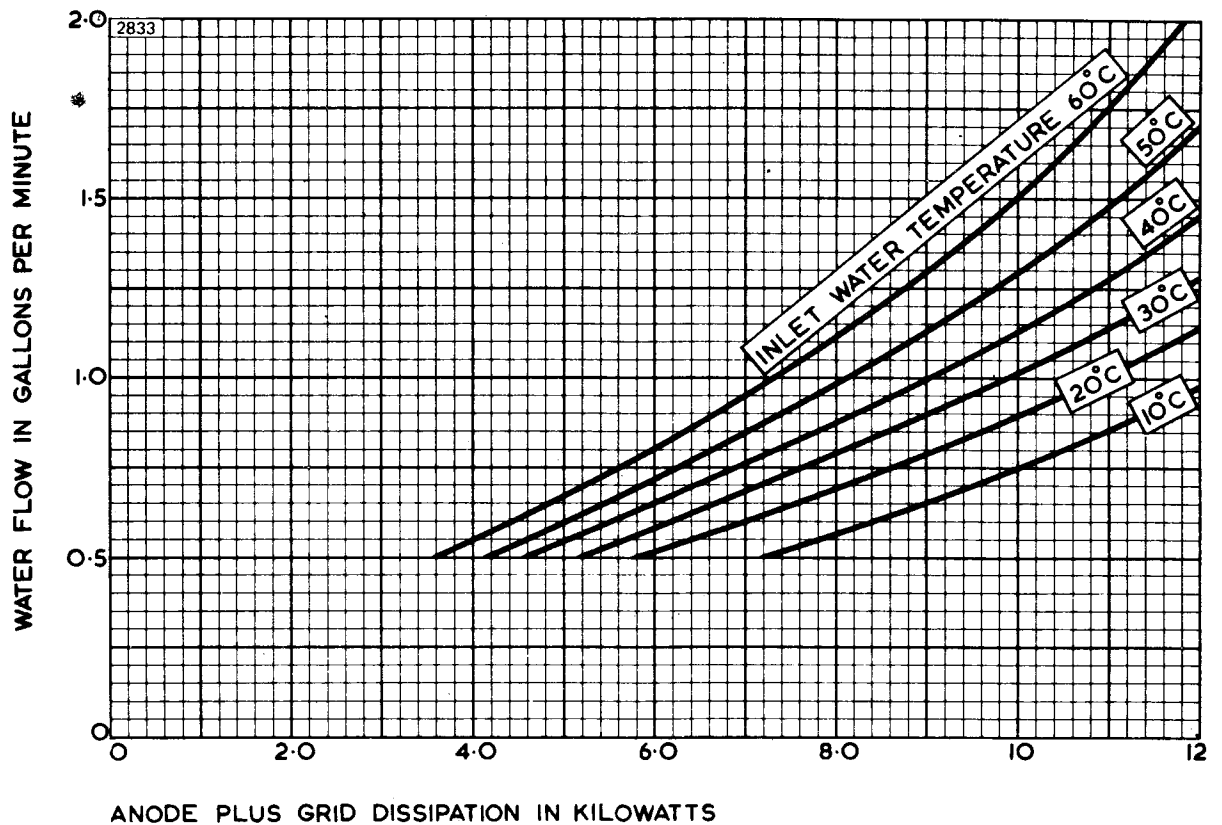
AIR COOLING REQUIREMENTS FOR BR1181



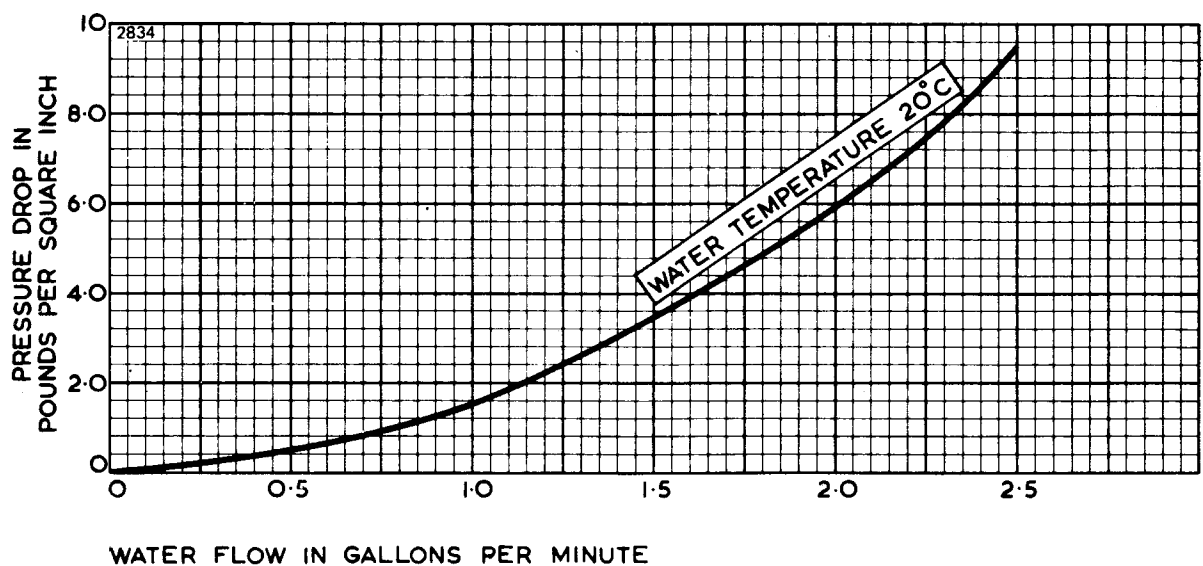
TYPICAL AIR FLOW CHARACTERISTIC FOR BR1181



MINIMUM WATER COOLING REQUIREMENTS FOR BW1181J3 (Higher rates of flow should be used where possible)

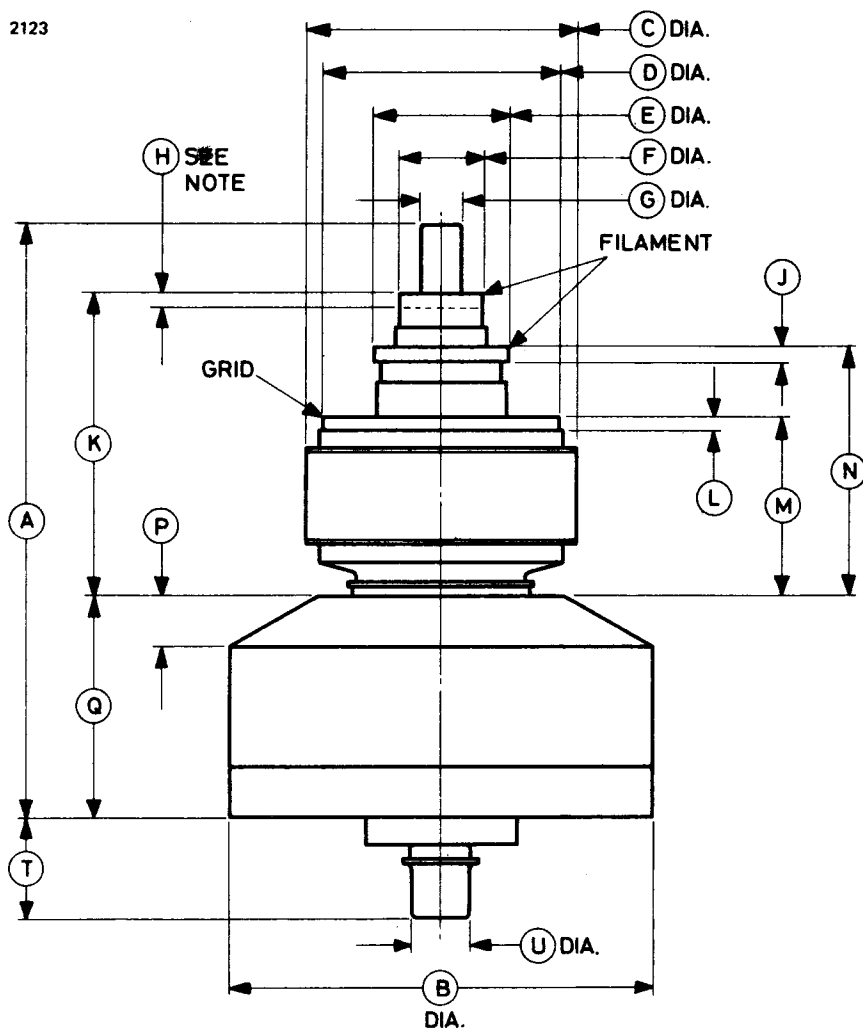


TYPICAL WATER FLOW CHARACTERISTIC FOR BW1181J3



OUTLINE FOR BR1181 (All dimensions without limits are nominal)

2123



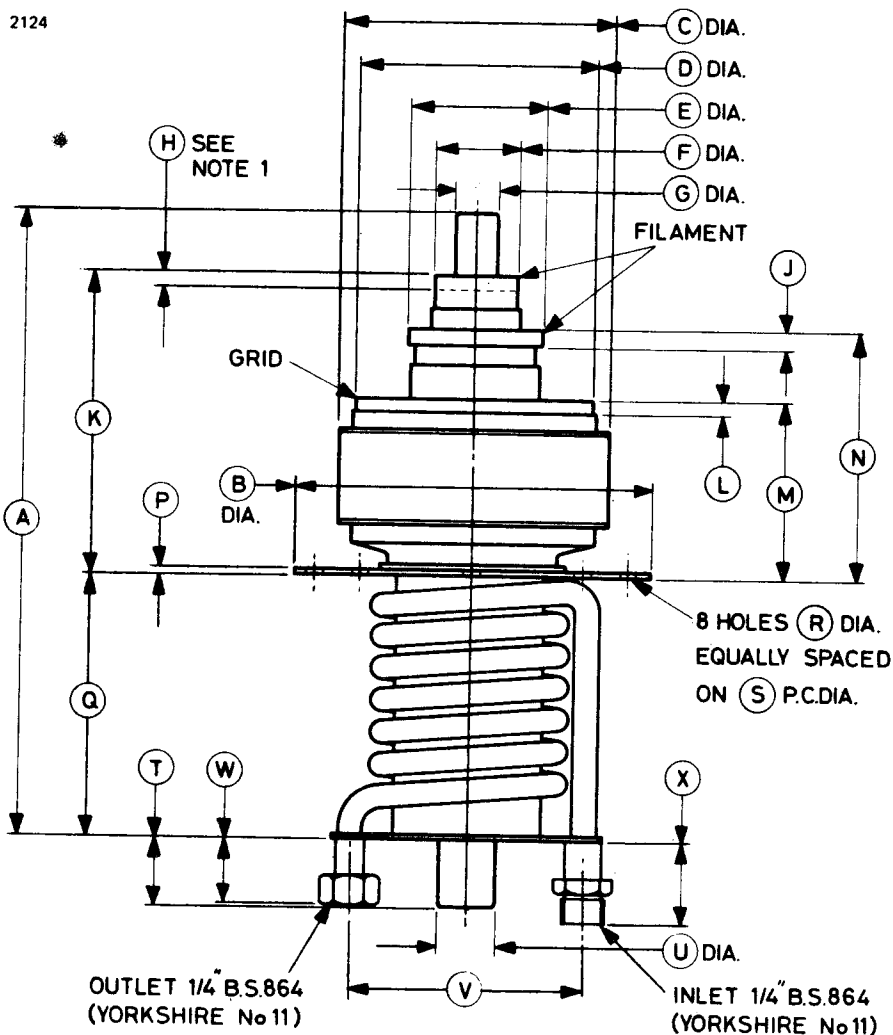
Ref	Inches	Millimetres	Ref	Inches	Millimetres
A	8.782	223.1	K	4.470	113.5
B	6.250	158.8	L	0.218	5.54
C	4.000	101.6	M	2.656	67.46
D	3.500	88.90	N	3.687	93.65
E	2.000	50.80	P	0.750	19.05
F	1.250	31.75	Q	3.312	84.12
G	0.625	15.88	T	1.501	38.13
H	0.219 ± 0.031	5.56 ± 0.79	U	0.875 ± 0.005	22.23 ± 0.13
J	0.250	6.35			

Millimetre dimensions have been derived from inches.

Outline Note for BR1181

The filament contact surface may be clamped only within this area.

OUTLINE FOR BW1181J3 (All dimensions without limits are nominal)



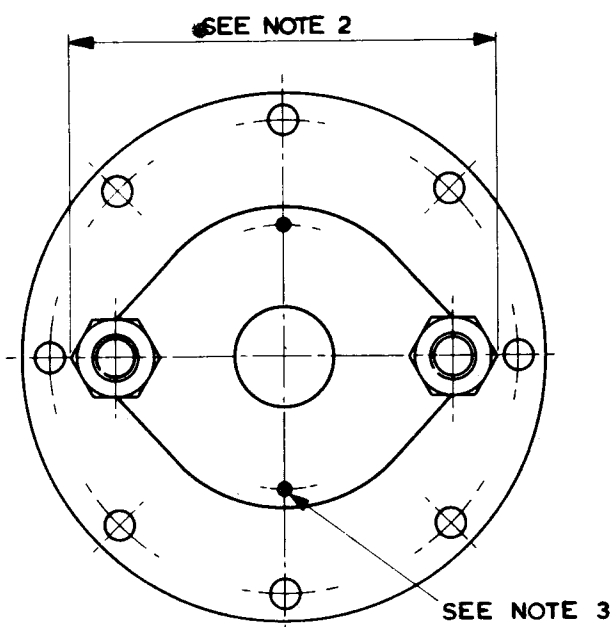
Ref	Inches	Millimetres	Ref	Inches	Millimetres
A	9.300	236.2	M	2.656	67.46
B	5.250	133.4	N	3.687	93.65
C	4.000	101.6	P	0.128	3.25
D	3.500	88.90	Q	3.830	97.28
E	2.000	50.80	R	0.257	6.53
F	1.250	31.75	S	4.687	119.0
G	1.000 max	25.40 max	T	1.000	25.40
H	0.187 min	4.75 min	U	1.000 max	25.40 max
J	0.187 min	4.75 min	V	3.375	85.73
K	4.470	113.5	W	0.985	25.02
L	0.187 min	4.75 min	X	1.250	31.75

Millimetre dimensions have been derived from inches.

Outline Detail of BW1181J3

(Enlarged view from below)

2125A



Outline Notes for BW1181J3

1. The filament contact surface may be clamped only within this area.
2. This dimension will pass through a hole of 4.250 inches (108.0mm) minimum diameter.
3. Two holes threaded 4B.A., for thermal fuses MA85E (see page 2).