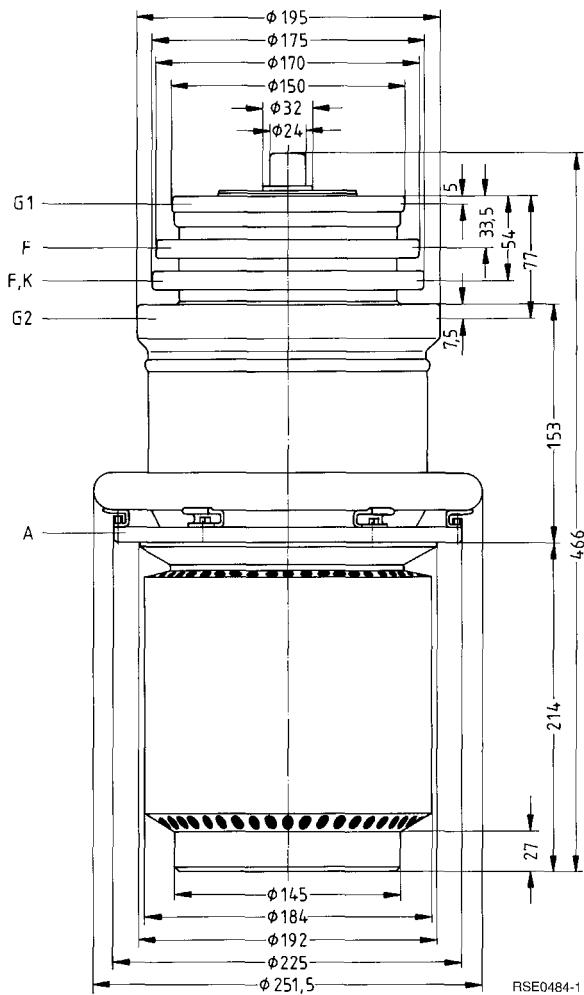


Ordering code Q53-X1896

Linear metal-ceramic-glass tetrode with coaxial electrode lead-throughs, vapor-cooled, suitable for single-sideband transmitter of up to 100 kW or 55 kW with grid-current free modulation.



Dimensions in mm

Approx. weight 30 kg

Heating

Heater voltage	U_F	11	V
Heater current	I_F	≈ 175	A
Permissible starting current	I_{FM}	≤ 240	A
Heating: direct			
Cathode: thoriated tungsten			

Characteristics

Emission current at $U_A = U_{G2} = U_{G1} = 550 \text{ V}$	I_{em}	55	A
Amplification factor of screen grid at $U_A = 13 \text{ kV}$, $U_{G2} = 1,5 \text{ to } 2 \text{ kV}$, $I_A = 3 \text{ A}$	μ_{g2g1}	5,5	
Transconductance at $U_A = 13 \text{ kV}$, $U_{G2} = 2 \text{ kV}$, $I_A = 3 \text{ A}$	S	40	mA/V

Capacitances

Cathode/control grid	C_{kg1}	≈ 195	pF
Cathode/screen grid	C_{kg2}	≈ 70	pF
Cathode/anode	C_{ka}	$\approx 0,45$	pF ¹⁾
Control grid/screen grid	C_{g1g2}	≈ 145	pF
Control grid/anode	C_{g1a}	$\approx 2,5$	pF ¹⁾
Screen grid/anode	C_{g2a}	≈ 70	pF

Accessories

Ordering code

Connector for heater and cathode	RöKat896	Q1001-X5
Connector for heater	RöKat897	Q1001-X6
Control grid terminal	RöGit896	Q1001-X18
Screen grid terminal	RöGit897	Q1001-X17
Handle	RöZub896	Q1001-X105
Boiler 100 kW	RöKüV896	Q1001-X47
Gasket at vapor outlet	RöKüV201Zub8	Q81-X1678
Insulating pipe at vapor outlet	RöKüV896Zub3	Q81-X1660
Insulating pipe at water inlet	RöKüV896Zub4	Q81-X1662
Union at water inlet	RöKüV896Zub7	C65055-A664-A42
LL electrolytic target	RöEI41	C65055-A667-A41
Gasket ring for tube flange		C65051-A411-C552
Anode terminal with contact springs for 100 kW boiler	C65055-A620-B120	Q1001-X22
Gasket ring for water supply line	C65055-A620-C545	Q1001-X77
Gasket ring for vapor outlet	C65055-A620-C543	Q1001-X78

1) Measured by means of a 50 cm diameter screening plate in the screen grid terminal plane.

**RF linear amplifier,
single-sideband modulation, grounded cathode circuit**

Maximum ratings

Frequency	f	30	MHz
Anode voltage (dc)	U_A	15	kV
Screen grid voltage (dc)	U_{G2}	2400	V
Control grid voltage (dc)	U_{G1}	– 1000	V
Cathode current (dc)	I_K	18	A
Peak cathode current	$I_{K M}$	55	A
Anode dissipation	P_A	100	kW
Screen grid dissipation	P_{G2}	1,8	kW
Control grid dissipation	P_{G1}	500	W

Operating characteristics

	I	II	III	I	II	III	
P_2	0	110	55	0	60	30	kW ¹⁾
U_A	13,5	13,5	13,5	13	13	13	kV
U_{G2}	2000	2000	2000	2200	2200	2200	V
U_{G1}	– 375	– 375	– 375	– 430	– 430	– 430	V
$U_{g1 m}$	0	620	620	0	375	375	V
I_A	3	14,2	9,5	2	7,5	5,1	A
I_{G2}	0	0,45	0,22	0	0,23	0,12	A
I_{G1}	0	0,30	0,15	0	–	–	A
$P_{B A}$	40,5	192	128	26	97,5	66	kW
P_1	0	168	84	0	–	–	W
P_A	40,5	82	73	26	37,5	36	kW
P_{G2}	0	0,9	0,44	0	0,51	0,26	W
P_{G1}	0	55	28	0	–	–	W
η	–	57,5	43	–	61,5	45,5	%
R_A	–	460	460	–	710	710	Ω

- I No modulation
- II 1-tone modulation
- III 2-tone modulation

¹⁾ Circuit losses are not included.

Tube mounting

Axis vertical, anode down.
For connection of the tube use the terminals listed under “Accessories”.

Maximum tube surface temperature

The temperature of the glass-metal seals must not exceed 170 °C at any point. The maximum permissible temperature in the center of the glass bulb between screen grid and anode is 220 °C. The ceramic and the connecting points between metal and ceramic must not exceed 220 °C.
The maximum permissible temperature difference at the bulb circumference is 50 °C. The temperature gradient must not exceed 20 °C/cm. This requires additional cooling of the tube terminals by an adequately directed air flow of min. 2 m³/min. Care must be taken that grid and heater lead-throughs are in proper contact.

Vapor cooling

Cooling data for maximum anode dissipation	$P_{A\max} = 100\text{ kW}$
Total power to be dissipated by the cooling system ($P_A + P_{G2} + P_{G1} + 0,8 P_F$)	103,8 kW
Equivalent thermal output	6170 kJ/min (1480 kcal/min)
Flow rate of returning water	
at returning water temperature of 20 °C	approx. 2,4 l/min
at returning water temperature of 90 °C	approx. 2,7 l/min
Volume of generated vapor	
at returning water temperature of 20 °C	approx. 4,0 m³/min
at returning water temperature of 90 °C	approx. 4,5 m³/min

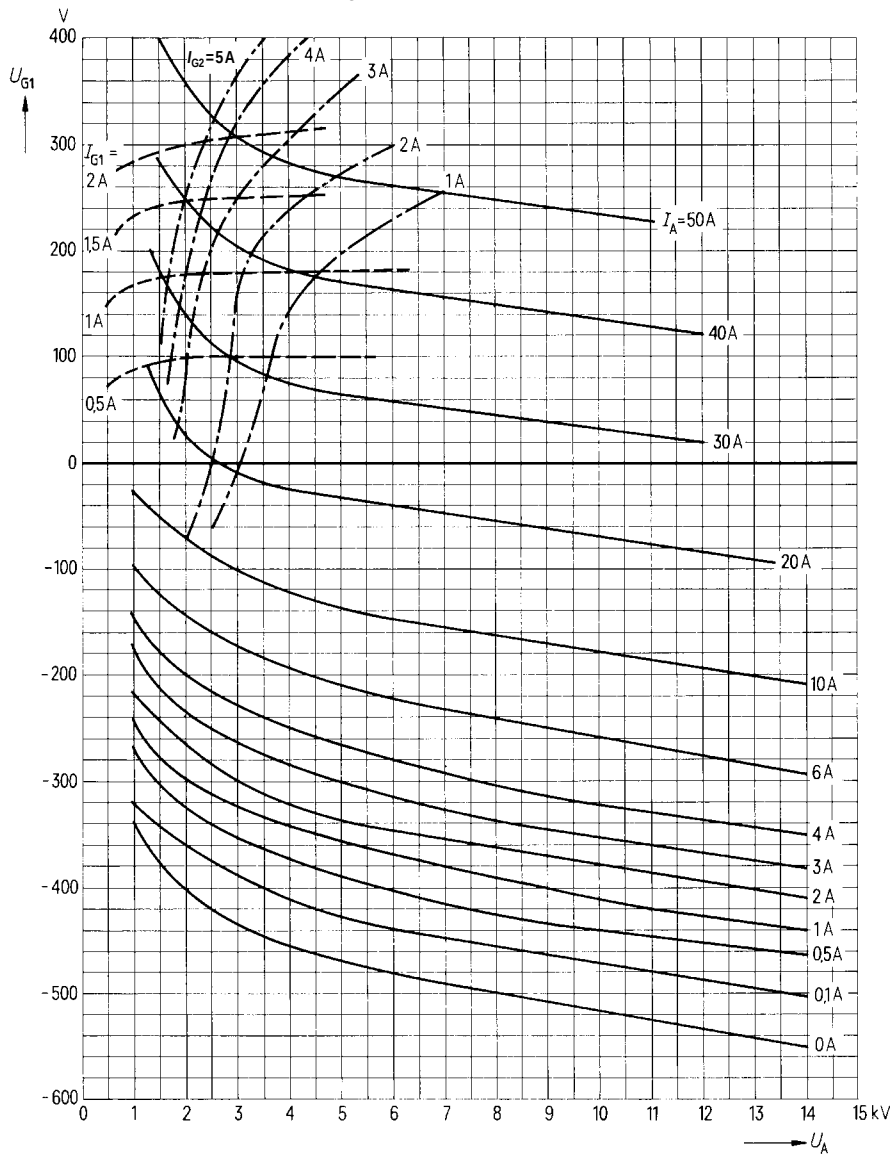
Detailed information on vapor cooling upon request. Please observe the instructions on vapor cooling given under “Explanations on Technical Data”.

Safety precautions

The section “Safety precautions” under “Explanations on Technical Data” describes how the tube is to be protected against damage due to electric overload or insufficient cooling. A copper wire with 0,22 mm diameter is used to test the anode overcurrent trip circuit.

$U_{G1} = f(U_A)$
 $U_{G2} = 2000 \text{ V}$

Parameter = I_A —————
Parameter = I_{G2} - - - - -
Parameter = I_{G1} - - - - -



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