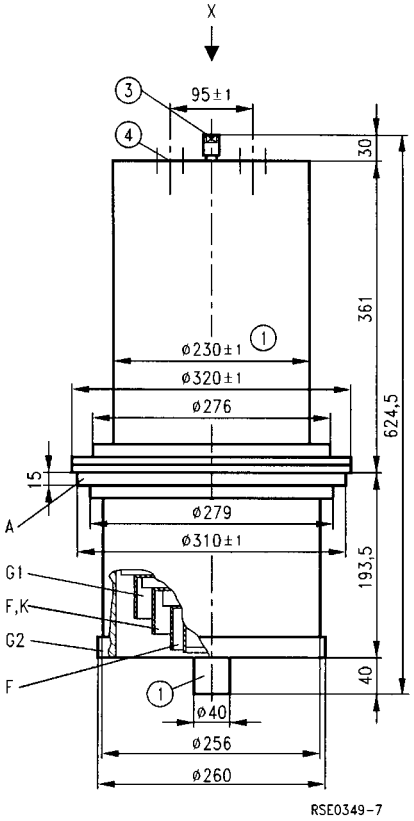
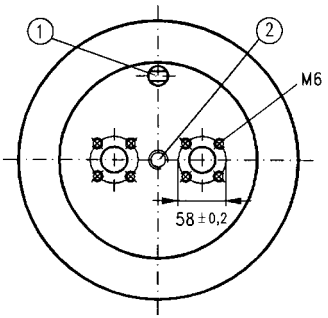
Ordering code Q53-X2078

Coaxial metal-ceramic tetrode, grid in pyrolytic graphite technolgy, vapor-condensation-cooled. The tube's excellent efficiency results from its favorable current transfer characteristic and high permissible screen grid dissipation.

The RS 2078 SK is particularly suitable for up to 600 kW MW and 500 kW SW broadcast transmitters and as switching tube in PDM transmitters.



View X



Dimensions in mm

① Do not use as terminal
② Taphole M14 for screw ring conveyer RöZub278
③ Terminal for suction lifter with 6 mm hose diameter
④ 4 tapholes M6 on 58 mm dia.

Approx. weight 75 kg

Heating

Heater voltage	U_F	23	V [1]
Heater current	I_F	550	A
Permissible starting current	$I_{F\,M}$	≤ 1300	A
Heating: direct			
Cathode: thoriated tungsten			

Characteristics

Emission current at $U_A = U_{G2} = U_{G1} = 700$ V	I_{em}	600	A
Amplification factor of screen grid at $U_A = 5$ kV, $U_{G2} = 800$ to 1200V, $I_A = 10$ A	μ_{g2g1}	5,0	
Transconductance at $U_A = 5$ kV, $U_{G2} = 1100$ V, $I_A = 25$ to 55 A	s	520	mA/V

Capacitances

Cathode/control grid	c_{kg1}	480	pF
Cathode/screen grid	c_{kg2}	40	pF
Cathode/anode	c_{ka}	0,8	pF
Control grid/screen grid	c_{g1g2}	800	pF
Control grid/anode	c_{g1a}	6,0	pF
Screen grid/anode	c_{g2a}	110	pF

Accessories

Upon request

1) The heater voltage will be determined by the tube manufacturer for each individual application taking into account the respective operating conditions. The heating data specified above are guideline values.

Anode and screen grid modulation, class C operation, grounded cathode circuit

Maximum ratings

Frequency	f	110	MHz
Anode voltage (dc)	U_A	13,5	kV
Screen grid voltage (dc)	U_{G2}	1250	V
Control grid voltage (dc)	U_{G1}	– 800	V
Cathode current (dc)	I_K	100	A
Peak cathode current	$I_{K\,M}$	600	A
Anode dissipation	P_A	500	kW
Screen grid dissipation	P_{G2}	8,0	kW
Control grid dissipation	P_{G1}	3,0	kW

Operating characteristics

Frequency	f	≤ 30	MHz
Carrier power	P_{trg}	540	kW [1]
Anode voltage (dc)	U_A	12,5	kV
Screen grid voltage (dc)	U_{G2}	1100	V
Control grid bias (dc), fixed	$U_{G1\,fix}$	– 535	V
Peak control grid voltage (ac)	$U_{g1\,m}$	715	V
Anode current (dc)	I_A	53,5	A
Screen grid current (dc)	I_{G2}	2,8	A
Control grid current (dc)	I_{G1}	4,9	A
Anode input power	$P_{B\,A}$	669	kW
Drive power	P_1	3400	W [1]
Anode dissipation	P_A	129	kW [2]
Screen grid dissipation	P_{G2}	3000	W
Control grid dissipation	P_{G1}	700	W
Efficiency	η	81	%
Anode load resistance	R_A	120	Ω
Modulation factor	m	100	%
Peak screen grid voltage (ac)	$U_{g2\,m}$	800	V
Modulation power	P_{mod}	350	kW
Control grid current	I_{G1}	6,5	A [3]
Drive power	P_1	4500	W [1][3]
Anode dissipation at modulation	$P_{A\,mod}$	220	kW [4]
Screen grid dissipation at modulation	$P_{G2\,mod}$	3,7	kW [4]

1) Circuit losses are not included.
2) Even during modulation the maximum ratings must not be exceeded.
3) Maximum values at U_A = 0 V.
4) Average values at m = 100 %.

Tube mounting

Axis vertical, anode up or down.

Maximum tube surface temperature

The maximum surface temperature of the tube must not exceed 220 °C. The maximum permissible temperature difference at the circumference of the tube is 50 °C . Furthermore, temperature gradients at the tube must not be more than 25 °C/cm. To keep below these limit temperatures, an air stream should be directed onto the terminals.

Vapor condensation cooling

The cooling water diagram gives the minimum water flow rate (distilled or de-ionized water) for maximum anode dissipation, as well as pressure drop and water outlet temperatue at 60 °C water inlet temperature. The diagram applies to a hermetically sealed cooling system with less than1,5 bar overpressure at the tube's cooling water outlet and with a maximum permissible water outlet temperature of 100 °C.

Operation with open cooling cycle (without overpressure) is also possible if the maximum outlet temperature remains below 60 °C (sea level, air pressure ≈ 1 bar) with lower inlet temperature and, if required, increased water flow rate.

For more information on vapor condensation cooling refer to "Explanation of Technical Data" in the data book.

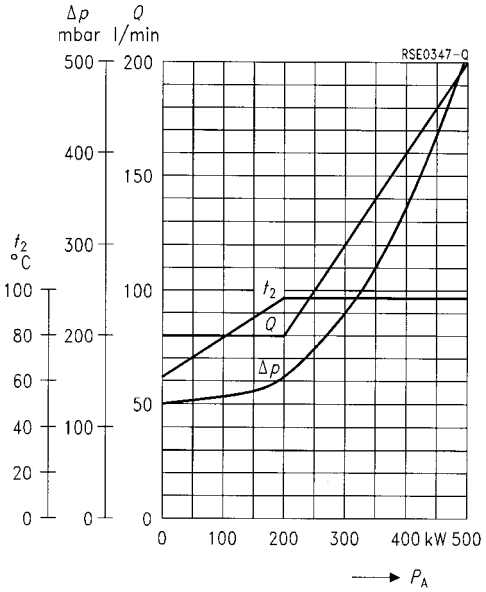
Safety precautions

Refer to "Explanation of Technical Data" in the data book for a desription on how to protect the tube against damage due to electrical overload or insufficient cooling. A copper wire with a diameter of 0,35 mm should be used to test the anode overcurrent trip circuit.

Switching on the heating

The heater voltage must be slowly increased (some minutes) until the specified value is reached. This requirement can be met by applying the heater voltage in 3 steps or by providing a motor-driven control transformer or a thyristor controller on the primary side of the heater transformer.

Cooling water diagram



Closed cooling cycle with distilled water

Overpressure = 1,5 bar

t_1 = 60 °C

$U_{G1} = f(U_A)$ Parameter = I_A ——————————
U_{G2} = 800 V Parameter = I_{G2} —·—·—·—·—·—
Parameter = I_{G1} — — — — — — —