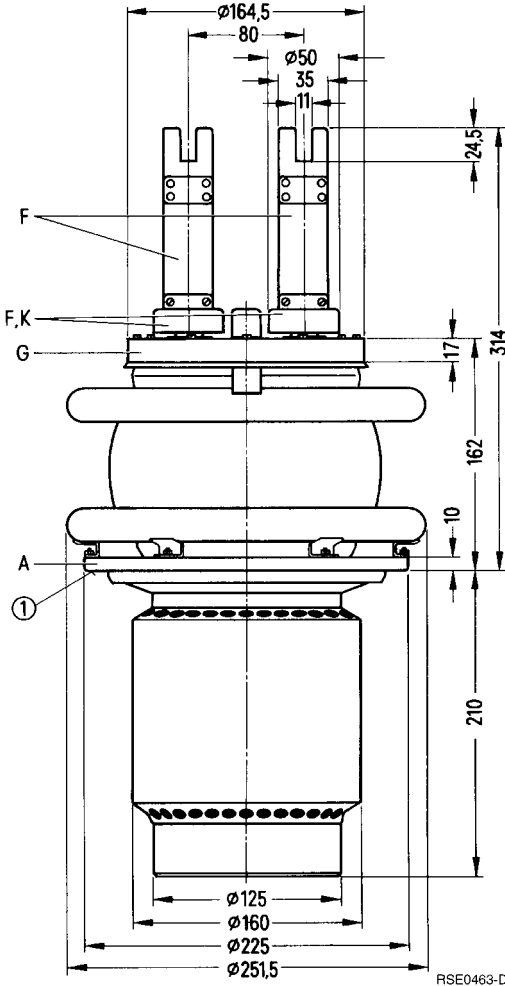Ordering code Q53-X876

Vapor-cooled triode with coaxial grid lead-through, particularly suitable for modulators of 200 kW to 250 kW transmitters.

RSE0463-D

Dimensions in mm

① Sealing surface

Approx. weight 24 kg

Heating

Heater voltage	U_F	11	V
Heater current	I_F	≈ 155	A
Permissible starting current	$I_{F\,M}$	≤ 300	A
Heating: direct			
Cathode: thoriated tungsten			

Characteristics

Emission current at $U_A = U_G = 500$ V	I_{em}	42	A
Amplification factor at $U_A = 8$ to 10 kV, $I_A = 3$ A	μ	15	
Transconductance at $U_A = 8$ kV, $I_A = 3$ A	s	40	mA/V

Capacitances

Cathode/grid	c_{kg}	≈ 130	pF
Cathode/anode	c_{ka}	≈ 3,8	pF [1]
Grid/anode	c_{ga}	≈ 75	pF

Accessories

		Ordering code
Mounting instruction	RöMo876	
RF terminal (2 for each tube)	RöKat876	Q1001-X24
Grid terminal for SW	RöGit876	Q1001-X13
Grid terminal for MW	RöGit877	Q1001-X11
Handle	RöZub876	Q1001-X101
Boiler	RöKüV876	Q1001-X42
Insulating pipe at water inlet	RöKüV31Zub4	Q81-X1634
Union at water inlet	RöKüV31Zub7	Q81-X1637
Gasket at vapor outlet	RöKüV201Zub8	Q81-X1678
Insulating pipe at vapor outlet	RöKüV876Zub3	Q81-X1610
Insulator	RöKüV876Zub5K	Q81-X1659
Water level stabilizer with control electrodes	RöZubV4	Q81-X2105
LL electrolytic target	RöEl41	C65055-A667-A41
Gasket ring for boiler		C65051-A411-C552
Gasket ring for water supply line		C65055-A620-C523
Gasket ring for vapor outlet		C65055-A620-C526

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

Modulator Triode

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RS 876

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**AF amplifier and modulator,
class B operation, 2 tubes in push-pull circuit**

Maximum ratings

Anode voltage (dc)	U_A	14	kV
Grid voltage (dc)	U_G	$-$ 2	kV
Cathode current (dc)	I_K	16	A
Peak cathode current	I_{KM}	50	A
Anode dissipation	P_A	75	kW
Grid dissipation	P_G	700	W

Operating characteristics at modulator operation for

		250 kW carrier power		
Output power	P_2	0	200	kW
Anode voltage (dc)	U_A	11,5	11,5	kV
Grid voltage (dc)	U_G	$-$ 720	$-$ 720	V
Peak control grid voltage (ac) between the 2 tubes	U_{ggm}	0	2340	V
Anode current (dc)	I_A	2×1	$2 \times 14,5$	A
Grid current (dc)	I_G	0	$2 \times 0,7$	A
Anode input power	P_{BA}	$2 \times 11,5$	2×167	kW
Drive power	P_1	0	2×820	W
Anode dissipation	P_A	$2 \times 11,5$	2×67	kW
Grid dissipation	P_G	0	2×310	W
Efficiency	η	$-$	60	%
Effective load resistance (anode to anode)	R_{AA}	$-$	820	Ω

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Tube mounting

Axis vertical, anode down.

For connection of the tube use the terminals listed under "Accessories". The heater current is applied via flexible strips which are attached to the tube and must not be removed. A possibly necessary RF connection must be established via helix contacts at the caps below the flexible heater strips.

Maximum tube surface temperature

The temperature of the glass-to-metal seals must not exceed 170 °C at any point. The maximum permissible temperature in the center of the glass bulb between grid and anode is 220 °C. At the ceramic cathode lead-throughs the temperature should not exceed 220 °C.

The maximum temperature difference at the bulb circumference is 50 °C, and in axial direction 120 °C. The temperature gradient must not exceed 25 °C/cm. The temperature can be kept within these limits by providing additional air cooling of the tube terminals by an adequately directed air flow of at least 2 m³/min.
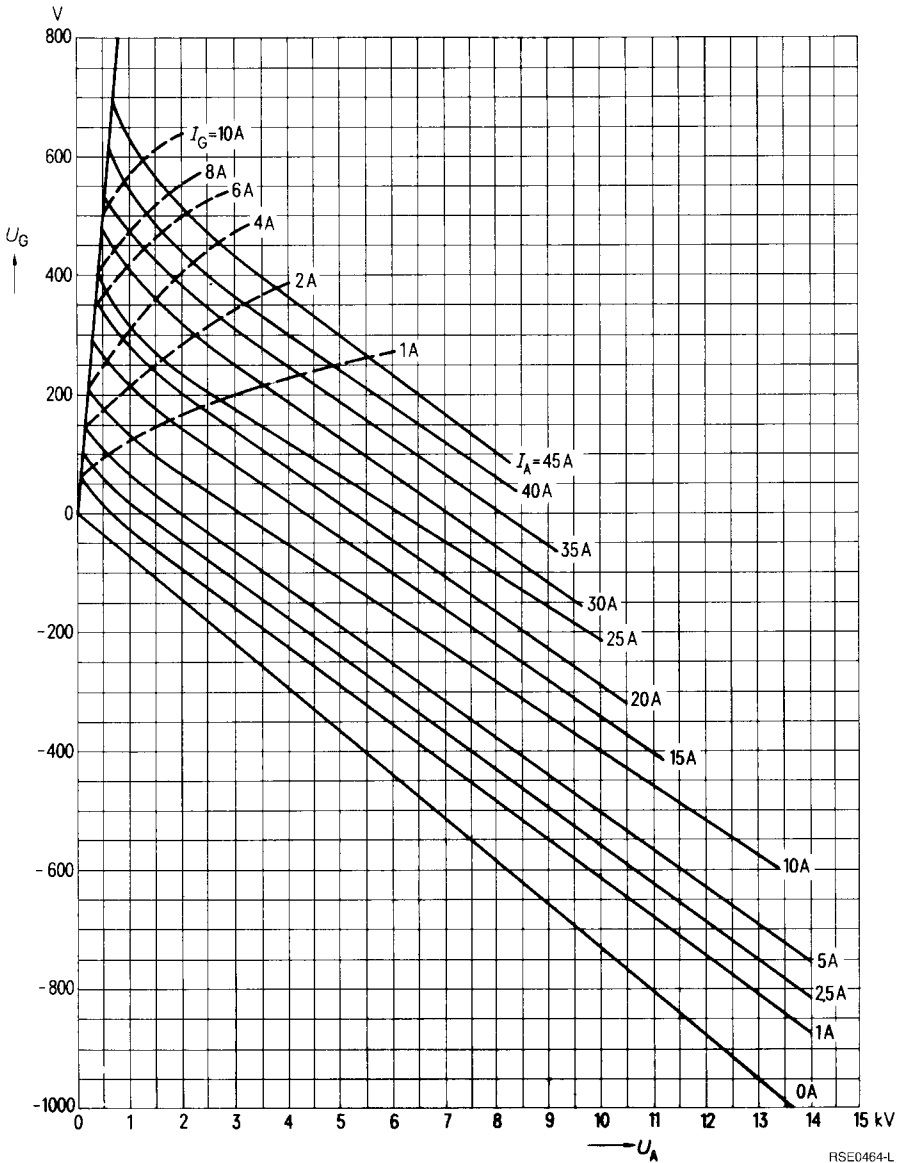
Vapor cooling

Cooling data for maximum anode dissipation	$P_{A\,max} = 75$ kW
Total power to be dissipated by the cooling system	
($P_A + P_G + 0.8\ P_F$)	76,1 kW
Equivalent thermal output	4570 kJ/min (1090 kcal/min)
Flow rate of returning water	
at returning water temperature of 20 °C	approx. 1,8 l/min
at returning water temperature of 90 °C	approx. 2,0 l/min
Volume of generated vapor	
at returning water temperature of 20 °C	approx. 3,0 m³/min
at returning water temperature of 90 °C	approx. 3,3 m³/min

Detailed information on vapor cooling upon request. Please observe 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 0,25 mm diameter should be used to test the anode overcurrent trip circuit.

$U_G = f(U_A)$ Parameter = I_A ————————
Parameter = I_G — — — — — — —

V
800

$I_G = 10\,A$
8 A
6 A
600

4 A

U_G

400

2 A

1 A

200

$I_A = 45\,A$
40 A

0

35 A

30 A
−200
25 A

20 A

15 A
−400

10 A
−600

5 A
2.5 A
−800
1 A

0 A
−1000

0   1   2   3   4   5   6   7   8   9   10   11   12   13   14   15 kV

U_A

RSE0464-L