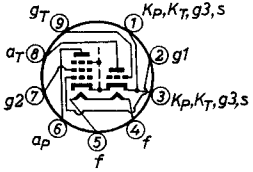
Combined high slope FRAME GRID TRIODE AND R.F. PENTODE for use as frequency changer in V.H.F. television tuners

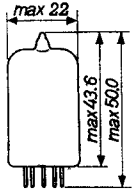
HEATING

Indirect by A.C. or D.C.; parallel supply

Heater voltage V_f = 6.3 V

Heater current I_f = 0.41 A





Base: NOVAL (Dimensions in mm)

CAPACITANCES

Pentode section (with external shield)

Grid No.1 to all other elements except anode	C_{g_1}	=	6.2 pF
Anode to all other elements except grid No.1	C_a	=	3.5 pF
Anode to grid No.1	C_{ag_1} C_{ag_1}	= 0.009 pF < 0.012 pF	
Grid No.1 to grid No.2	$C_{g_1g_2}$	=	1.5 pF

Triode section

Grid to all other elements except anode	C_g	=	3.3 pF
Anode to all other elements except grid	C_a	=	1.7 pF
Anode to grid	C_{ag}	=	1.8 pF

Between pentode and triode sections

Pentode anode to triode anode	C_{aP-aT}	< 0.025 pF
Pentode anode to triode grid	C_{aP-gT}	< 0.010 pF
Pentode grid to triode anode	C_{g_1P-aT}	< 0.010 pF
Pentode grid to triode grid	C_{g_1P-gT}	< 0.010 pF

TYPICAL CHARACTERISTICS

Pentode section

Anode voltage	V_a	= 170	V
Grid No.2 voltage	V_{g2}	= 120	V
Grid No.1 voltage	V_{g1}	= -1.2	V
Anode current	I_a	= 10	mA
Grid No.2 current	I_{g2}	= 3	mA
Mutual conductance	S	= 11	mA/V
Internal resistance	R_i	> 350	kΩ
Amplification factor of grid No.2 with respect to grid No.1	$\mu_{g_2g_1}$	= 55	
Equivalent noise resistance	R_{eq}	= 1.5	kΩ
Grid No.1 current	I_{g_1}	= +0.3	μA
Negative grid No.1 voltage	$-V_{g_1}$	≦ 1.3	V

Triode section

Anode voltage	V_a	= 100	V
Grid voltage	V_g	= -3	V
Anode current	I_a	= 15	mA
Mutual conductance	S	= 9	mA/V
Amplification factor	μ	= 20	
Grid current	I_g	= +0.3	μA
Negative grid voltage	$-V_g$	≦ 1.3	V

OPERATING CHARACTERISTICS of the triode section as oscillator

Anode supply voltage	V_{ba}	= 200		V
Grid resistor	R_g	= 10		kΩ
Anode resistor	R_a	= 8.2	12	kΩ
Oscillator voltage	V_{osc}	= 4.5	3.3	V(RMS)
Anode current	I_a	= 16	12	mA
Effective mutual conductance [1]	S_{eff}	= 3.7	3.7	mA/V

[1]) Without higher harmonics

OPERATING CHARACTERISTICS of the pentode section as mixer				
Anode supply voltage	V_{ba}	=	200	V
Grid No.2 supply voltage	V_{bg2}	=	200	V
Grid No.2 resistor	R_{g2}	=	27	kΩ
Anode resistor	Ra	=	2.7 to 4.7	kΩ
Grid No.1 supply voltage	V_{bg1}	=	-1.2 to 0	V
Grid No.1 resistor	R_{g1}	=	0.1 to 1	MΩ
Oscillator voltage	V_{osc}	=	1.6 to 1.6	V(RMS)
Anode current	I_a	=	10 to 9	mA
Grid No.2 current	I_{g2}	=	3.0 to 2.8	mA
Grid No.1 current	I_{g1}	=	10 to 2.3	μA
Conversion conductance	S_c	=	5 to 4.7	mA/V

OPERATING CHARACTERISTICS of the pentode section as I.F. amplifier				
Anode supply voltage	V_{ba}	=	200	V
Grid No.2 supply voltage	V_{bg2}	=	200	V
Grid No.2 resistor	R_{g2}	=	27	kΩ
Anode resistor	Ra	=	2.7 to 4.7	kΩ
Grid No.1 supply voltage	V_{bg1}	=	-1.2 to 0	V
Grid No.1 resistor	R_{g1}	=	0.1 to 1	MΩ
Anode current	I_a	=	10 to 12.5	mA
Grid No.2 current	I_{g2}	=	3.0 to 3.7	mA
Mutual conductance	S	=	11 to 14	mA/V
Input resistance at 50 Mc/s	r_{g1}	=	10 to 10	kΩ
Grid No.1 voltage	V_{g1}	=	-12 to -	V
Mutual conductance	S	=	0.11 to -	mA/V

LIMITING VALUES of the pentode section (Design centre limits)

Anode voltage in cold condition	V_{a_o}	= max.	550 V
Anode voltage	V_a	= max.	250 V
Anode dissipation	W_a	= max.	2.0 W
Grid No.2 voltage in cold condition	V_{g2o}	= max.	550 V
Grid No.2 voltage	V_{g2}	= max.	250 V
Grid No.2 dissipation			
at $-V_{g1}$ < 1.5 V	W_{g2}	= max.	0.45 W
at 1.5 V < $-V_{g1}$ < 2 V	W_{g2}	= max.	0.4 W
at $-V_{g1}$ > 2 V	W_{g2}	= max.	0.3 W
Negative grid No.1 voltage	$-V_{g1}$	= max.	50 V
Grid No.1 resistor with fixed bias	R_{g1}	= max.	1 MΩ
Grid No.1 resistor with automatic bias	R_{g1}	= max.	2.2 MΩ
Cathode current	I_k	= max.	18 mA
Voltage between heater and cathode	V_{kf}	= max.	100 V [1]

LIMITING VALUES of the triode section (Design centre limits)

Anode voltage in cold condition	V_{a_o}	= max.	550 V
Anode voltage	V_a	= max.	125 V
Anode dissipation	W_a	= max.	1.5 W
Negative grid voltage	$-V_g$	= max.	50 V
Grid resistor	R_g	= max.	0.5 MΩ
Cathode current	I_k	= max.	20 mA
Voltage between heater and cathode	V_{kf}	= max.	100 V [1]

[1]) To fulfil the modulation hum requirements in intercarrier receivers, the voltage between heater and cathode should not exceed 100 V (RMS)

With respect to modulation hum in A.M. sound receivers the voltage between heater and cathode should not exceed 50 V(RMS)

PHILIPS

Electronic Tube

HANDBOOK

ECF801

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3	3	1962.10.10
4	4	1962.10.10
5	FP	2005.05.06