

## TENTATIVE DATA

### QUICK REFERENCE DATA

External anode triode, of ceramic to metal construction, intended for use as an industrial oscillator at frequencies up to 120 MHz.

The YD1170 is forced-air cooled.

The YD1171 is water cooled by means of a separate water jacket.

The YD1172 has an integral helical water cooler.

|                               |      |     |
|-------------------------------|------|-----|
| f                             | 120  | MHz |
| $P_{out}$ (less $P_{drive}$ ) | 15.4 | kW  |
| f max.                        | 120  | MHz |
| $V_a$ max.                    | 7.2  | kV  |
| $p_a$ max.                    | 10   | kW  |

Unless otherwise stated, data is applicable to all types

To be read in conjunction with

GENERAL OPERATIONAL RECOMMENDATIONS - TRANSMITTING VALVES

INDUSTRIAL OSCILLATOR, CLASS 'C'

### OPERATING CONDITIONS

|                                       |       |          |
|---------------------------------------|-------|----------|
| f                                     | 120   | MHz      |
| $P_{out}$                             | 16.2  | kW       |
| $P_{out}$ (less $P_{drive}$ )         | 15.4  | kW       |
| $P_{load}$                            | 13.5* | kW       |
| Duty factor                           | 1.0   |          |
| $\eta_a$                              | 79.4  | %        |
| $V_a$                                 | 6.0   | kV       |
| $I_a$                                 | 3.4   | A        |
| $-V_g$                                | 460   | V        |
| $I_g$ on load                         | 920   | mA       |
| $I_g$ off load                        | 1.35  | A        |
| $R_{g-f}$                             | 500   | $\Omega$ |
| Feedback ratio $v_{in(pk)}/v_{a(pk)}$ | 0.13  |          |
| $p_a$                                 | 4.2   | kW       |
| $p_g$                                 | 275   | W        |

\*Cavity circuit, 90% transfer.

# **RATINGS (ABSOLUTE MAXIMUM SYSTEM)**

|                             |     |            |
|-----------------------------|-----|------------|
| $f_{\text{max.}}$           | 120 | MHz        |
| $P_{\text{in max.}}$        | 24  | kW         |
| $V_{\text{a max.}}$         | 7.2 | kV         |
| $-V_{\text{g max.}}$        | 1.5 | kV         |
| $I_{\text{a max.}}$         | 4.0 | A          |
| $I_{\text{g max.}}$ on load | 1.0 | A          |
| off load                    | 1.5 | A          |
| $I_{\text{k max.}}$         | 4.8 | A          |
| $i_{\text{k(pk) max.}}$     | 25  | A          |
| $p_{\text{a max.}}$         | 10  | kW         |
| $R_{\text{g-f max.}}$       | 10  | k $\Omega$ |

## **CATHODE**

Directly heated, thoriated tungsten

|                                    |        |          |
|------------------------------------|--------|----------|
| $V_{\text{f}} < 100\text{MHz}$     | 5.8    | V        |
| 100-120MHz                         | 5.5    | V        |
| $I_{\text{f}}$                     | 130    | A        |
| $i_{\text{f(pk) max.}}$ (starting) | 800    | A        |
| $r_{\text{f}}$ (cold)              | 0.0056 | $\Omega$ |

The filament has been designed to accept temporary fluctuations of supply voltage of +5 to -10%.

## **CAPACITANCES**

|                  |     |    |
|------------------|-----|----|
| $c_{\text{a-g}}$ | 24  | pF |
| $c_{\text{g-f}}$ | 47  | pF |
| $c_{\text{a-f}}$ | 0.6 | pF |

## **CHARACTERISTICS (at $V_{\text{a}} = 6.0\text{kV}$ , $I_{\text{a}} = 2.0\text{A}$ )**

|                |    |      |
|----------------|----|------|
| $g_{\text{m}}$ | 33 | mA/V |
| $\mu$          | 29 |      |

**MOUNTING POSITION** - YD1170, YD1172  
YD1171

Vertical, anode up or down  
Vertical, anode down

## COOLING

### YD1170

Anode - Forced-air cooled

Seals - At the higher values of anode dissipation and at the highest operating frequencies additional cooling is required.

#### Temperatures

|                |     |    |
|----------------|-----|----|
| All seals max. | 200 | °C |
| Envelope max.  | 200 | °C |
| Air inlet max. | 45  | °C |

| Anode<br>dissipation | Height<br>above<br>sea level | Inlet<br>temperature | Outlet<br>temperature | Rate of<br>air flow<br>per minute |                    | Pressure<br>difference<br>between inlet<br>and outlet |
|----------------------|------------------------------|----------------------|-----------------------|-----------------------------------|--------------------|-------------------------------------------------------|
| (kW)                 | (km)                         | (°C)                 | (°C)                  | (m <sup>3</sup> )                 | (ft <sup>3</sup> ) | (mm H <sub>2</sub> O)                                 |
| 10                   | 0                            | 35                   | 94                    | 9.5                               | 335                | 55                                                    |
| 8.0                  | 0                            | 35                   | 105                   | 6.5                               | 229                | 28                                                    |
| 6.0                  | 0                            | 35                   | 113                   | 4.5                               | 159                | 15                                                    |
| 4.0                  | 0                            | 35                   | 117                   | 3.0                               | 106                | 8.0                                                   |
| 10                   | 0                            | 45                   | 98                    | 11.0                              | 388                | 69                                                    |
| 8.0                  | 0                            | 45                   | 108                   | 7.6                               | 265                | 35                                                    |
| 6.0                  | 0                            | 45                   | 115                   | 5.2                               | 184                | 19                                                    |
| 4.0                  | 0                            | 45                   | 119                   | 3.5                               | 123                | 10                                                    |
| 10                   | 1.5                          | 35                   | 94                    | 11.4                              | 405                | 63                                                    |
| 8.0                  | 1.5                          | 35                   | 105                   | 7.8                               | 273                | 32                                                    |
| 6.0                  | 1.5                          | 35                   | 113                   | 5.4                               | 194                | 17                                                    |
| 4.0                  | 1.5                          | 35                   | 117                   | 3.6                               | 131                | 9.0                                                   |
| 10                   | 3.0                          | 25                   | 90                    | 12                                | 424                | 62                                                    |
| 8.0                  | 3.0                          | 25                   | 102                   | 8.2                               | 291                | 32                                                    |
| 6.0                  | 3.0                          | 25                   | 111                   | 5.7                               | 203                | 17                                                    |
| 4.0                  | 3.0                          | 25                   | 116                   | 3.8                               | 138                | 9.0                                                   |

## YD1171

Anode - Water cooled (separate water jacket)

Seals - For frequencies >4 MHz air cooling is required.

Temperatures

|                  |     |    |
|------------------|-----|----|
| All seals max.   | 200 | °C |
| Envelope max.    | 200 | °C |
| Water inlet max. | 50  | °C |

| Anode<br>dissipation | Inlet<br>temperature | Outlet<br>temperature | Rate of<br>water flow<br>per minute |       | Pressure<br>difference<br>between inlet<br>and outlet<br>(atm) |
|----------------------|----------------------|-----------------------|-------------------------------------|-------|----------------------------------------------------------------|
| (kW)                 | (°C)                 | (°C)                  | (litres)                            | (gal) |                                                                |
| 10                   | 20                   | 36                    | 10                                  | 2.2   | 0.6                                                            |
| 8.0                  | 20                   | 37                    | 7.8                                 | 1.72  | 0.38                                                           |
| 6.0                  | 20                   | 38                    | 5.7                                 | 1.25  | 0.22                                                           |
| 10                   | 50                   | 61                    | 15                                  | 3.3   | 1.25                                                           |
| 8.0                  | 50                   | 62                    | 11.3                                | 2.49  | 0.75                                                           |
| 6.0                  | 50                   | 62                    | 8.2                                 | 1.80  | 0.42                                                           |

For inlet temperatures between 20 and 50°C the required water flow can be found by linear interpolation.

## YD1172

Anode - Water cooled (integral cooler)

Seals - For frequencies >4 MHz air cooling is required.

Temperatures

|                  |     |    |
|------------------|-----|----|
| All seals max.   | 200 | °C |
| Envelope max.    | 200 | °C |
| Water inlet max. | 50  | °C |

| Anode<br>dissipation | Inlet<br>temperature | Outlet<br>temperature | Rate of<br>water flow<br>per minute |       | Pressure<br>difference<br>between inlet<br>and outlet<br>(atm) |
|----------------------|----------------------|-----------------------|-------------------------------------|-------|----------------------------------------------------------------|
| (kW)                 | (°C)                 | (°C)                  | (litres)                            | (gal) |                                                                |
| 10                   | 20                   | 46                    | 6.0                                 | 1.32  | 0.25                                                           |
| 8.0                  | 20                   | 49                    | 4.5                                 | 0.99  | 0.15                                                           |
| 6.0                  | 20                   | 53                    | 3.0                                 | 0.66  | 0.07                                                           |
| 10                   | 50                   | 67                    | 9.0                                 | 1.98  | 0.52                                                           |
| 8.0                  | 50                   | 69                    | 6.7                                 | 1.47  | 0.31                                                           |
| 6.0                  | 50                   | 72                    | 4.5                                 | 0.99  | 0.15                                                           |

For inlet temperatures between 20 and 50°C the required water flow can be found by linear interpolation.

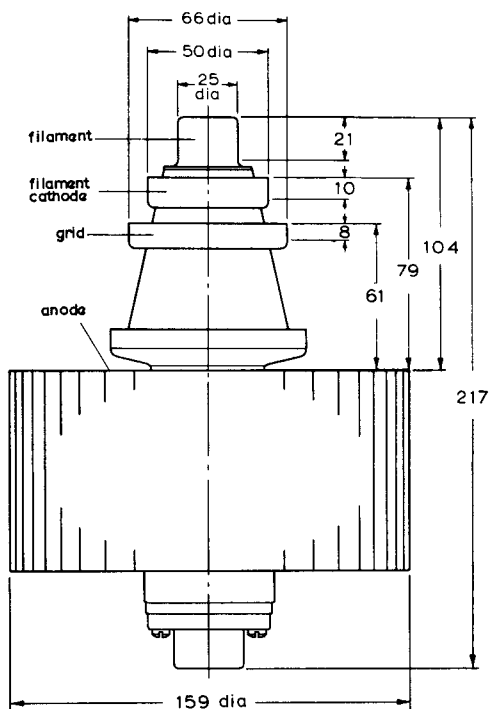
## PHYSICAL DATA

|                               | YD1170 | YD1171 | YD1172 |    |
|-------------------------------|--------|--------|--------|----|
| Weight of valve               | 7.5    | 1.5    | 2.0    | kg |
|                               | 16.5   | 3.3    | 4.4    | lb |
| Weight of insulating pedestal | 4.25   | -      | -      | kg |
|                               | 9.4    | -      | -      | lb |
| Weight of water jacket        | -      | 2.0    | -      | kg |
|                               | -      | 4.4    | -      | lb |

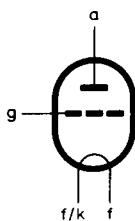
## ACCESSORIES

|                                    |       |
|------------------------------------|-------|
| Filament connector                 | 40692 |
| Filament/cathode connector         | 40693 |
| Grid connector ( $f \leq 4.0$ MHz) | 40690 |
| Grid connector ( $f > 4.0$ MHz)    | 40691 |
| Filament cables $\times 2$         | 40715 |
| Insulating pedestal (YD1170)       | 40654 |
| Water jacket (YD1171)              | K727  |

# OUTLINE DRAWING OF YD1170

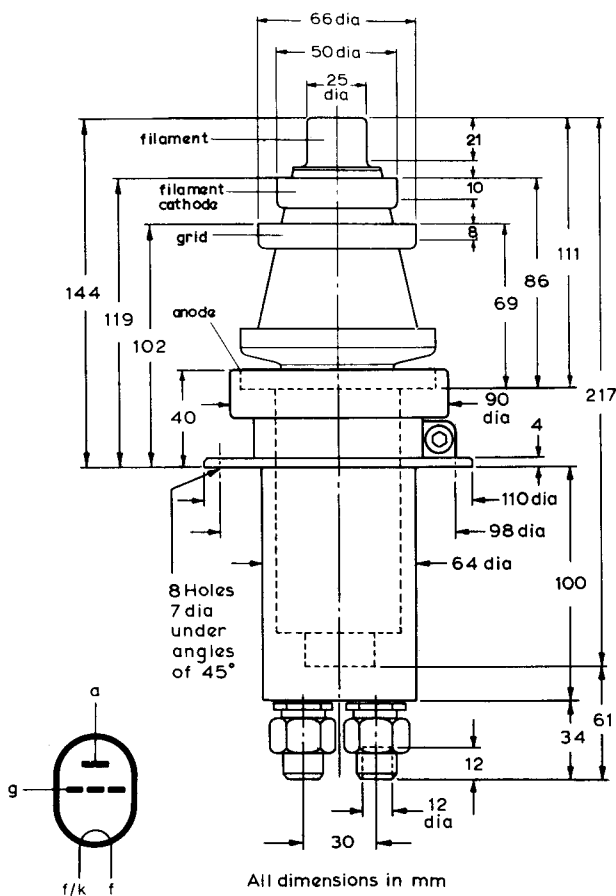


All dimensions in mm



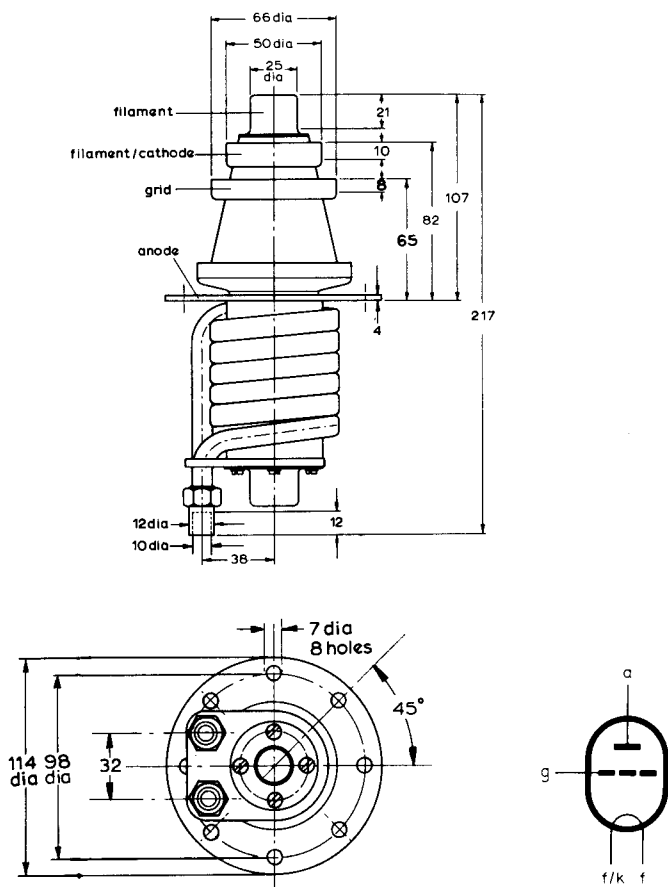
B5767

OUTLINE DRAWING OF YD1171 MOUNTED IN WATER JACKET K727



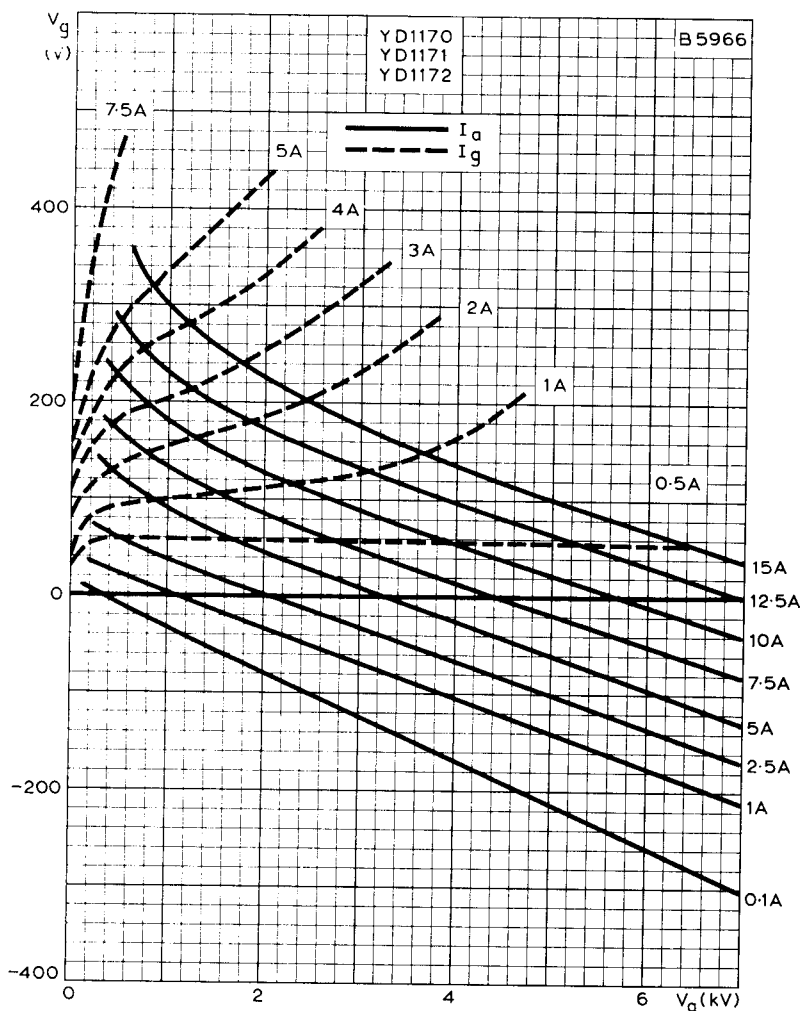
85751

# OUTLINE DRAWING OF YD1172



All dimensions in mm

B6734



CONSTANT CURRENT CHARACTERISTICS