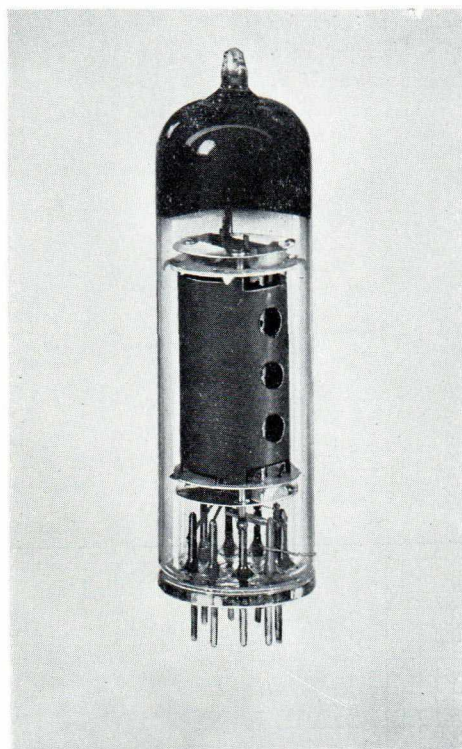


VIDEO OUTPUT PENTODE PL 83

DESCRIPTION

The PL 83 is a pentode on Noval base intended for use as the video output tube in television receivers. At a screen-grid voltage of only 170 V a considerable anode current swing can be obtained,



62148

Fig. 43. The video output pentode PL 83 (actual size).

so that the anode load resistance can be kept low and thus high-frequency compensation is simplified. The PL 83 can therefore be used in cases where the EF 80 would be inadequate.

Important features of the PL 83 are its high mutual conductance and small internal capacitances. Special attention has been paid to the mechanical design so as to produce a robust and rigid assembly, which minimizes the risk of microphony.

APPLICATION

1. THE PL 83 AS VIDEO AMPLIFIER WITH CATHODE COMPENSATION

A circuit of a video output stage employing the PL 83 with cathode compensation and a high-

tension line voltage of 180 V is represented in fig. 49. Compared with anode compensation by means of a shunt peaking coil, cathode compensation has the advantage that it permits of a simple and inexpensive circuit lay-out. Owing to the negative feedback, however, the gain of a cathode-compensated stage is usually lower.

In the circuit of fig. 49 it is assumed that the total capacitance in the anode circuit of the PL 83 is 35 pF. With a cathode resistor of 470 Ω and an anode load of 5 k Ω the capacitor shunting the cathode resistor should have a value of 390 pF, thus providing equal time constants in the anode and in the cathode circuit. A 3 db drop in frequency response occurs at about 5 Mc/s when the signal is applied directly to the control grid of the PL 83.

Under static conditions with $V_{g1} = -5.6$ V the anode current is 10.5 mA and the screen-grid current 1.4 mA. The gain of the stage is 7.5 and, if the black level of the input signal is at chassis potential, a peak video output voltage of 80 V, excluding sync, can be obtained at the anode. This signal is ample for driving any direct-viewing picture tube and also sufficient for the projection tube type MW 6-2.

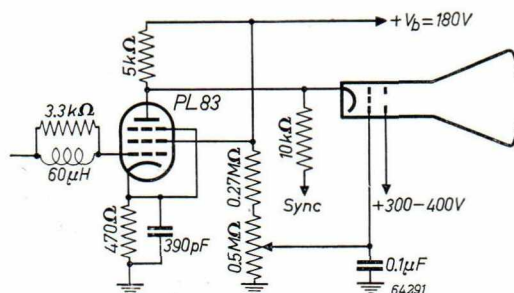


Fig. 49. The PL 83 as video amplifier with cathode compensation.

2. THE PL 83 AS VIDEO AMPLIFIER WITH ANODE COMPENSATION

Fig. 50 gives a circuit employing the PL 83 with anode compensation. The high-tension line voltage is 180 V and the circuit is suitable for driving any direct-viewing picture tube or a projection tube.

The series peaking coils in the control grid circuit

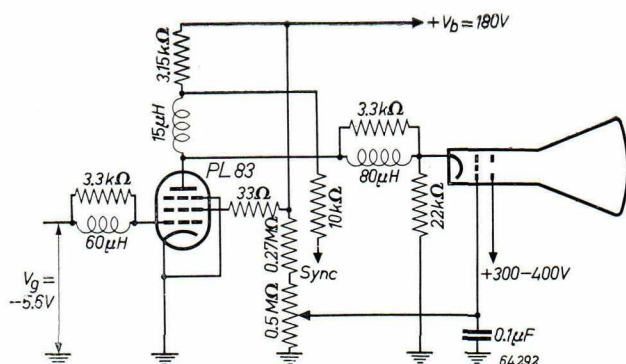


Fig. 50. The PL 83 as video amplifier with anode compensation. The stopper resistor in the screen-grid lead should not be chosen higher than 33 Ω .

TECHNICAL DATA

HEATER DATA

Heating: indirect by A.C. or D.C.
series supply

Heater voltage	V_f	15 V
Heater current	I_f	0.3 A

BASE CONNECTIONS AND DIMENSIONS (in mm)

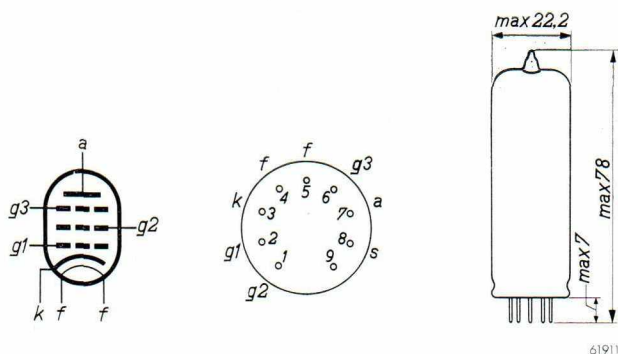


Fig. 51.

Mounting position: any

CAPACITANCES

C_{g1}	10.4 pF
C_a	6.6 pF
C_{ag1}	< 0.1 pF
C_{g1f}	< 0.15 pF

of the PL 83 and in the cathode of the picture tube are shunted by damping resistors so as to prevent overshoot.

The anode current under static conditions is 11 mA and the screen-grid current 1.5 mA when the grid bias is -5.6 V. If the black level of the input signal is at chassis potential a peak output voltage of about 100 V can be delivered, whilst the gain is 25. This gain is substantially higher than that of a stage with cathode compensation, but, on the other hand, anode compensation is more complicated.

TYPICAL CHARACTERISTICS

Anode voltage	V_a	170	200 V
Suppressor-grid voltage	V_{g3}	0	0 V
Screen-grid voltage	V_{g2}	170	200 V
Control-grid voltage	V_{g1}	-2.3	-3.5 V
Anode current	I_a	36	36 mA
Screen-grid current	I_{g2}	5	5 mA
Mutual conductance	S	10.5	10.5 mA/V
Internal resistance	R_i	0.1	0.1 M Ω
Amplification factor			
between screen grid and			
control grid	μ_{g2g1}	24	24

LIMITING VALUES

Anode voltage at zero anode			
current	V_{a0}	max.	550 V
Anode voltage	V_a	max.	250 V
Screen-grid voltage at zero			
screen-grid current	V_{g20}	max.	550 V
Screen-grid voltage	V_{g2}	max.	250 V
Control-grid voltage			
(grid current $+0.3 \mu A$)	V_{g1}	max.	-1.3 V
Heater voltage during			
warming-up period		max.	22.5 V
Voltage between heater and			
cathode	V_{kf}	max.	150 V
Cathode current	I_k	max.	70 mA
Anode dissipation	W_a	max.	9 W
Screen-grid dissipation	W_{g2}	max.	2 W
External resistance between			
control grid and cathode	R_{g1}		
with fixed bias		max.	0.5 M Ω
with automatic bias		max.	1 M Ω
External resistance between			
heater and cathode	R_{kf}	max.	20 k Ω

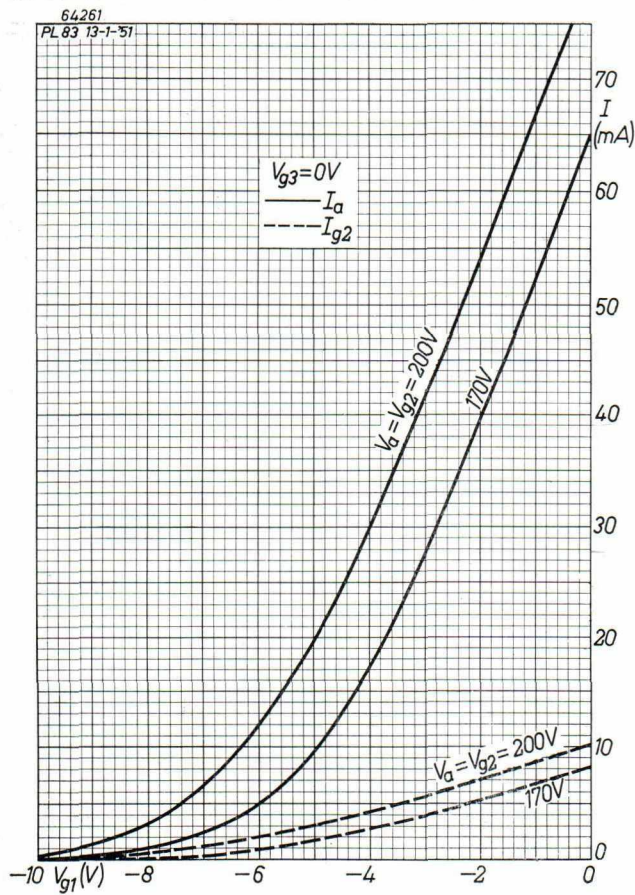
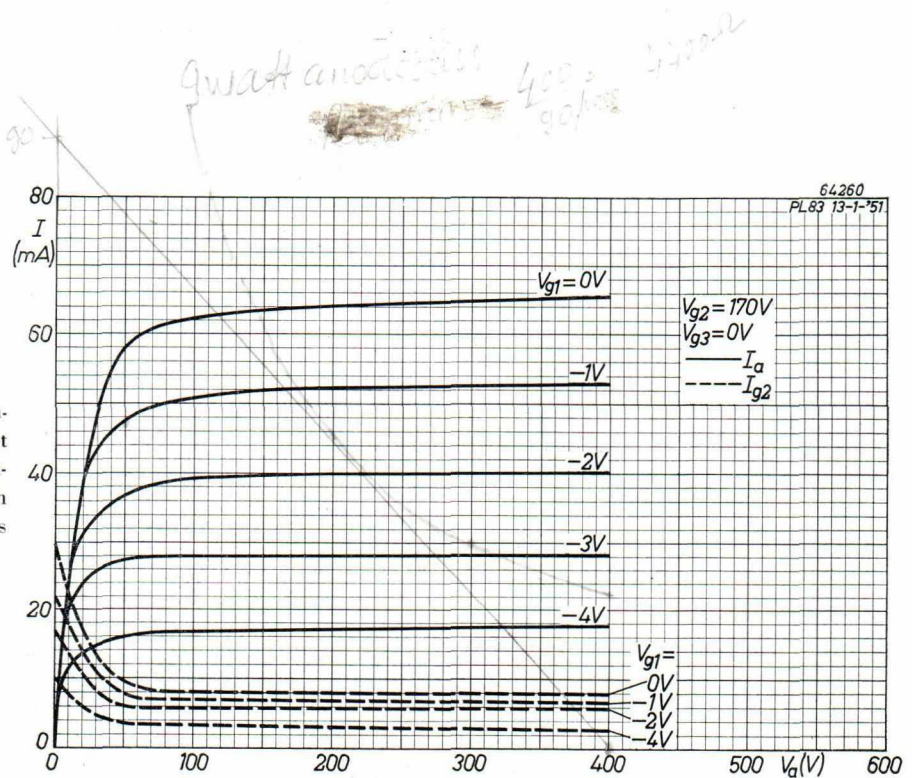


Fig. 52.
Anode current and screen-grid current plotted against control-grid voltage, with anode and screen-grid voltage as parameter.

Fig. 53.
Anode current and screen-grid current plotted against anode voltage for screen-grid voltage of 170 V, with control-grid voltage as parameter.



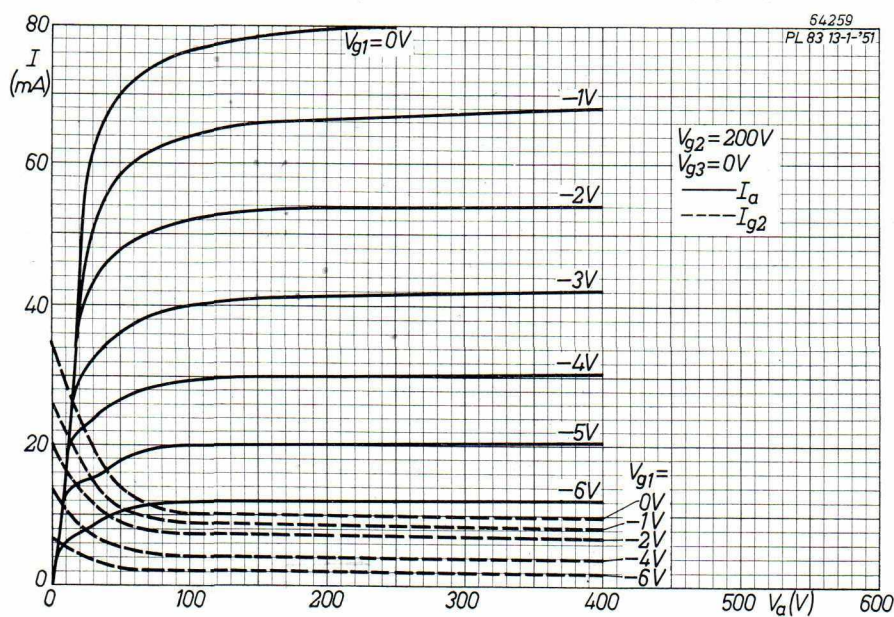


Fig. 54.
Anode current and screen-grid current plotted against anode voltage for screen-grid voltage of 200 V, with control-grid voltage as parameter.

Fig. 55.
Minimum permissible anode load resistance plotted against supply and screen-grid voltage.

