WATER COOLED INDUSTRIAL R.F. POWER TRIODE

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_{fo}	=	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	μ	=	34	
Mutual conductance	S	=	20	mA/V

TEMPERATURE LIMIT (Absolute limit)

Seal temperature = max. 220 °C

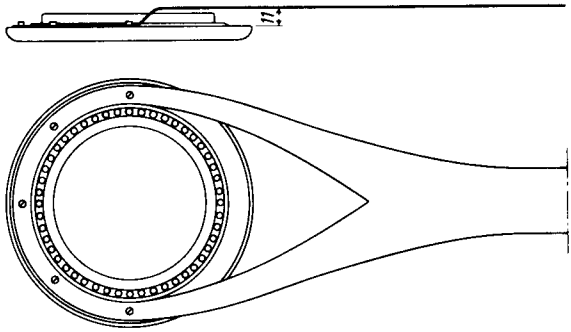
Generally a low velocity air flow to the seals is required

WATER COOLING CHARACTERISTICS

t_i = max. 50 °C

W_a (kW)	t_i (°C)	q_{min} [1]) (l/min)	p_i (atm.)
5	20	6	0.02
	50	15	0.22
10	20	11	0.1
	50	25	0.7
15	20	16	0.25
	50	37	1.3
20	20	22	0.5
	50	49	2.3

To ensure a uniform R.F. current distribution in the grid seal especially at frequencies higher than 4 MHz, the grid lead should be connected as shown below.



[1]) At inlet temperatures between 20 and 50 °C the required quantity of water can be found by proportional interpolation

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MECHANICAL DATA

Dimensions in mm

Net weight of the tube : 2.8 kg

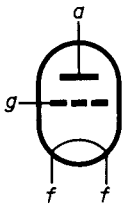
Net weight of water jacket: 2.1 kg

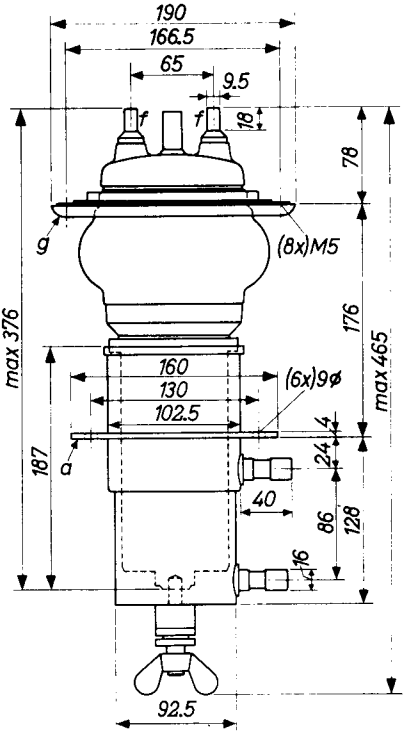
Filament connectors with cable : 40662

Grid connector : 40663

Water jacket : K717

→ O-ring large : 2622 080 30895
small : 2622 080 30736





Tube with grid connector and water jacket

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	η	=	75.5	72.5	70	%
Output power in the load	W_ℓ	=	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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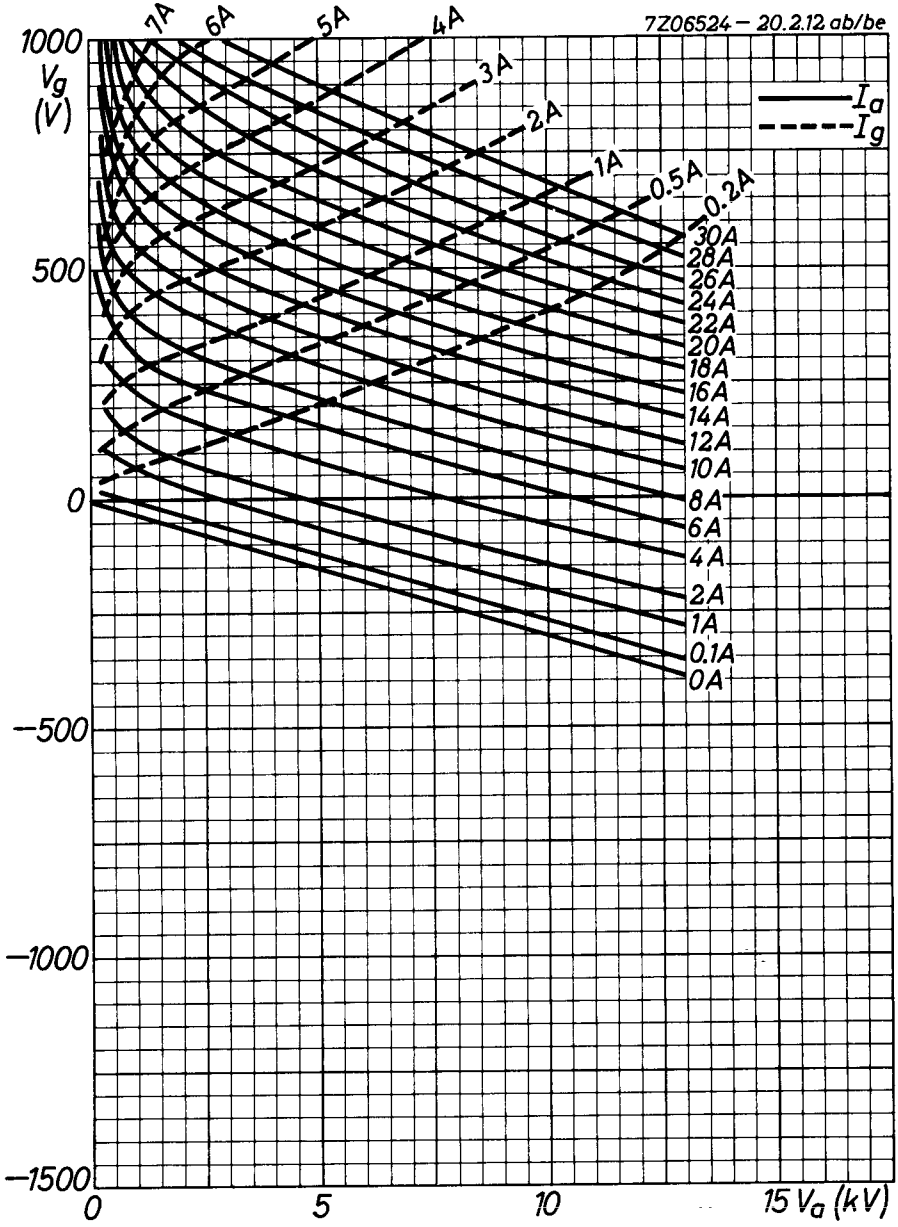
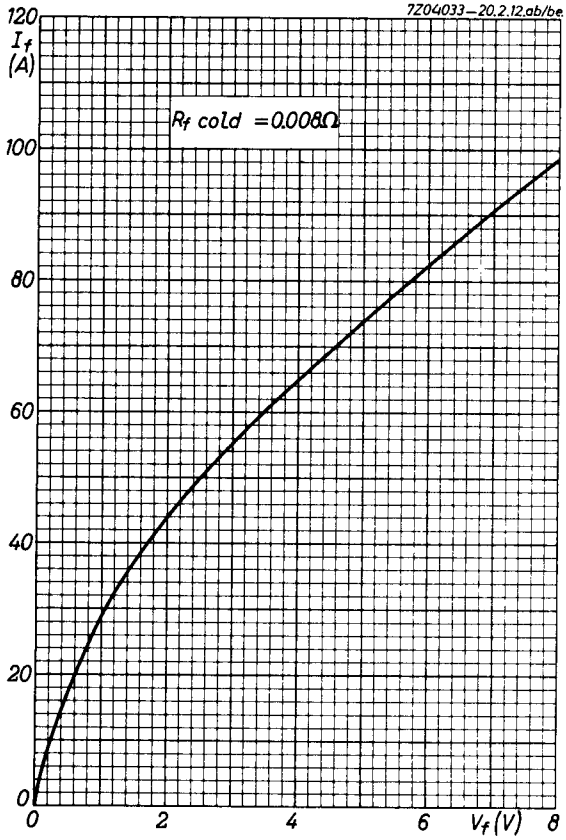

7Z06524 – 20.2.12 ab/be
1000
Vg
(V)
500
0
−500
−1000
−1500
0
5
10
15 Va (kV)
Ia
Ig
7A
6A
5A
4A
3A
2A
1A
0.5A
0.2A
30A
28A
26A
24A
22A
20A
18A
16A
14A
12A
10A
8A
6A
4A
2A
1A
0.1A
0A


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

PHILIPS

Data handbook

Electronic components and materials

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page	sheet	date
1	1	1967.09
2	2	1967.09
3	3	1971.09
4	4	1967.09
5	A	1967.09
6	B	1967.09
7	FP	1999.08.10