RF POWER TRIODE

- Air cooled

QUICK REFERENCE DATA

Industrial RF oscillator, class-C

freq.	three-phase rectifier continuous		intermittent	
	V_a	W_o	V_a	W_o
MHz	kV	kW	kV	kW
50	7	4,85		
	6	4,1	6	5,9

HEATING: direct; thoriated tungsten filament

Filament voltage	V_f	=	6,3 V
Filament current	I_f	=	65 A

The filament is designed to accept temporary fluctuations of +5% and −10%

CAPACITANCES

Anode to all other elements except grid	C_a	<	0,5 pF
Grid to all other elements except anode	C_g	=	13 pF
Anode to grid	C_{ag}	=	7,5 pF

TYPICAL CHARACTERISTICS

Anode voltage	V_a	=	6 kV
Anode current	I_a	=	0,24 A
Mutual conductance	S	=	7 mA/V
Amplification factor	μ	=	23

TEMPERATURE LIMITS (Absolute limits)

Temperature of all seals	max.	220 °C
Temperature of external parts of anode	max.	270 °C

Table 1 Cooling

	W_a (kW)	q_{min} (m^3/min)	ΔP (Pa)*
Continuous service	1.3	1.6	160
	1.7	2.1	250

For intermittent service see figure page 113

At higher altitudes and/or temperatures a corresponding higher amount of air should be applied

RECOMMENDED COOLING DEVICE

(1) = metal housing (see page 3)

(2) = glass cylinder

(3) = socket 2422 511 05001

(4) = ground plate (see page 3)

Dimensions of the glass cylinder:

Height : 118 mm

Outside diameter : 150 mm

Inside diameter : 144 mm

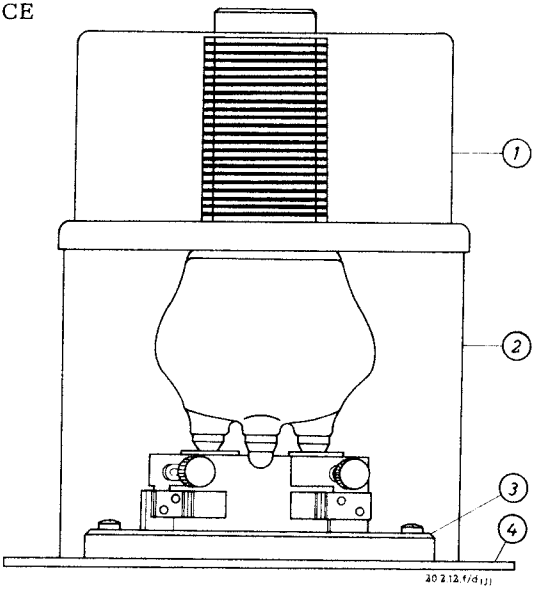

Fig. 1 Recommended cooling device.

The cooling air should preferably be supplied through the space under the ground plate (4). This ground plate should have holes of sufficient cross section to pass the required air flow.

The housing (1) should be connected to the anode connector. At frequencies above 4 MHz both grid terminals should be connected in parallel. At the highest frequencies care should be taken to distribute the RF current equally between both grid terminals to avoid excessive grid seal temperatures.

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* 1 Pa ≈ 0,1 mm H_2O.

RECOMMENDED COOLING DEVICE (continued)

Dimensions in mm

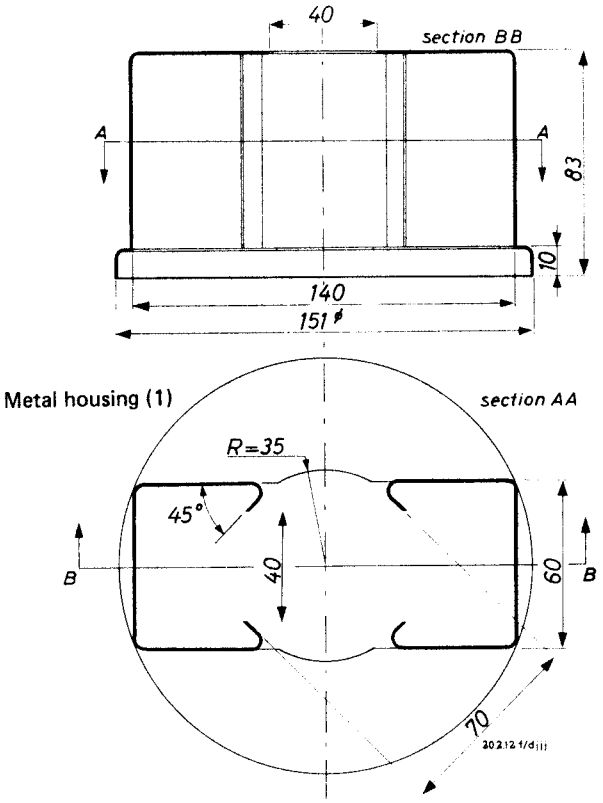
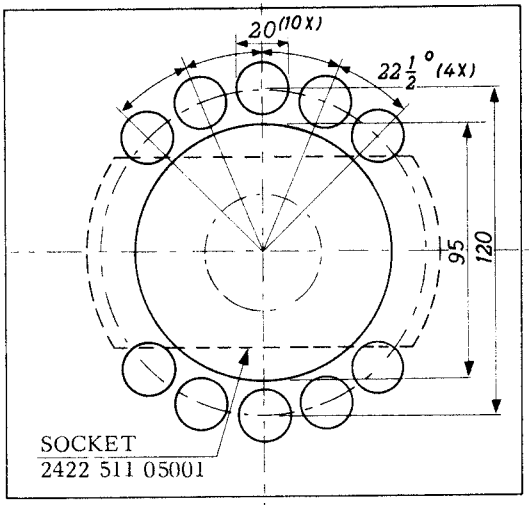


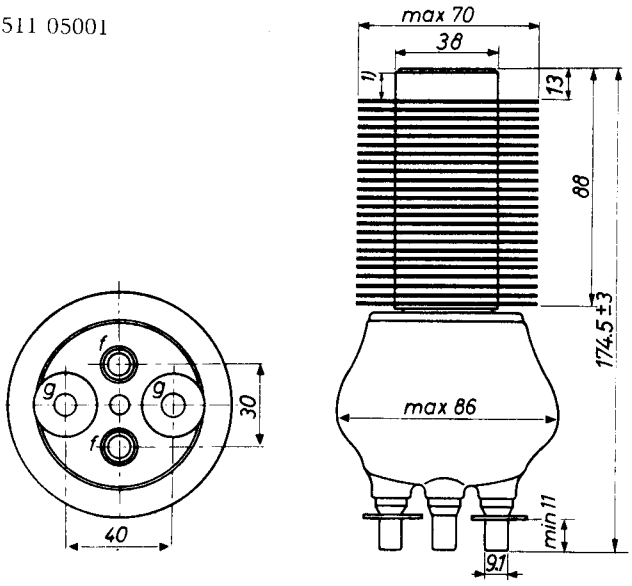
Fig. 2 Cooling device details.

Ground plate (4)



MECHANICAL DATA (dimensions in mm)

Socket: 2422 511 05001



Mounting position: vertical with anode up or down

Fig. 3 Mechanical outline.

1) Area for anode connector

RF CLASS C OSCILLATOR FOR INDUSTRIAL USE with anode voltage from three-phase rectifier without filter

LIMITING VALUES (Absolute limits) continuous service

Frequency	f		up to	50	MHz
Anode voltage	V_a	=	max.	8	kV
Anode current	I_a	=	max.	1	A
Anode input power	W_{ia}	=	max.	7	kW
Anode dissipation	W_a	=	max.	1.7	kW
Negative grid voltage	$-V_g$	=	max.	1250	V
Grid current, loaded	I_g	=	max.	0.4	A
Grid current, unloaded	I_g	=	max.	0.5	A
Grid resistor	R_g	=	max.	10	kΩ

OPERATING CONDITIONS, continuous service

Frequency	f	=	50	50	MHz
Transformer voltage	V_{tr}	=	6.0	5.1	kV_{RMS}
Anode voltage	V_a	=	7	6	kV
Anode current, loaded	I_a	=	0.9	0.9	A
Anode current, unloaded	I_a	=	0.2	0.2	A [1]
Grid current, loaded	I_g	=	0.25	0.28	A
Grid current, unloaded	I_g	=	0.30	0.35	A [1]
Grid resistor	R_g	=	2.5	2	kΩ
Load resistance	$R_{a\sim}$	=	3.85	3.3	kΩ
Feedback ratio under loaded conditions	$V_{g\sim}/V_{a\sim}$	=	15	16	%
Anode input power	W_{ia}	=	6.3	5.4	kW
Anode dissipation	W_a	=	1.45	1.3	kW
Output power	W_o	=	4.85	4.1	kW
Efficiency	η	=	77	76	%
Output power in the load	W_ℓ	=	4.0	3.3	kW [2]

[1] In a typical circuit

[2] Useful power in the load measured in a circuit having an efficiency of 85%.

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RF CLASS C OSCILLATOR FOR INDUSTRIAL USE with anode voltage from three-phase rectifier without filter

LIMITING VALUES (Absolute limits) intermittent service

Frequency	f	up to	50	MHz
Anode voltage	V_a	= max.	8	kV
Anode current	I_a	= max.	1.5	A
Anode input power	W_{ia}	= max.	9	kW
Anode dissipation	W_a	= max.	2.1	kW [1]
Negative grid voltage	$-V_g$	= max.	1250	V
Grid current, loaded	I_g	= max.	0.4	A
Grid current, unloaded	I_g	= max.	0.5	A
Grid resistor	R_g	= max.	10	kΩ

OPERATING CONDITIONS, intermittent service

Frequency	f	=	50	MHz
Transformer voltage	V_{tr}	=	5.1	kV_{RMS}
Anode voltage	V_a	=	6	kV
Anode current, loaded	I_a	=	1.33	A
Anode current, unloaded	I_a	=	0.33	A [2]
Grid current, loaded	I_g	=	0.38	A
Grid current, unloaded	I_g	=	0.48	A [2]
Grid resistor	R_g	=	1450	Ω
Load resistance	$R_{a\sim}$	=	2200	Ω
Feedback ratio under loaded conditions	$V_{g\sim}/V_{a\sim}$	=	17	%
Anode input power	W_{ia}	=	8	kW
Anode dissipation	W_a	=	2.1	kW [1]
Output power	W_o	=	5.9	kW
Efficiency	η	=	74	%
Output power in the load	W_ℓ	=	4.75	kW [3]

1) See Fig. 4
2) In a typical circuit
3) Useful power in the load measured in a circuit having an efficiency of 85%.

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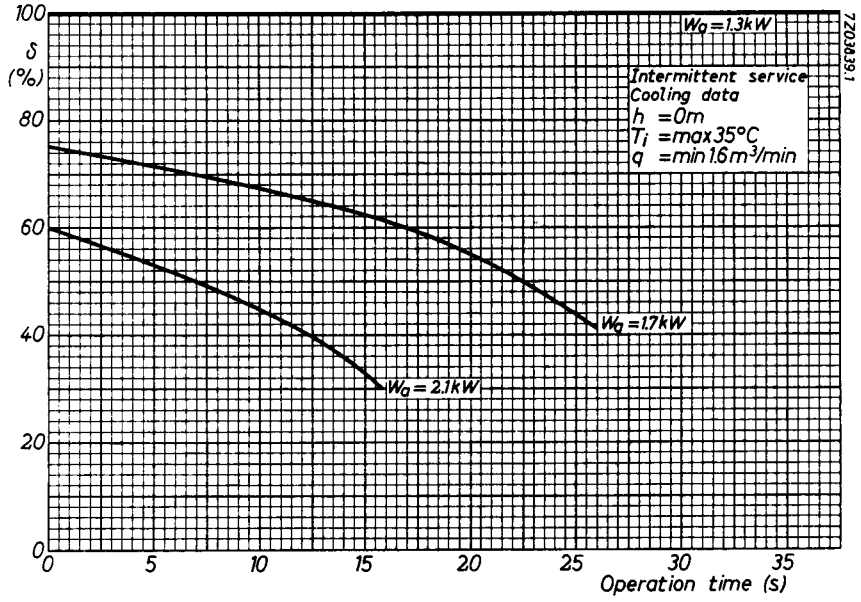

Fig. 4 Intermittent service. Limits of anode dissipation and cooling.

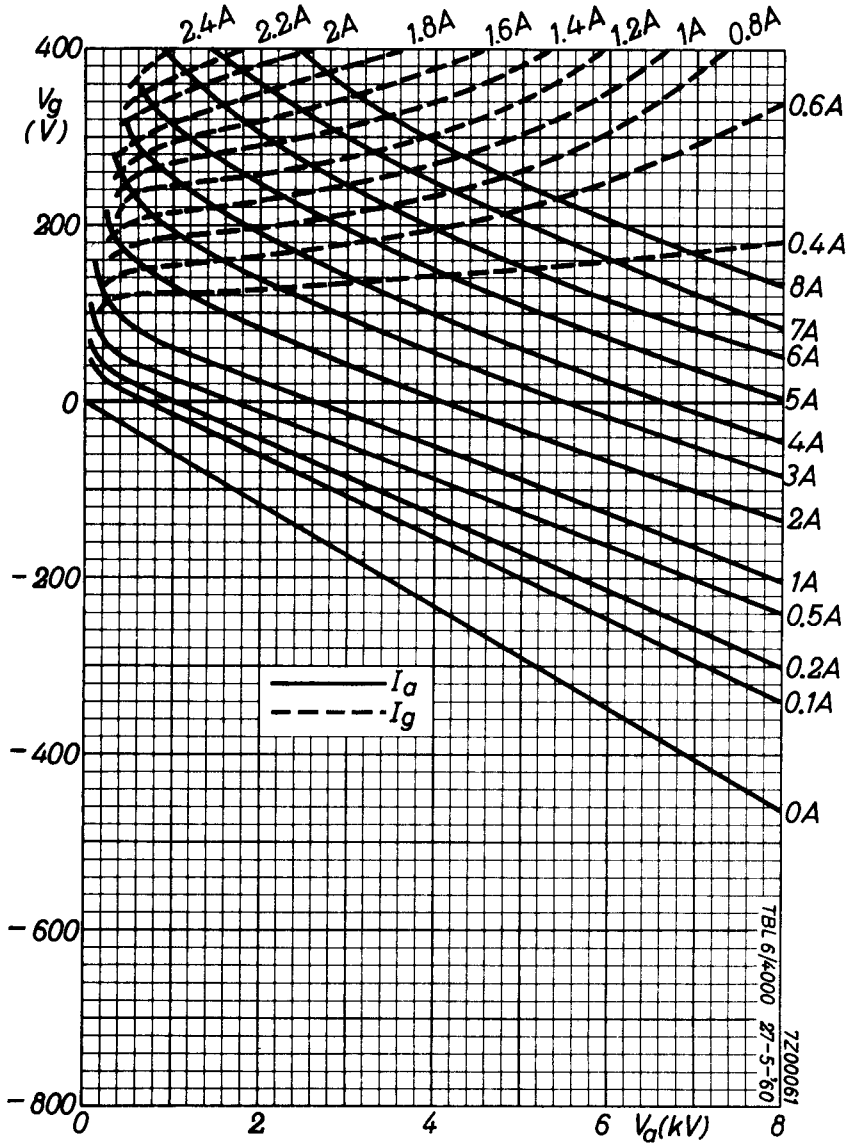

Fig. 5 Constant current characteristics.

PHILIPS

Data handbook

Electronic components and materials

TBL6/4000

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