WATER COOLED R.F. POWER TRIODE

QUICK REFERENCE DATA								
Frequency (MHz)	C telegr.		B teleph.		C an.mod.		A.F.class B [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)
10	15	360					12	450
30	12	285	10	60	11	165	10	400
			8	50	10	135	8	300
			6	35	8	110	6	200

HEATING : direct by AC or DC; filament thoriated tungsten

Filament voltage	V_f	= 18	V
Filament current	I_f	= 280	A

CAPACITANCES

Anode to filament	C_{af}	= 7.5	pF
Grid to filament	C_{gf}	= 240	pF
Anode to grid	C_{ag}	= 120	pF

TYPICAL CHARACTERISTICS

Anode voltage	V_a	= 4	kV
Anode current	I_a	= 5	A
Amplification factor	μ	= 55	
Mutual conductance	S	= 130	mA/V

[1]) Two tubes

TEMPERATURE LIMITS (Absolute limits)

Bulb temperature = max. 180 °C

Seal temperature = max. 180 °C

COOLING CHARACTERISTICS . See also cooling curves

W_a (kW)	t_i (°C)	q_{min} (l/min)	p_i (atm)
10	20	12	0.003
	50	17	0.005
40	20	37	0.03
	50	54	0.07
80	20	75	0.12
	50	112	0.26
120	20	120	0.3
	50	179	0.6

For inlet temperatures t_i between 20 °C and 50 °C the required quantity of water can be found by proportional interpolation.

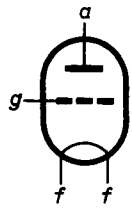
At frequencies higher than 10 MHz a low velocity air flow should be directed to the seals of grid and filament.

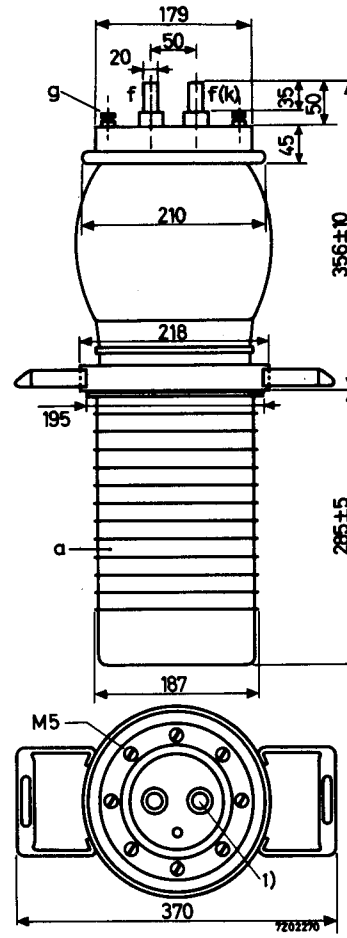
MECHANICAL DATA

Dimensions in mm

Net weight of tube : 32.5 kg

Net weight of water jacket: 30.5 kg





Mounting position: vertical with anode down

ACCESSORIES

Water jacket : K723

Filament connectors with cable: 40667

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1) This pin should be used for connecting the anode return lead.

R.F. CLASS C TELEGRAPHY

LIMITING VALUES (Absolute limits)

Frequency	f		up to 10	up to 30	MHz
Anode voltage	V_a	= max.	15	12	kV
Anode dissipation	W_a	= max.	120	120	kW
Negative grid voltage	$-V_g$	= max.	1200	1200	V
Grid dissipation	W_g	= max.	4	4	kW
Anode current	I_a	= max.	33	33	A
Grid current	I_g	= max.	8	8	A

OPERATING CONDITIONS

Frequency	f	=	10	10	30	30	MHz
Anode voltage	V_a	=	15	15	12	12	kV
Grid voltage	V_g	=	-520	-800	-480	-720	V
Anode current	I_a	=	29.3	24.7	29.3	24.7	A
Grid current	I_g	=	5.4	5.2	5.9	5.5	A
Peak driving voltage	V_{gp}	=	1090	1370	1050	1290	V
Driving power	W_{dr}	=	5.5	6.6	5.7	6.6	kW
Anode input power	W_{ia}	=	440	371	353	296	kW
Anode dissipation	W_a	=	80	61	68	51	kW
Output power	W_o	=	360	310	285	245	kW
Efficiency	η	=	81.8	83.5	80.8	82.6	%

R.F. CLASS C ANODE MODULATION

LIMITING VALUES (Absolute limits)

Frequency		f		up to 30	MHz
Anode voltage		V_a	= max.	11	kV
Anode dissipation		W_a	= max.	80	kW
Negative grid voltage		$-V_g$	= max.	1000	V
Grid dissipation		W_g	= max.	4	kW
Anode current		I_a	= max.	22	A
Grid current		I_g	= max.	8	A

OPERATING CONDITIONS

Frequency	f	=	30	30	30	MHz
Anode voltage	V_a	=	11	10	8	kV
Grid voltage	V_g	=	-170	-140	-100	V
Grid resistor	R_g	=	40	44	33	Ω
Anode current	I_a	=	19	17.3	18	A
Grid current	I_g	=	7.4	6.9	7.6	A
Peak driving voltage	V_{gp}	=	1000	930	855	V
Driving power	W_{dr}	=	7.1	6	6	kW
Anode input power	W_{ia}	=	209	173	144	kW
Anode dissipation	W_a	=	44	38	34	kW
Output power	W_o	=	165	135	110	kW
Efficiency	η	=	79	78	76.5	%
Modulation depth	m	=	100	100	100	%
Modulation power	W_{mod}	=	105	87	72	kW

R.F. CLASS B TELEPHONY

LIMITING VALUES (Absolute limits)

Frequency	f		up to 10	up to 30	MHz
Anode voltage	V_a	= max.	15	12	kV
Anode dissipation	W_a	= max.	120	120	kW
Negative grid voltage	$-V_g$	= max.	800	800	V
Grid dissipation	W_g	= max.	4	4	kW
Anode current	I_a	= max.	27	27	A
Grid current	I_g	= max.	8	8	A

OPERATING CONDITIONS

Frequency	f	=	30	30	30	MHz
Anode voltage	V_a	=	10	8	6	kV
Grid voltage	V_g	=	-150	-115	-82	V
Anode current	I_a	=	17	18.2	17.9	A
Grid current	I_g	=	0.8	1.2	1.5	A
Peak driving voltage	V_{gp}	=	338	338	321	V
Driving power	W_{dr}	=	0.25	0.36	0.43	kW
Anode input power	W_{ia}	=	170	146	108	kW
Anode dissipation	W_a	=	110	96	73	kW
Output power	W_o	=	60	50	35	kW
Efficiency	η	=	35.3	34.3	32.6	%
Modulation depth	m	=	100	100	100	%
Grid current	I_g	=	5.9	6.8	7.2	A
Driving power	W_{dr}	=	3.6	4.1	4.1	kW

A.F. CLASS B AMPLIFIER

LIMITING VALUES (Absolute limits)

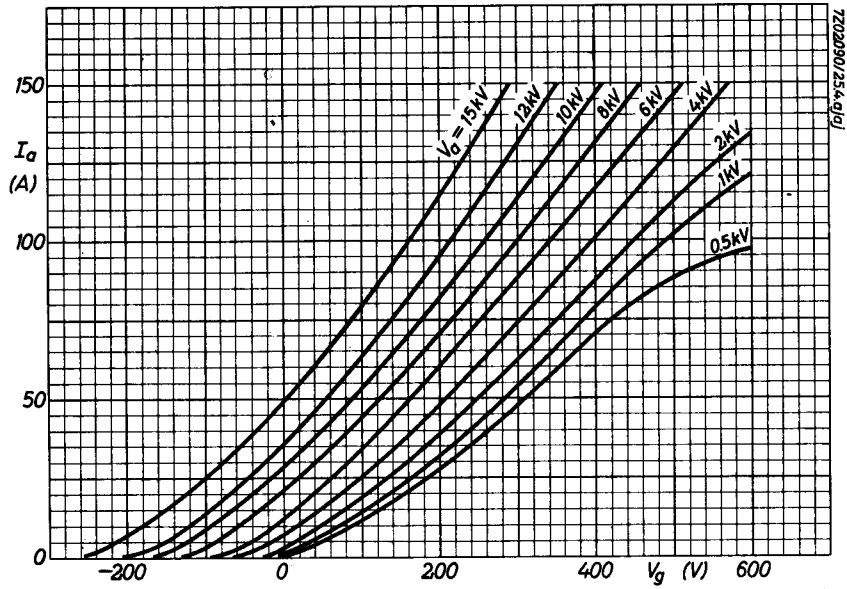
Anode voltage	V_a	= max.	12	kV
Anode dissipation	W_a	= max.	120	kW
Negative grid voltage	$-V_g$	= max.	800	V
Grid dissipation	W_g	= max.	4	kW
Anode current	I_a	= max.	33	A
Grid current	I_g	= max.	8	A

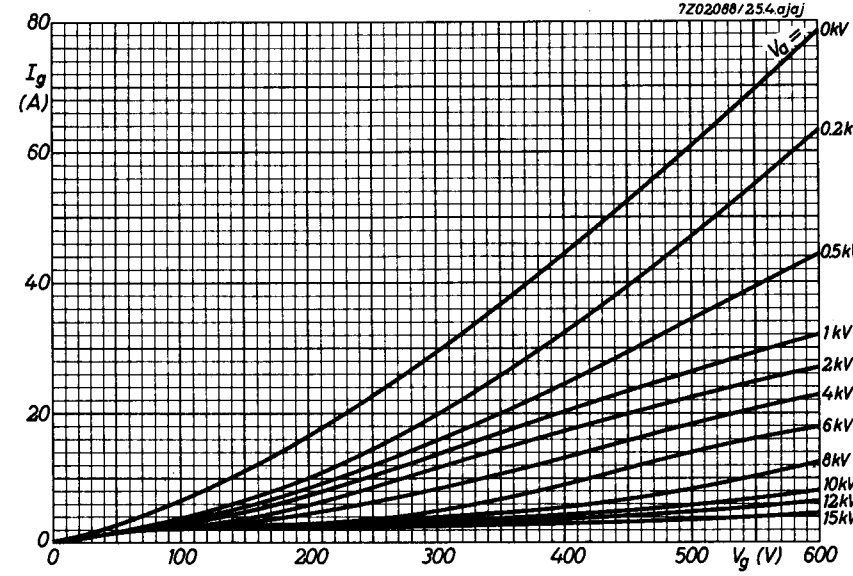
OPERATING CONDITIONS, two tubes in push-pull

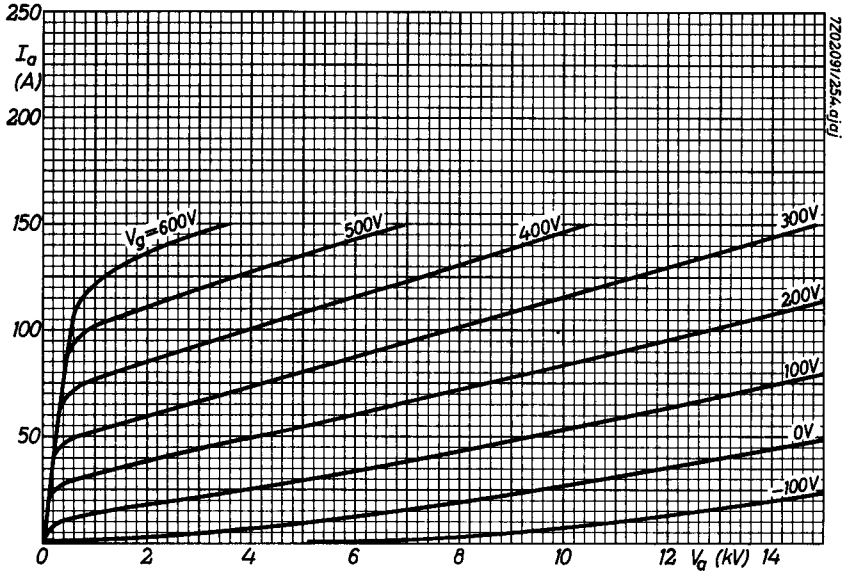
Anode voltage	V_a	=	12		10		kV
Grid voltage	V_g	=	-180		-150		V
Load resistance	$R_{aa\sim}$	=	552		410		Ω
Peak driving voltage	V_{ggp}	=	0	1210	0	1205	V
Anode current	I_a	=	2x2	2x26	2x1.8	2x28	A
Grid current	I_g	=	0	2x4.4	0	2x4.8	A
Peak grid current	$I_{g\,p}$	=	0	2x23	0	2x24	A
Driving power	W_{dr}	=	0	2x2.4	0	2x2.6	kW
Anode input power	W_{ia}	=	2x24	2x312	2x18	2x280	kW
Anode dissipation	W_a	=	2x24	2x87	2x18	2x80	kW
Output power	W_o	=	0	450	0	400	kW
Efficiency	η	=	-	72	-	71.4	%

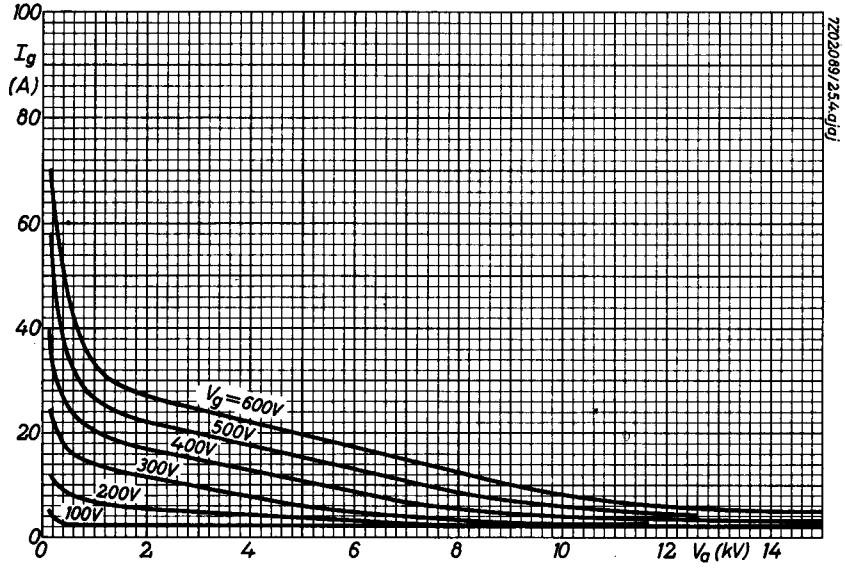
OPERATING CONDITIONS, two tubes in push-pull (continued)

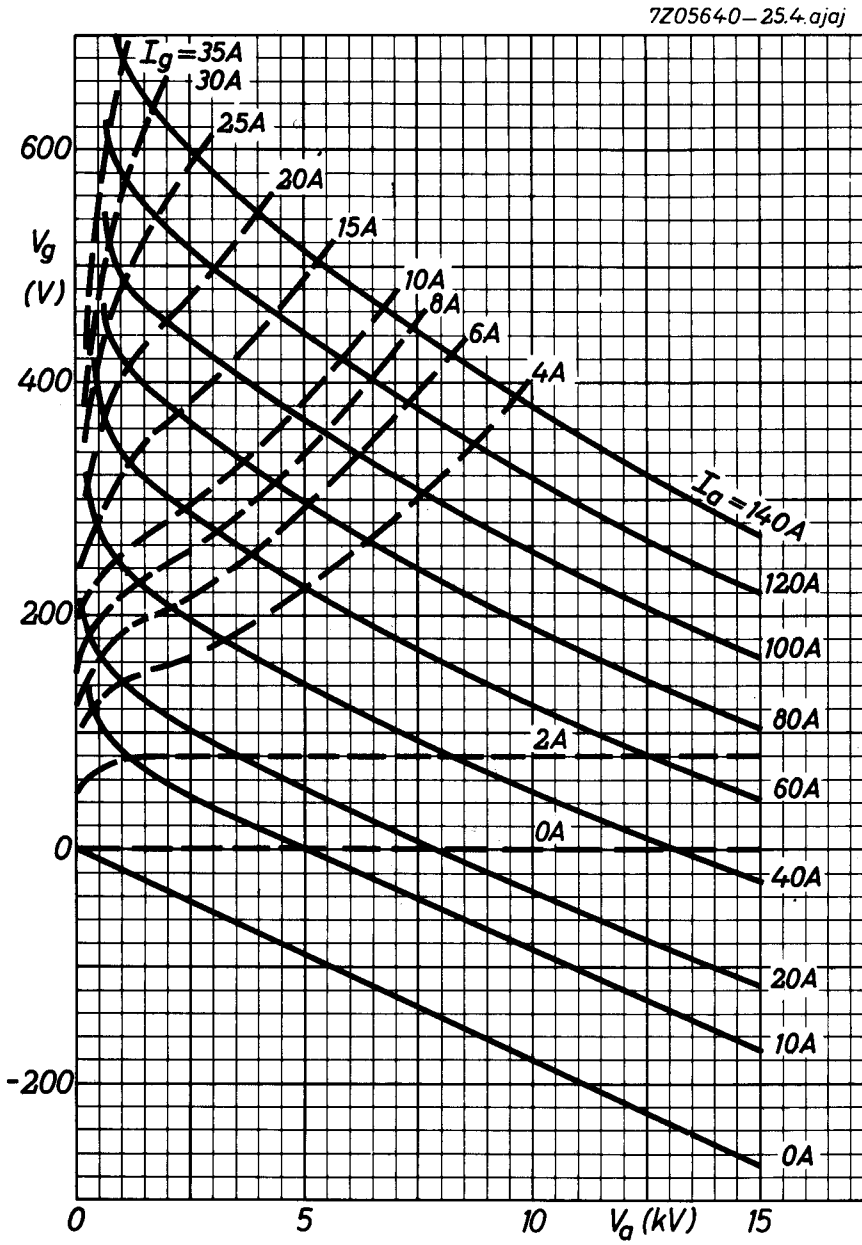
Anode voltage	V_a	=	8		6		kV
Grid voltage	V_g	=	-115		-82		V
Load resistance	$R_{aa\sim}$	=	338		268		Ω
Peak driving voltage	V_{ggp}	=	0	1110	0	990	V
Anode current	I_a	=	2x1.6	2x27	2x1.4	2x25	A
Grid current	I_g	=	0	2x5	0	2x4.9	A
Peak grid current	I_{gp}	=	0	2x24	0	2x22	A
Driving power	W_{dr}	=	0	2x2.5	0	2x2.2	kW
Anode input power	W_{ia}	=	2x12.8	2x216	2x8.4	2x150	kW
Anode dissipation	W_a	=	2x12.8	2x66	2x8.4	2x50	kW
Output power	W_o	=	0	300	0	200	kW
Efficiency	η	=	-	69.5	-	67	%

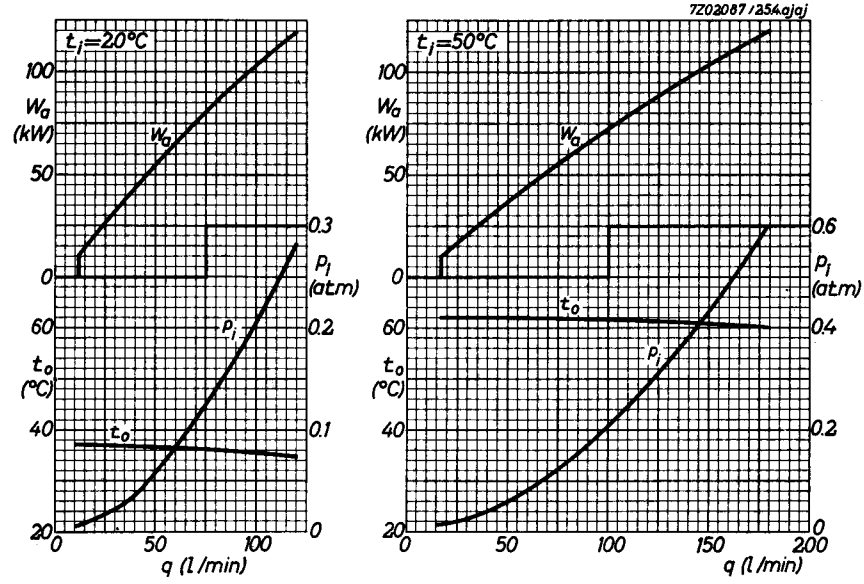

7Z02090/254.ajaj
150
I_a
(A)
100
50
0
V_a = 15kV
12kV
10kV
8kV
6kV
4kV
2kV
1kV
0.5kV
−200
0
200
400
V_g (V)
600


7Z02088/254.ajaj
80
I_g
(A)
60
40
20
0
V_a = 0kV
0.2kV
0.5kV
1kV
2kV
4kV
6kV
8kV
10kV
12kV
15kV
0
100
200
300
400
500
V_g (V)
600


250
I_a
(A)
200
150
100
50
0
2
4
6
8
10
12
V_a (kV)
14
V_g=600V
500V
400V
300V
200V
100V
0V
-100V
7Z02091/254.ajaj


100
I_g
(A)
80
60
40
20
0
2
4
6
8
10
12
V_a (kV)
14
V_g=600V
500V
400V
300V
200V
100V
7Z02089/254.ajaj


7Z05640—25.4.ajaj
I_g = 35A
30A
25A
20A
15A
10A
8A
6A
4A
I_a = 140A
120A
100A
80A
60A
2A
0A
40A
20A
10A
0A
600
400
200
0
-200
V_g (V)
0
5
10
15
V_a (kV)


7Z02087/254.ajaj
t_i=20°C
W_a (kW)
100
50
0
60
40
20
t_o (°C)
W_a
P_i
t_o
0.3
0.2
0.1
0
P_i (atm)
0
50
100
q (l/min)
t_i=50°C
W_a (kW)
100
50
0
60
40
20
t_o (°C)
W_a
t_o
P_i
0.6
0.4
0.2
0
P_i (atm)
0
50
100
150
200
q (l/min)