# BR/BW179

## R.F. POWER TRIODES

**Service Type (BR179) CV2323**

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

## ABRIDGED DATA

Two r.f. transmitting triodes differing only in anode dissipation and the method of anode cooling. The tubes have grid terminals suitable for cathode drive operation.

| | | |
|---|---|---|
| Anode cooling: | | |
| BR179 | forced-air | |
| BW179 | water; separate jacket | |
| Anode dissipation: | | |
| BR179 | 8.0 | kW max |
| BW179 | 10 | kW max |
| Anode voltage | 8.5 | kV max |
| Frequency for full ratings | 50 | MHz max |
| Frequency at reduced ratings | 110 | MHz max |
| Output power (class C telegraphy) | 17 | kW |

## GENERAL

### Electrical

| | | |
|---|---|---|
| Filament | thoriated tungsten | |
| Filament voltage (see note 1) | 6.6 | V |
| Filament current | 90 | A |
| Surge filament current (peak) (see note 2) | 195 | A max |
| Filament cold resistance | 8.4 | mΩ |
| Peak usable cathode current | 16 | A |
| Amplification factor ($V_a$ = 5.0kV, $I_a$ = 1.0A) | 28 | |
| Mutual conductance ($V_a$ = 5.0kV, $I_a$ = 1.0A) | 10 | mA/V |
| Inter-electrode capacitances: | | |
| grid to anode | 32 | pF |
| grid to filament | 33 | pF |
| anode to filament | 1.0 | pF |

### Mechanical

| | |
|---|---|
| Overall dimensions | see outline drawings |
| Net weights: | |
| BR179 | 25 pounds (11.5kg) approx |
| BW179 | 5 pounds (2.3kg) approx |
| Mounting position | vertical, filament end up |

### Accessories

| | |
|---|---|
| Filament leads | MA135 |
| Grid connector | MA66A |
| Water jacket for BW179 | BW4029 |
| Sealing ring (supplied with BW179) | MA252 |

## COOLING

### Anode

The BR179 air cooling requirements are shown on pages 8 and 9. 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.

The anode of the BW179 must be fitted into a water jacket for cooling, the recommended jacket being type BW4029. A flow of water of 4 to 5 imp. gal/min (18.2 to 22.7 l./min) is required; the temperature of the cooling water at the outlet must not exceed 65°C, nor should the temperature rise across the jacket exceed 15°C.

### Filament and Grid Seals

The temperature of the filament and grid seals must not exceed 140°C. A flow of air of 15ft$^3$/min (0.43m$^3$/min) directed into the filament header via a 1-inch (25mm approx) diameter nozzle before and during the application of any voltages is usually adequate for limiting the temperature of these seals.

### Anode Seal and Bulb

The anode seal and bulb temperatures must not exceed 180°C.

## R.F. POWER AMPLIFIER AND OSCILLATOR
**(Class C telegraphy, key down conditions, one valve)**

### MAXIMUM RATINGS (Absolute values)

| | | |
|---|---|---|
| Anode voltage | 8.5 | kV max |
| Anode dissipation: | | |
| BR179 | 8.0 | kW max |
| BW179 | 10 | kW max |
| Grid dissipation | 600 | W max |
| Operating frequency (for full ratings) | 50 | MHz max |

## TYPICAL OPERATING CONDITIONS

| | | | |
|---|---|---|---|
| Anode voltage | 6.0 | 8.0 | kV |
| Grid voltage | −705 | −775 | V |
| Peak r.f. grid drive voltage | 1605 | 1675 | V |
| Anode current | 2.92 | 2.94 | A |
| Grid current (approx) | 0.42 | 0.38 | A |
| Anode dissipation | 5.5 | 6.2 | kW |
| Grid dissipation | 350 | 325 | W |
| Driving power | 650 | 620 | W |
| Output power | 12 | 17.3 | kW |
| Efficiency | 69 | 73.5 | % |

## RANGE OF CHARACTERISTICS FOR EQUIPMENT DESIGN

| | Min | Max | |
|---|---|---|---|
| Filament current at filament voltage 6.6V | 83 | 97 | A |
| Amplification factor ($I_a$ = 1.0A, $V_g$ = −50V) | 25 | 32 | |
| Mutual conductance ($V_a$ = 5.0kV, $I_a$ = 1.0A) | 7.5 | 12.5 | mA/V |
| Grid voltage (negative value) ($V_a$ = 10kV, $I_a$ = 0.1A) | − | 400 | V |
| Grid voltage (negative value) ($V_a$ = 5.0kV, $I_a$ = 1.0A) | 15 | 55 | V |
| Anode current ($V_a$ = 2.0kV, $V_g$ = +200V) | 2.2 | 3.0 | A |
| Grid current ($V_a$ = 2.0kV, $V_g$ = +200V) | 0 | 0.3 | A |
| Inter-electrode capacitances: | | | |
| grid to anode | 28 | 36 | pF |
| grid to filament | 28 | 38 | pF |

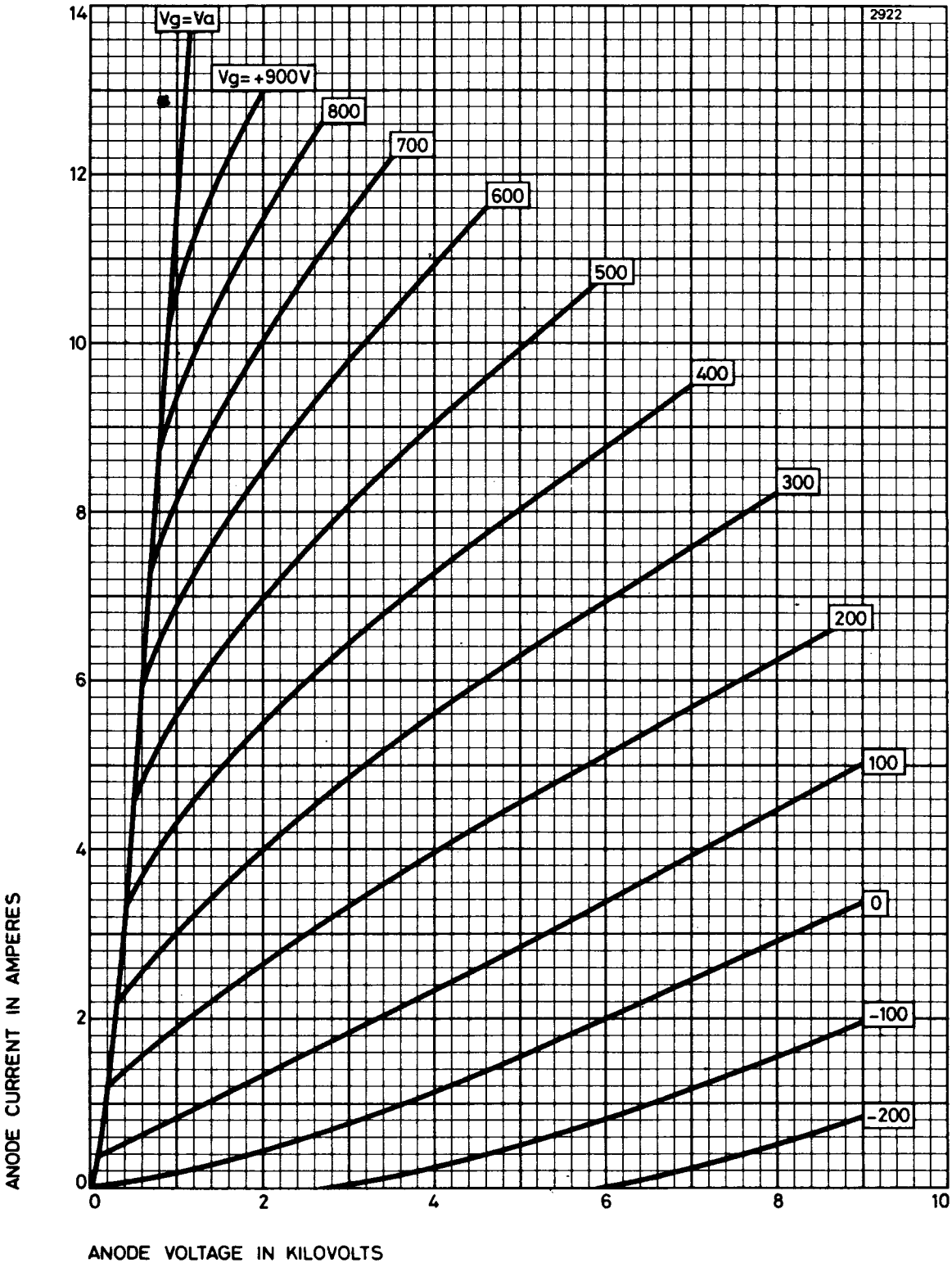
## MAXIMUM ANODE VOLTAGE AGAINST FREQUENCY

| Operating frequency (MHz) | Max anode voltage c.w. (kV) | Max anode voltage with anode modulation (kV) |
|---|---|---|
| 50 | 8.5 | 6.0 |
| 110 | 6.5 | 5.2 |

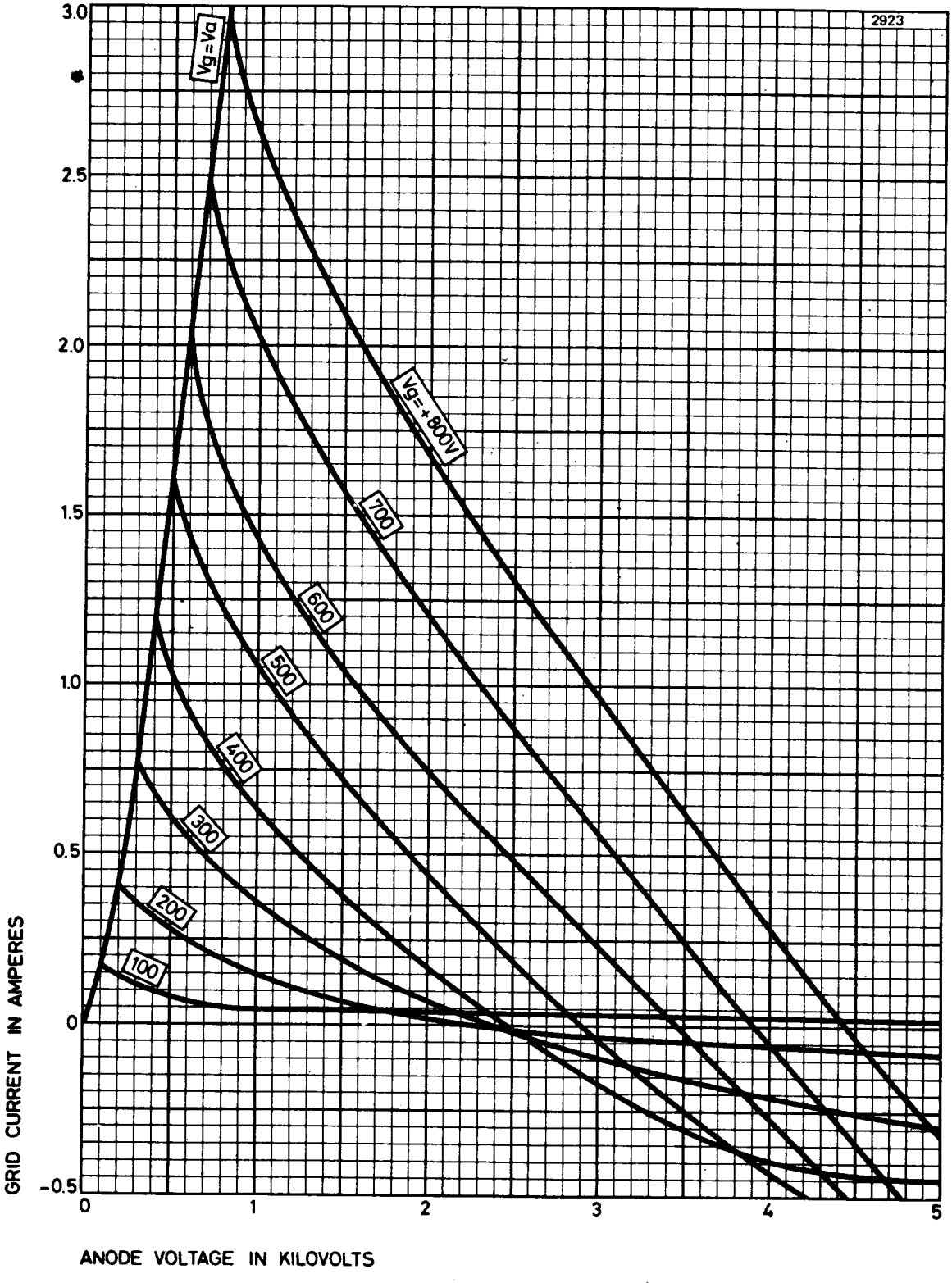
## NOTES

1. The valve must be operated at the stated filament voltage. Fluctuation in filament voltage must not exceed ±5%.
2. The filament current must not exceed 195A, even momentarily, at any time.

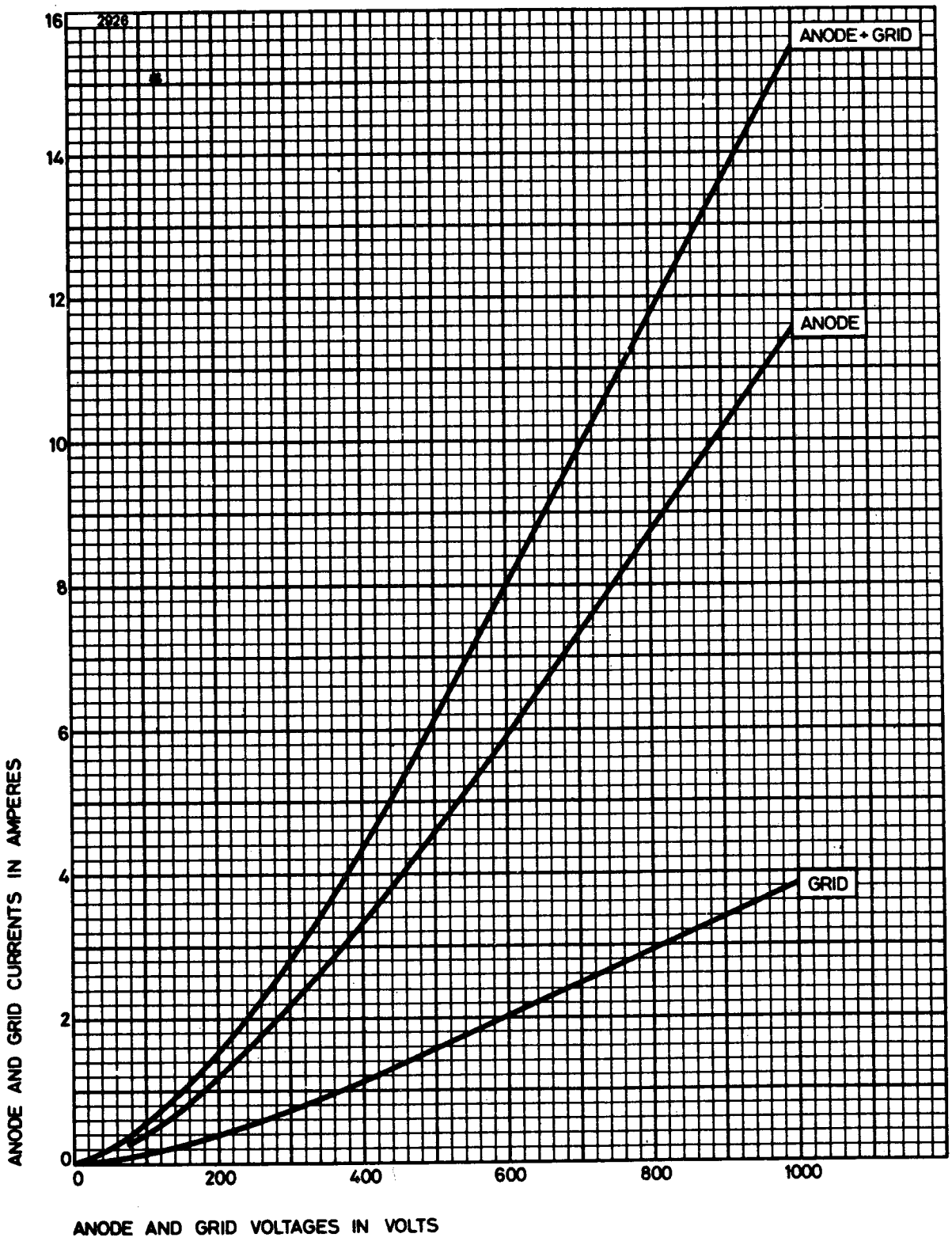
## TYPICAL ANODE CHARACTERISTICS



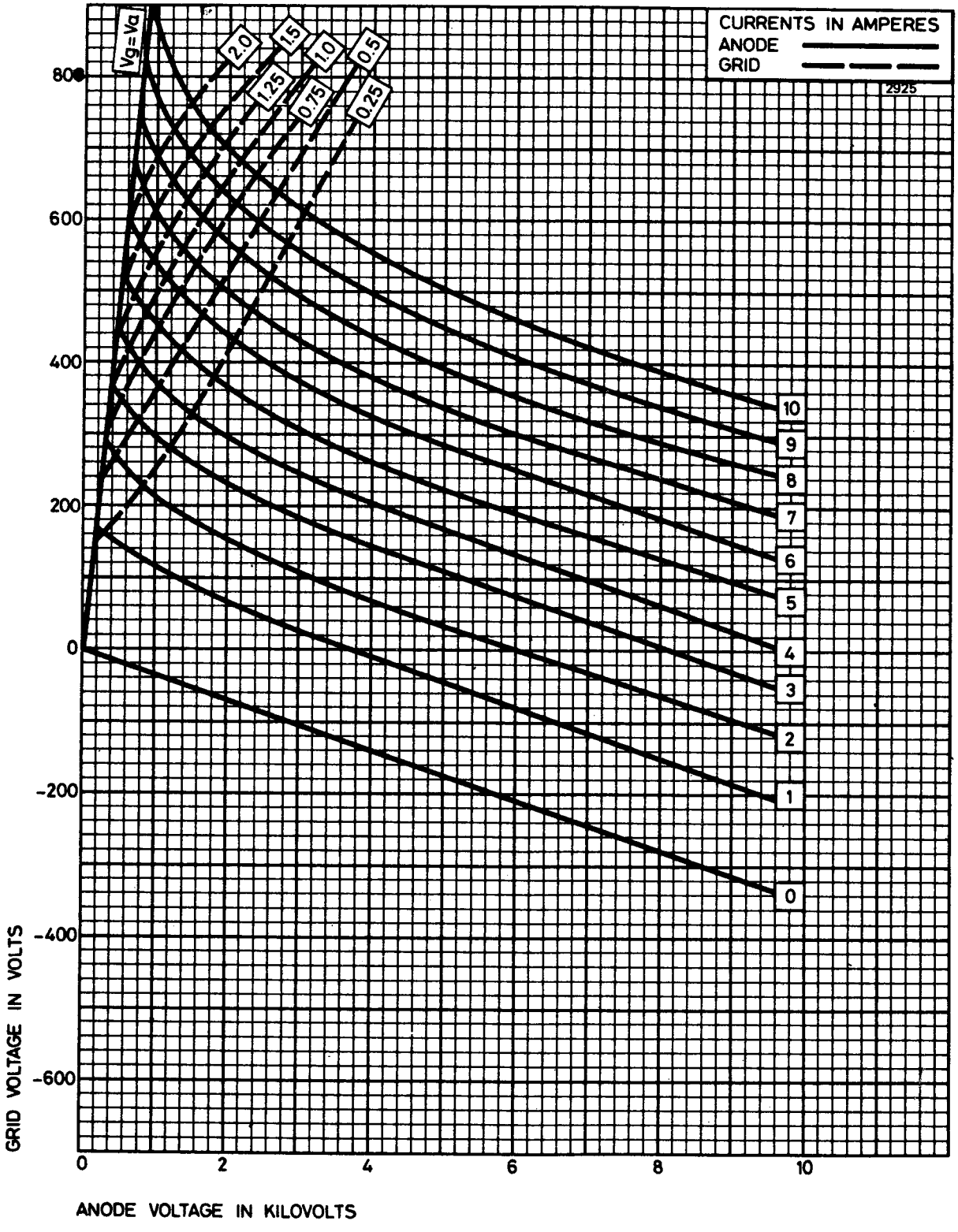
## TYPICAL GRID CHARACTERISTICS



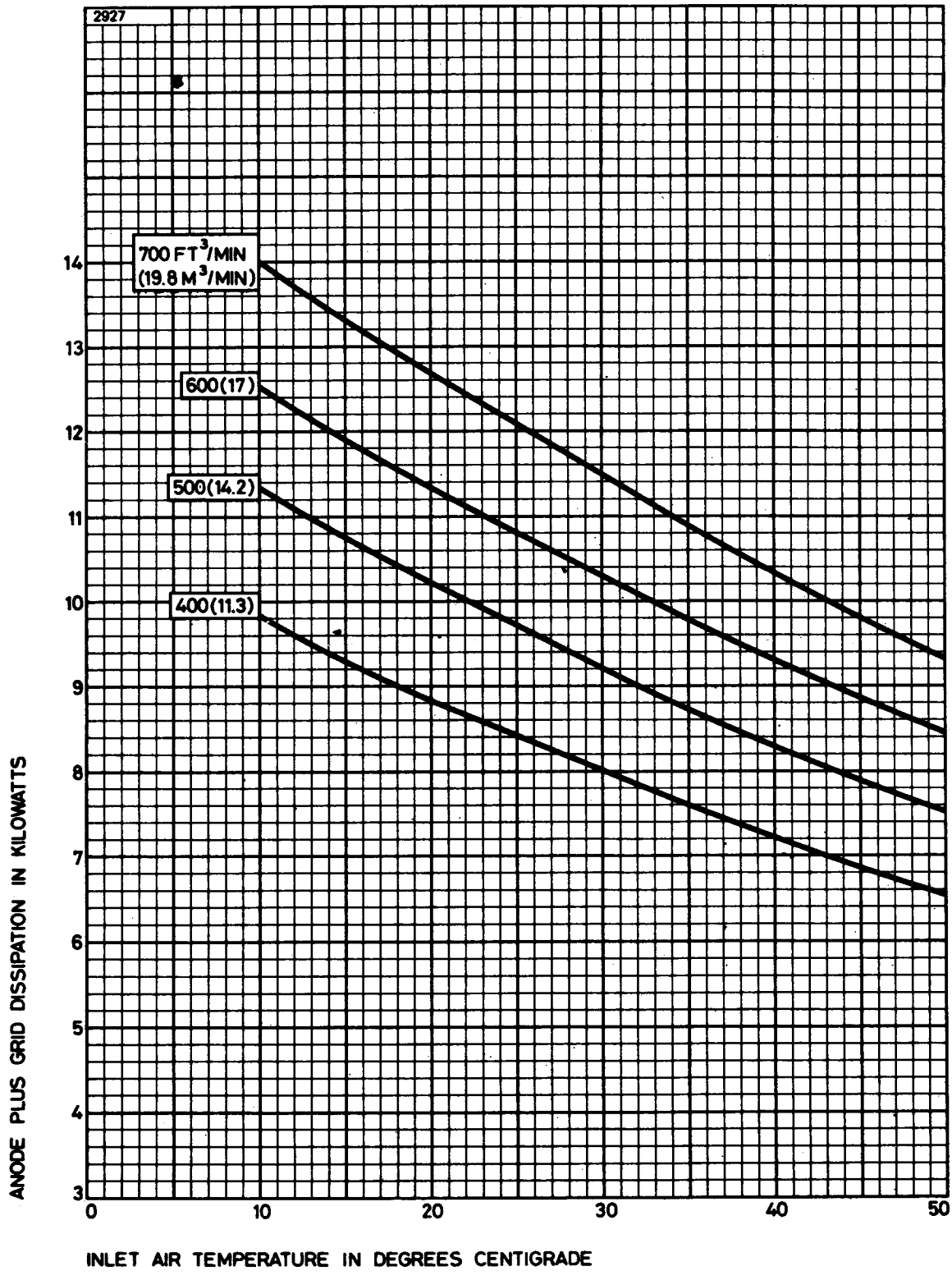
## TYPICAL STRAPPED CHARACTERISTICS



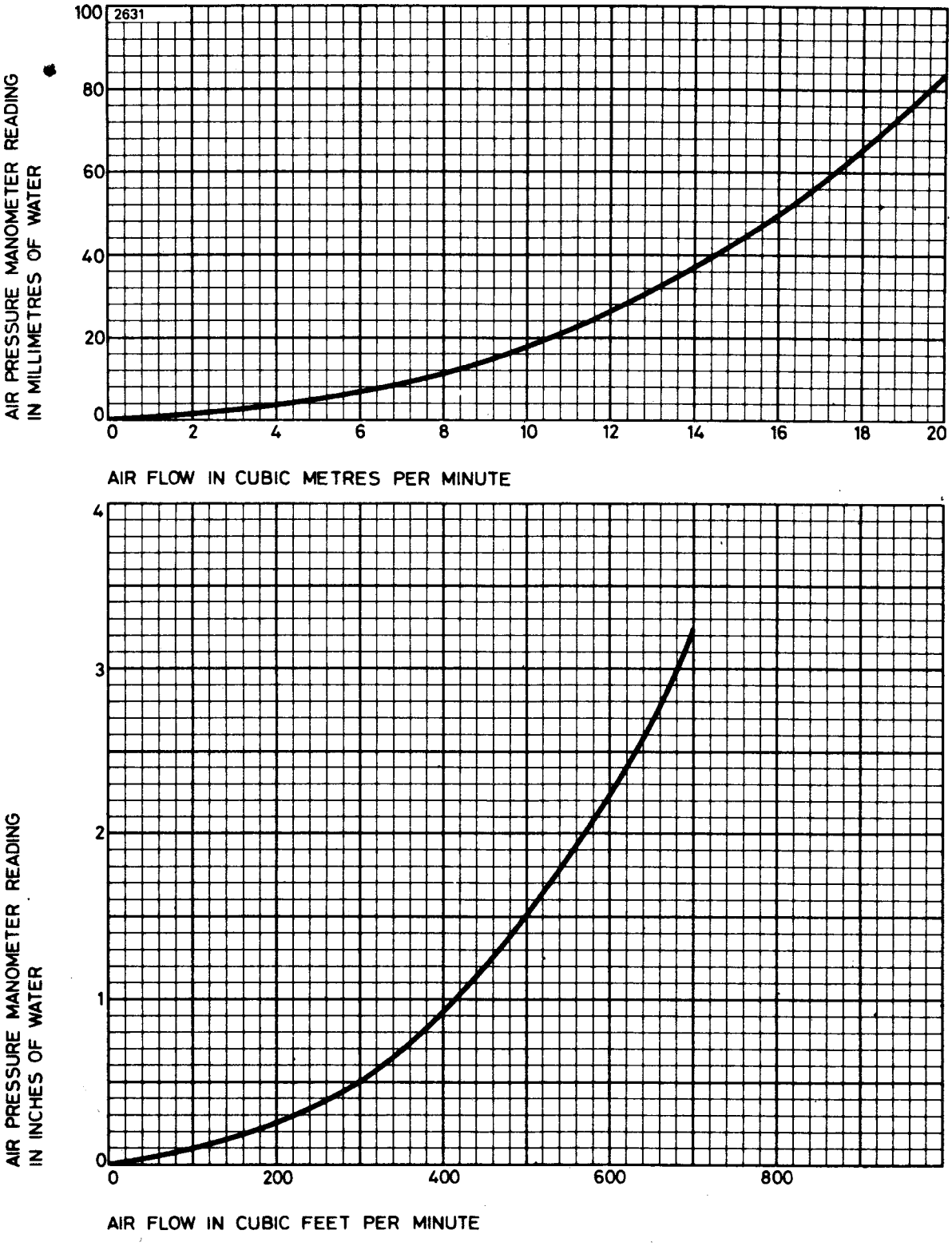
## TYPICAL CONSTANT CURRENT CHARACTERISTICS



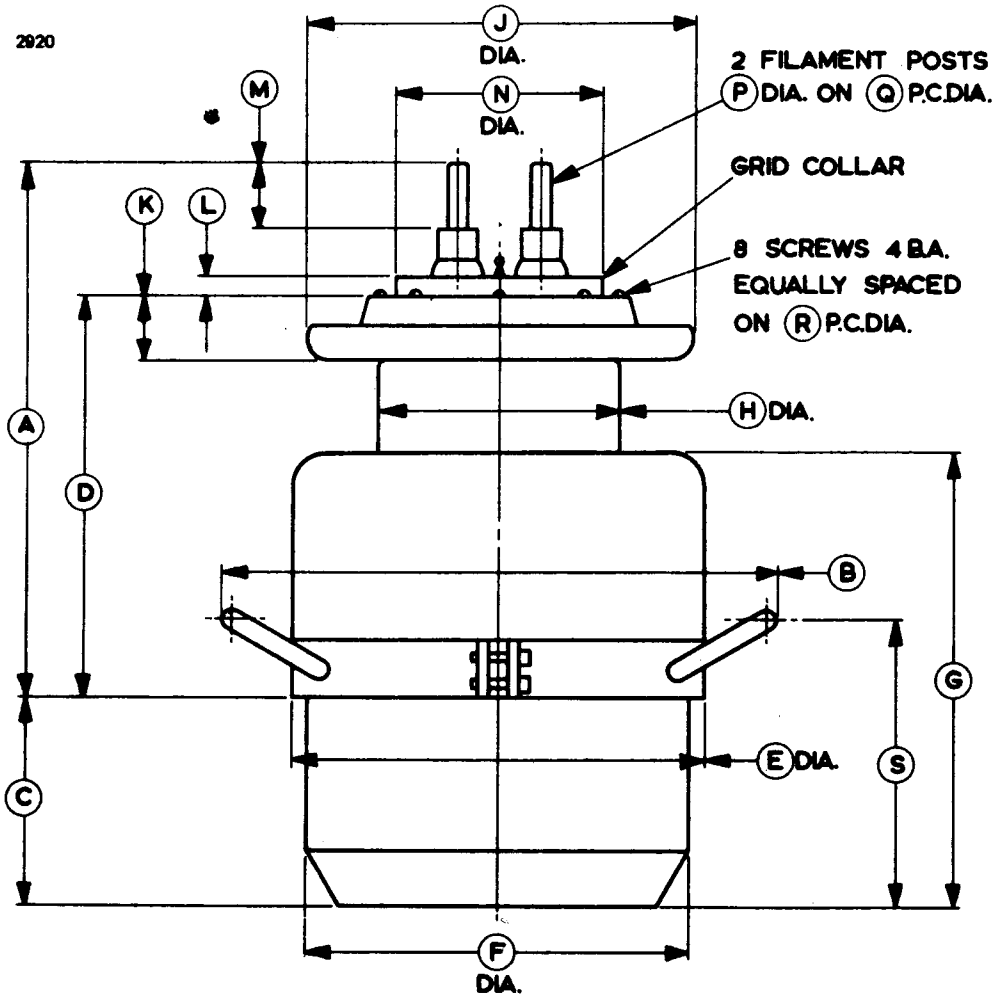
## AIR COOLING REQUIREMENTS FOR BR179



# TYPICAL AIR FLOW CHARACTERISTIC FOR BR179



## OUTLINE FOR BR179 (All dimensions without limits are nominal)




| Ref | Inches | Millimetres | Ref | Inches | Millimetres |
|---|---|---|---|---|---|
| A | 10.000 max | 254.0 max | K | 1.187 | 30.15 |
| B | 10.125 | 257.2 | L | 0.328 | 8.33 |
| C | 3.812 | 96.82 | M | 1.187 | 30.15 |
| D | 7.531 max | 191.3 max | N | 3.750 | 95.25 |
| E | 7.625 max | 193.7 max | P | 0.437 | 11.10 |
| F | 7.062 max | 179.4 max | Q | 1.500 | 38.10 |
| G | 8.312 | 211.1 | R | 4.375 | 111.1 |
| H | 4.437 | 112.7 | S | 5.250 | 133.4 |
| J | 7.125 | 181.0 | | | |

Millimetre dimensions have been derived from inches.

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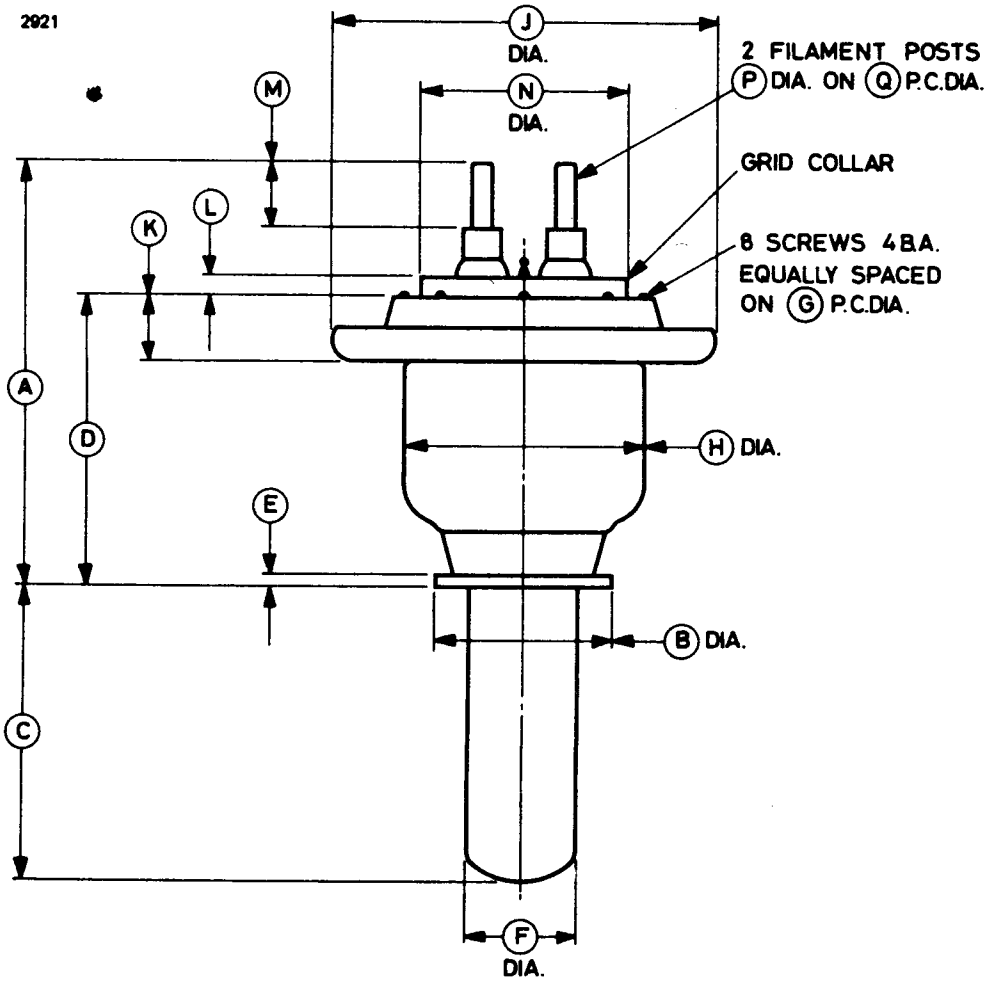


| Ref | Inches | Millimetres | Ref | Inches | Millimetres |
|---|---|---|---|---|---|
| A | 8.125 max | 206.4 max | J | 7.125 | 181.0 |
| B | 3.250 | 82.55 | K | 1.187 | 30.15 |
| C | 5.375 | 136.5 | L | 0.328 | 8.33 |
| D | 5.625 max | 142.9 max | M | 1.187 | 30.15 |
| E | 0.250 | 6.35 | N | 3.750 | 95.25 |
| F | 2.000 | 50.80 | P | 0.437 | 11.10 |
| G | 4.375 | 111.1 | Q | 1.500 | 38.10 |
| H | 4.437 | 112.7 | | | |

Millimetre dimensions have been derived from inches.