# WATER COOLED INDUSTRIAL R.F. POWER TRIODE WITH INTEGRAL HELICAL COOLER

| QUICK REFERENCE DATA | | |
|---|---|---|
| Industrial R.F. oscillator class C | | |
| Freq. (MHz) | Three phase | |
| | $V_a$ (kV) | $W_o$ (kW) |
| 30 | 12 | 29.0 |
| | 10 | 23.3 |
| | 8 | 17.9 |

**HEATING**: direct; filament thoriated tungsten

| | | | | |
|---|---|---|---|---|
| Filament voltage | $V_f$ | = | 8.0 | V $^{+5\%}_{-10\%}$ |
| Filament current | $I_f$ | = | 98 | A |
| Cold filament resistance | $R_f$ | = | 0.008 | Ω |

The filament current must never exceed a peak value of 210 A instantaneously at any time during the initial energizing schedule

**CAPACITANCES**

| | | | | |
|---|---|---|---|---|
| Anode to all other elements except grid | $C_a$ | = | 0.4 | pF |
| Grid to all other elements except anode | $C_g$ | = | 37 | pF |
| Anode to grid | $C_{ag}$ | = | 30 | pF |

**TYPICAL CHARACTERISTICS**

| | | | | |
|---|---|---|---|---|
| Anode voltage | $V_a$ | = | 12 | kV |
| Anode current | $I_a$ | = | 2 | A |
| Amplification factor | $\mu$ | = | 34 | |
| Mutual conductance | S | = | 20 | mA/V |

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**TEMPERATURE LIMITS** (Absolute limits)

| | | | | |
|---|---|---|---|---|
| Water inlet temperature | $t_i$ | = | max. 50 | °C |
| Temperature off all seals | | = | max. 220 | °C |

**WATER COOLING CHARACTERISTICS**

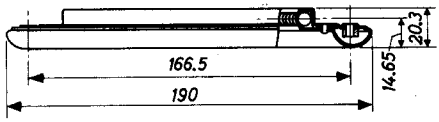
| $W_a$ (kW) | $t_i$ (°C) | qmin (l/min) | $p_i$ (atm.) |
|---|---|---|---|
| 10 | 20 | 4.2 | 0.08 |
| | 50 | 8.4 | 0.27 |
| 15 | 20 | 6.5 | 0.16 |
| | 50 | 13.0 | 0.50 |
| 20 | 20 | 9.3 | 0.30 |
| | 50 | 18.6 | 1.0 |

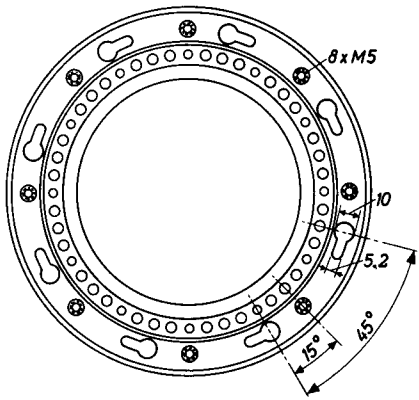
At water inlet temperatures between 20 °C and 50 °C the required quantity of water can be found by linear interpolation

Generally a low velocity air flow to the seals is required

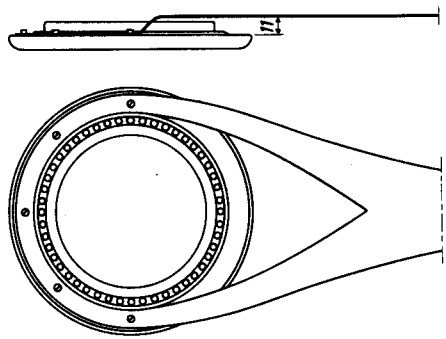
**MECHANICAL DATA**

Dimensions in mm




Grid connector 40663




Connection of the grid lead

The rounded side of the grid connector should face the anode. To ensure a uniform R.F. current distribution in the grid seal at frequencies higher than 4 MHz, the grid lead should be connected as shown at right.

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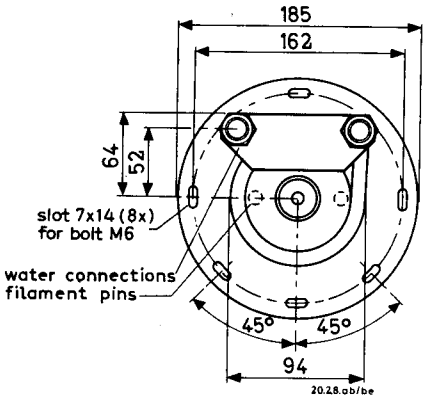
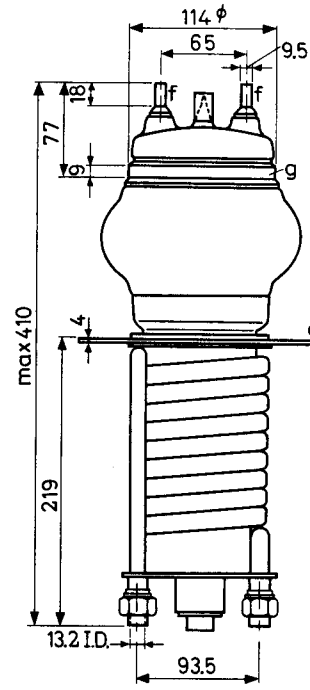
**MECHANICAL DATA** (continued)

Dimensions in mm

| | |
|---|---|
| Filament connectors with cable | 40662 |
| Grid connector | 40663 |
| Net weight | 5.2 kg |




Mounting position: vertical with anode down

**R.F. CLASS C OSCILLATOR FOR INDUSTRIAL USE** with anode voltage from three-phase half-wave rectifier without filter

LIMITING VALUES (Absolute limits)

| Frequency | | f | | up to | 30 | MHz |
|---|---|---|---|---|---|---|
| Anode voltage | | $V_a$ | = | max. | 13 | kV |
| Anode current | | $I_a$ | = | max. | 4.8 | A |
| Anode dissipation | | $W_a$ | = | max. | 20 | kW |
| Anode input power | | $W_{ia}$ | = | max. | 60 | kW |
| Negative grid voltage | | $-V_g$ | = | max. | 1500 | V |
| Grid current | | $I_g$ | = | max. | 0.8 | A |
| Grid circuit resistance | | $R_g$ | = | max. | 10 | kΩ |

OPERATING CONDITIONS

| | | | | | | |
|---|---|---|---|---|---|---|
| Frequency | f | = | 30 | 30 | 30 | MHz |
| Transformer voltage | $V_{tr}$ | = | 8.9 | 7.4 | 6.0 | kV |
| Anode voltage | $V_a$ | = | 12 | 10 | 8 | kV |
| Anode current, loaded | $I_a$ | = | 3.2 | 3.2 | 3.2 | A |
| Anode current, unloaded | $I_a$ | = | 0.52 | 0.50 | 0.48 | A |
| Grid current, loaded | $I_g$ | = | 0.50 | 0.50 | 0.50 | A |
| Grid current, unloaded | $I_g$ | = | 0.74 | 0.77 | 0.80 | A |
| Grid resistor | $R_g$ | = | 2.0 | 1.6 | 1.1 | kΩ |
| Load resistance | $R_{a\sim}$ | = | 1800 | 1450 | 1100 | Ω |
| Feedback ratio under loaded conditions | $V_{g\sim}/V_{a\sim}$ | = | 16 | 17 | 19 | % |
| Anode input power | $W_{ia}$ | = | 38.4 | 32.0 | 25.6 | kW |
| Anode dissipation | $W_a$ | = | 9.4 | 8.7 | 7.7 | kW |
| Output power | $W_o$ | = | 29.0 | 23.3 | 17.9 | kW |
| Efficiency | $\eta$ | = | 75.5 | 72.5 | 70 | % |
| Output power in the load | $W_\ell$ | = | 25 | 20 | 15.5 | kW[1] |

1) Useful power in the load measured in a circuit having an efficiency of 90%

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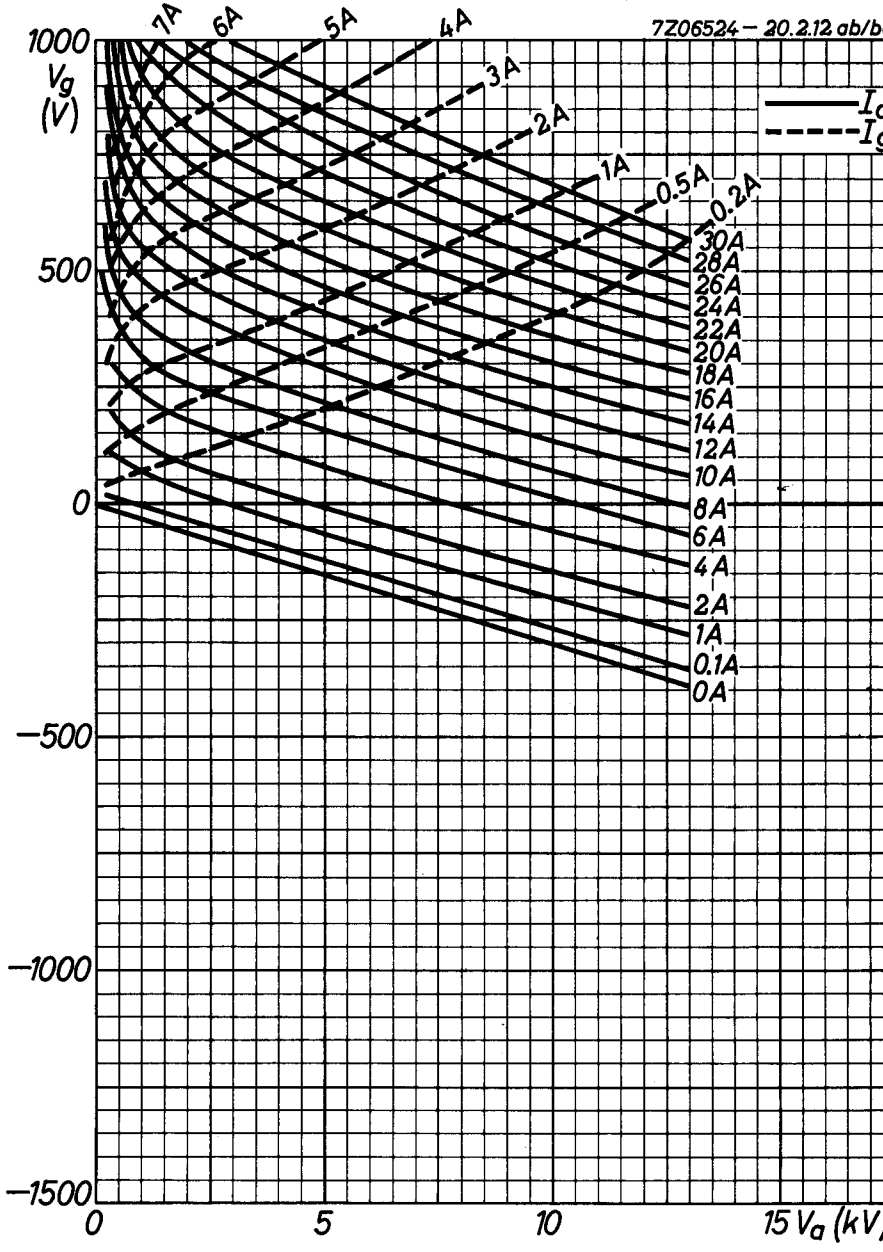
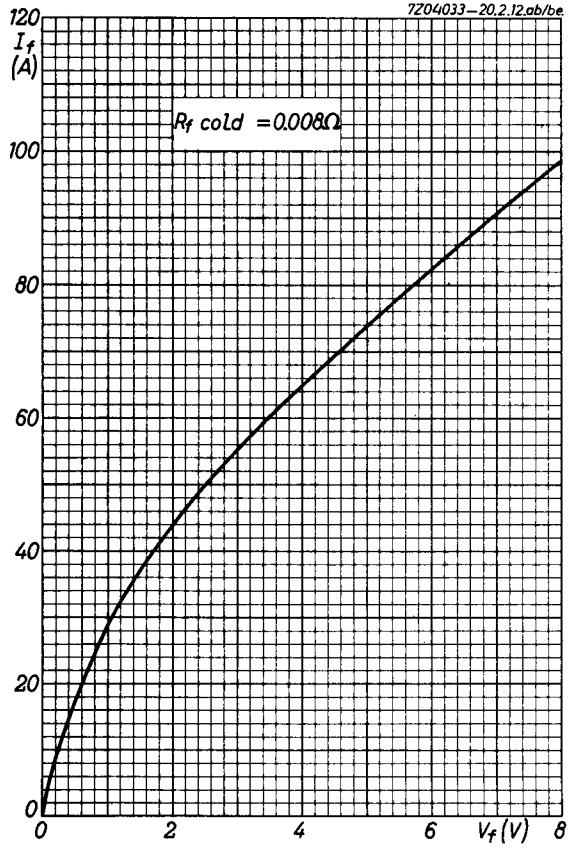

7Z06524 – 20.2.12 ab/be
1000
Vg
(V)
500
0
−500
−1000
−1500
0
5
10
15 Va (kV)
Ia
Ig
7A
6A
5A
4A
3A
2A
1A
0.5A
0.2A
30A
28A
26A
24A
22A
20A
18A
16A
14A
12A
10A
8A
6A
4A
2A
1A
0.1A
0A


7Z04033—20.2.12.ab/be
120
$I_f$ (A)
100
80
60
40
20
0
$R_f$ cold = 0.008Ω
0
2
4
6
$V_f$ (V)
8