

WATER COOLED R.F. POWER TRIODE

QUICK REFERENCE DATA								
Freq. (MHz)	C telegr.		C an. mod.		C industr. osc.		B mod ¹⁾	
	V _a (kV)	W _o (kW)	V _a (kV)	W _o (kW)	V _a (kV)	W _o (kW)	V _a (kV)	W _o (kW)
30	12	108	10	83	12	124	10	106
	10	75	10	58	12	108	10	64
					10	75		

HEATING: direct; filament thoriated tungsten

Filament voltage	V _f	=	17.5	V
Filament current	I _f	=	196	A
Filament peak current	I _{fp}	max.	420	A
Cold filament resistance	R _{fo}	=	0.012	Ω

CAPACITANCES

Anode to all other elements except grid	C _a	=	2.2	pF
Grid to all other elements except anode	C _g	=	122	pF
Anode to grid	C _{ag}	=	75	pF

TYPICAL CHARACTERISTICS

Anode voltage	V _a	=	3	10	kV
Anode current	I _a	=	50	5	A
Amplification factor	μ	=	25	25	
Mutual conductance	S	=	140	60	mA/V

¹⁾ Two tubes

TEMPERATURE LIMITS (Absolute limits)

Water inlet temperature t_i = max. 50 °C

Temperature of seals = max. 180 °C

WATER COOLING CHARACTERISTICS ; see also cooling curves

W_a (kW)	t_i (°C)	q_{min} (l/min)	P_i (atm)
30	20	25	0.15
	50	45	0.45
50	20	32	0.25
	50	65	0.85
100	20	55	0.6
	50	120	3.0

At water inlet temperatures between 20 and 50 °C the required quantity of water can be found by linear interpolation.

At frequencies below 6 MHz forced air cooling of the seals will, as a rule, not be necessary. Above 6 MHz air cooling must be used to keep the anode and grid seal temperatures below 180 °C. The seals can be cooled by connecting a blower of suitable size to the air inlet of the anti-corona ring, attached to the tube.

At maximum frequency (30 MHz) and published operating conditions an air flow of 2.5 m³/minute with a pressure loss of about 500 mm H₂O will in general be sufficient. The air flow must be started upon or before the application of filament voltage.

When using the special filament connectors type No. 40628, together with connecting leads of adequate cross-section, additional air cooling of the filament terminals is, as a rule, not necessary.

Care should be taken to ensure firm contact of the filament terminals in order to obtain equal distribution of current over these terminals.

MECHANICAL DATA

Dimensions in mm

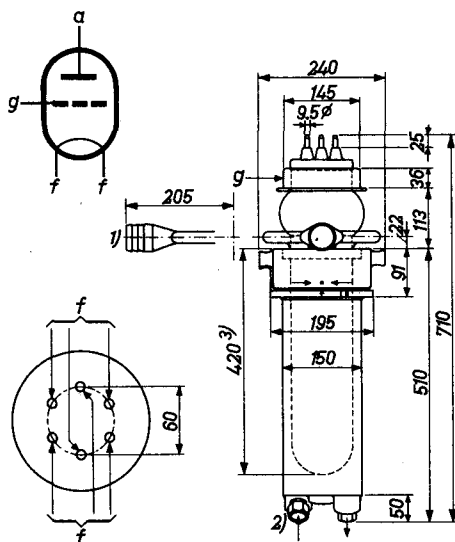
Water-jacket : K714

Net weight of tube : 14 kg

Filament connectors: 40628

Net weight of water-jacket: 20.5 kg

O-ring : 2622 080 30916



Mounting position: vertical with anode down

When connecting the filament the three pins of each group must be joined.

1) Use connecting hose with an inner diameter of $1\frac{3}{4}$ ".

2) Coupling for metal tubing with an outer diameter of 28 mm.

3) For removing the tube from its water-jacket the free height above the tube must be at least 420 mm.

R.F. CLASS C TELEGRAPHY

LIMITING VALUES (Absolute limits)

Frequency	f	up to	4	15	30	MHz
Anode voltage	V_a	= max.	15	13.5	12.5	kV
Anode current	I_a	= max.	12.5	12.5	12.5	A
Anode input power	W_{ia}	= max.	165	165	150	kW
Anode dissipation	W_a	= max.	100	100	100	kW
Negative grid voltage	$-V_g$	= max.	1200	1200	1200	V
Grid current	I_g	= max.	1.2	1.2	1.2	A

OPERATING CONDITIONS

Frequency	f	=	30	30	MHz
Anode voltage	V_a	=	12	10	kV
Grid voltage	V_g	=	-1000	-800	V
Grid driving voltage	V_{gp}	=	1500	1200	V
Anode current	I_a	=	12	10	A
Grid current	I_g	=	0.75	0.75	A
Anode input power	W_{ia}	=	144	100	kW
Anode dissipation	W_a	=	36	25	kW
Driving power	W_{dr}	=	1100	850	W
Output power	W_o	=	108	75	kW
Efficiency	η	=	75	75	%

R.F. CLASS C ANODE MODULATION

LIMITING VALUES (Absolute limits)

Frequency	f	up to	30 MHz
Anode voltage	V_a	= max.	10.5 kV
Anode current	I_a	= max.	10.5 A
Anode input power	W_{i_a}	= max.	110 kW
Anode dissipation	W_a	= max.	66 kW
Negative grid voltage	$-V_g$	= max.	1200 V
Grid current	I_g	= max.	1.3 A

OPERATING CONDITIONS

Frequency	f	=	30	30 MHz
Anode voltage	V_a	=	10	10 kV
Grid voltage	V_g	=	-1050	-1050 V ¹⁾
Grid driving voltage	V_{gp}	=	1550	1450 V
Anode current	I_a	=	10.5	7.4 A
Grid current	I_g	=	1.1	0.8 A
Anode input power	W_{i_a}	=	105	74 kW
Anode dissipation	W_a	=	22	16 kW
Driving power	W_{dr}	=	1650	1100 W
Output power	W_o	=	83	58 kW
Efficiency	η	=	79	79 %
Modulation depth	m	=	100	100 %
Modulation power	W_{mod}	=	53	37 kW

¹⁾ Grid bias partly obtained by a grid resistor

R.F. CLASS C OSCILLATOR for industrial use with anode voltage from three-phase 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.	15 A
Anode input power	W_{i_a}	= max.	180 kW
Anode dissipation	W_a	= max.	100 kW
Negative grid voltage	$-V_g$	= max.	1600 V
Grid current, loaded	I_g	= max.	1.0 A
Grid current, unloaded	I_g	= max.	1.4 A
Grid circuit resistance	R_g	= max.	10 k Ω

OPERATING CONDITIONS

Frequency	f	=	30	30	30 MHz
Anode voltage	V_a	=	12	12	10 kV
Anode current	I_a	=	14	12	10 A
Grid current	I_g	=	0.9	0.75	0.75 A
Grid circuit resistance	R_g	=	1100	1350	1100 Ω
Feedback ratio	$V_{g\sim}/V_{a\sim}$	=	15	14	14 %
Anode input power	W_{i_a}	=	168	144	100 kW
Anode dissipation	W_a	=	44	36	25 kW
Output power	W_o	=	124	108	75 kW
Efficiency	η	=	74	75	75 %
Output power in the load	W_l	=	104	91	63 kW ¹⁾

1) Useful power in the load measured in a circuit having an efficiency of 85%.

A.F. CLASS B AMPLIFIER AND MODULATOR

LIMITING VALUES (Absolute limits)

Anode voltage	V_a	= max.	15	kV
Anode current	I_a	= max.	12	A
Anode input power	W_{i_a}	= max.	162	kW
Anode dissipation	W_a	= max.	100	kW
Negative grid voltage	$-V_g$	= max.	1200	V
Grid current	I_g	= max.	1.2	A

OPERATING CONDITIONS, two tubes in push-pull

Anode voltage	V_a	=	10	10	kV
Grid voltage	V_g	=	-540	-540	V ¹⁾
Load resistance	$R_{aa\sim}$	=	1360	1440	Ω
Driving voltage	V_{ggp}	=	0 1550	0 1300	V
Anode current	I_a	=	2x0.3 2x8	2x0.3 2x5.8	A
Grid current	I_g	=	0 2x0.2	0 2x0.15	A
Anode input power	W_{i_a}	=	2x3 2x80	2x3 2x58	kW
Anode dissipation	W_a	=	2x3 2x27	2x3 2x26	kW
Driving power	W_{dr}	=	0 2x150	0 2x100	W
Output power	W_o	=	0 106	0 64	kW
Efficiency	η	=	- 67	- 56	%

1) To be adjusted for a zero signal anode current of 0.3 A

