

ECH 4 Triode-heptode

The ECH 4 is a triode-heptode of which the electrical characteristics are similar to those of the "all-glass" valve ECH 21. The triode and heptode units both have their own separate external connections and can therefore be used for individual purposes.

For details of the various applications of this valve reference may be made to the particulars of the ECH 21 on p. 15. The electrical data are summarised below for easy reference and the characteristics are the same as those of the ECH 21.

HEATER RATINGS

Heater feed: indirect, by A.C.; parallel feed.

Heater voltage. $V_f = 6.3$ V

Heater current. $I_f = 0.35$ A

CAPACITANCES

a) heptode section:

C_{g1}	= 5.6 pF	C_{g1g3}	< 0.2 pF
C_a	= 9.2 pF	C_{gs1}	= 8.9 pF
C_{ag1}	< 0.002 pF	C_{g1f}	< 0.001 pF

b) triode section:

C_g	= 6.0 pF	C_{ak}	= 2.5 pF
C_a	= 5.4 pF	C_{ag}	= 2.1 pF
C_{gt}	= 3.0 pF	C_{gf}	< 0.3 pF

c) between heptode and triode and both combined:

C_{gTg1H}	< 0.1 pF	$C_{(gT+gs)g1H}$	< 0.25 pF
$C_{(gT+gs)}$	= 14 pF	$C_{(gT+gs)aH}$	< 0.1 pF

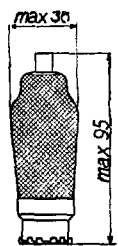


Fig. 1
Dimensions in mm.

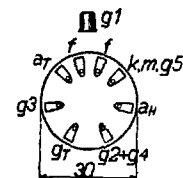
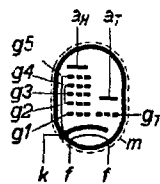


Fig. 2
Arrangement of
electrodes and
contacts.

OPERATING DATA: HEPTODE SECTION EMPLOYED AS MIXER VALVE (3rd grid connected to triode grid)

Anode and supply voltage.	$V_a = V_b =$	250 V
Screen grid resistance	$R_{(g2+g4)} =$	24,000 Ohms
Cathode resistance	$R_k =$	150 Ohms
Grid leak: 3rd grid and triode grid	$R_{(gs+gT)} =$	50,000 Ohms
Current to 3rd grid and triode grid	$I_{(gs+gT)} =$	190 μ A
Grid bias	$V_{g1} =$	-21 ¹⁾ V
Screen grid voltage.	$V_{(g2+g4)} =$	100 250 V
Anode current, ...	$I_a =$	3 — mA
Screen grid current.	$I_{(g2+g4)} =$	6.2 — mA
Internal resistance	$R_i =$	1.4 > 3 M ohms
Conversion conductance.	$S_c =$	750 7.5 μ A/V
Equivalent noise resistance	$R_{eq} =$	55,000 — Ohms.

¹⁾ Valve not controlled.

²⁾ Mutual conductance controlled to 1/100.

ENVIRONMENT

- 1) Valve not controlled.
- 2) Mutual conductance controlled to 1/100.
- 3) Mutual conductance controlled to 1/1000 (limit of control).

Anode voltage	$V_a = 100$	V
Grid bias	$V_g = 0$	V
Anode current	$I_a = 12$	mA
Mutual conductance	$S = 3.2$	mA/V
Gain factor	$\mu = 22$	

Supply voltage	V_b	=	250 V
Anode resistance	R_a	=	20,000 Ohms
Grid leak	$R_{(gT+g3)}$	=	50,000 Ohms
Current through grid leak to be adjusted to	$I_{(gT+g3)}$	=	190 μ A
Anode current	I_a	=	4.5 mA



Fig. 8

MAXIMUM RATINGS FOR THE HEPTODE SECTION

Anode voltage in cold condition	V_{ao}	= max. 550 V
Anode voltage	V_a	= max. 300 V
Anode dissipation	W_a	= max. 1.5 W
Screen grid voltage in cold condition	$V_{(g_2+g_4)o}$	= max. 550 V
Screen grid voltage, valve uncontrolled ($I_a=3\text{ mA}$)	$V_{(g_2+g_4)}$	= max. 100 V
Screen grid voltage, valve controlled ($I_a<1\text{ mA}$)	$V_{(g_2+g_4)}$	= max. 300 V
Screen grid dissipation	$W_{(g_2+g_4)}$	= max. 1 W
Cathode current	I_k	= max. 15 mA
Grid current commences at ($I_{g_1} = + 0.3\text{ }\mu\text{A}$)	V_{g_1}	= max. -1.3 V
Grid current commences at ($I_{g_3} = + 0.3\text{ }\mu\text{A}$)	V_{g_3}	= max. -1.3 V
Max. external resistance between grid 1 and cathode	R_{g_1k}	= max. 3 M Ohms
Max. external resistance between filament and cathode	R_{fk}	= max. 20,000 Ohms
Max. external resistance between grid 3 and cathode	R_{g_3k}	= max. 3 M Ohms
Max. voltage between filament and cathode (D.C. voltage or effective value of alternating voltage)	V_{fk}	= max. 50 V

MAXIMUM RATINGS FOR THE TRIODE SECTION

Anode voltage in cold condition	V_{ao}	= max. 550 V
Anode voltage	V_a	= max. 100 V
Anode dissipation	W_a	= max. 0.5 W
Grid current commences at ($I_g = + 0.3\text{ }\mu\text{A}$)	V_g	= max. -1.3 V
Max. external resistance in grid circuit	R_{gk}	= max. 3 M Ohms