LINE OUTPUT PENTODE

Output pentode intended for colour TV line deflection circuits.

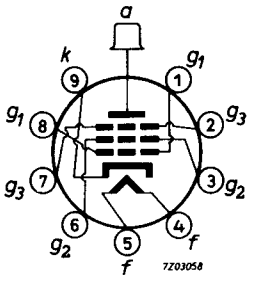
QUICK REFERENCE DATA				
Anode peak voltage	V_{a_p}		7000	V
Cathode current	I_k	max.	500	mA
Anode dissipation	W_a	max.	30	W

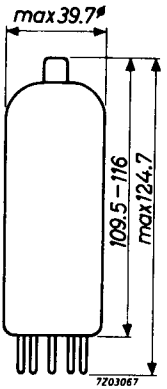
HEATING: Indirect by A.C. or D.C.; series supply

Heater current	I_f	300	mA
Heater voltage	V_f	40	V

DIMENSIONS AND CONNECTIONS Dimensions in mm

Base: Magnoval
Top cap: Type 1
Mounting: Additional supporting of the tube at the top is required.





CAPACITANCES

Grid No.1 to filament	C_{g_1f}	max.	0.2	pF
Anode to grid No.1	C_{ag_1}	max.	3.0	pF
	C_{ag_1}		2.5	pF

TYPICAL CHARACTERISTICS (measured under pulse conditions)

Anode voltage	V_a	160	50	V
Grid No.3 voltage	V_{g_3}	0	0	V
Grid No.2 voltage	V_{g_2}	160	175	V
Grid No.1 voltage	V_{g_1}	0	−10	V
Anode current	I_a	1400	800	mA
Grid No.2 current	I_{g_2}	45	70	mA

OPERATING CONDITIONS (D.C. feedback)

Cut-off voltage

The minimum required cut-off voltage ($-V_{g_1}$) during flyback at V_a = 7000 V and at line frequency is at :

V_{g_2} = 150 V : V_{g_1} = −175 V
V_{g_2} = 200 V : V_{g_1} = −195 V
V_{g_2} = 250 V : V_{g_1} = −215 V

Supply voltages: See pages 4-5-6

Minimum required anode voltage: $V_{a\ min}$

In order to prevent Barkhausen interference and loss of stabilization, care should be taken that the anode voltage never drops below the specified $V_{a\ min}$ during the scanning period.
If low values of $V_{a\ min}$ are required, the $V_{a\ min}$ 1-line can be shifted over 10 V to $V_{a\ min}$ 2, provided a D.C. voltage of at least +20 V is applied to the beamplate (g3).
To compensate for the influence of mains voltage variations, the specified values of $V_{a\ min}$ have to be increased with 10% of the anode supply voltage.

Minimum required values of the screen grid voltage: $V_{g2\ min}$

The graph refers to nominal mains voltage. The specified values of I_{a_p} will be available throughout life of the tube at supply voltages 10% below nominal.

Maximum permissible screen grid series resistance: R_{g2} max. See pages 4-5-6

Decoupling-capacitors in the grid no 2 and/or grid no 3 circuit

In circuits where decoupling capacitors in the grid no 2 or the grid no 3 circuits are applied, incidental flashover in the tube may give rise to excessive dischargecurrents and component or tube failure.
Therefore it is recommended to limit the dischargecurrents to these capacitors by means of an 100 Ohm resistance between g2 and the g2-bypass capacitance.
The 1000 Ohms resistance should be protected by a spark-gap connected between g^3 and earth.

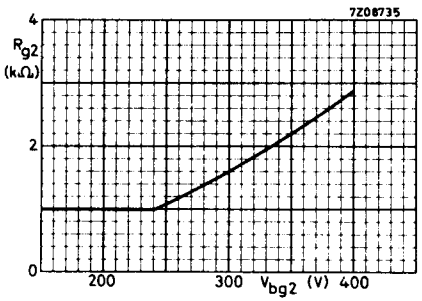
Hum

At Z_{g_1} = 200 k (f = 50 Hz), $V_{k/f}$ = 220 V_{RMS} and without wiring and socket capacitance, the equivalent grid hum voltage is less than 5 mV.

LIMITING VALUES

Design centre rating system					
Anode voltage in cold condition	V_{ao}	max.	700	V	
Anode peak voltage	V_{ap}	max.	7000	V	1)
Anode dissipation	W_a	max.	30	W	
Anode + grid No.2 dissipation (triode-connected)	$W_a + W_{g_2}$	max.	31	W	
Grid No.3 voltage	V_{g_3}	max.	50	V	
Grid No.2 voltage in cold condition	$V_{g_{2o}}$	max.	700	V	
Grid No.2 voltage	V_{g_2}	max.	275	V	
Grid No.2 dissipation	W_{g_2}	max.	7	W	2)
Cathode current	I_k	max.	500	mA	
Cathode peak current	I_{k_p}	max.	1200	mA	
Cathode-to-heater voltage	V_{kf}	max.	250	V	
Grid No.1 resistor: fixed bias	R_{g_1}	max.	0.5	MΩ	3)
stabilized circuits	R_{g_1}	max.	2.2	MΩ	3)
Grid No.3 circuit resistance	R_{g_3}	max.	10	kΩ	4)
Bulb temperature	t_{bulb}	max.	300	°C	5)
Design max. rating system 6)					
Anode dissipation	W_a	max.	40	W	
Anode + grid No.2 dissipation (triode connected)	$W_a + W_{g_2}$	max.	42	W	
Grid No.2 dissipation	W_{g_2}	max.	9	W	
Anode peak voltage	V_{ap}	max.	8000	V	1)
Neg. grid No.1 peak voltage	$-V_{g_1p}$	max.	550	V	1)

1. Max. pulse duration is 22% of a cycle and max. 18 μs.
2. To prevent an excessive value of W_{g_2} the minimum R_{g_2} values are given in the graph below.



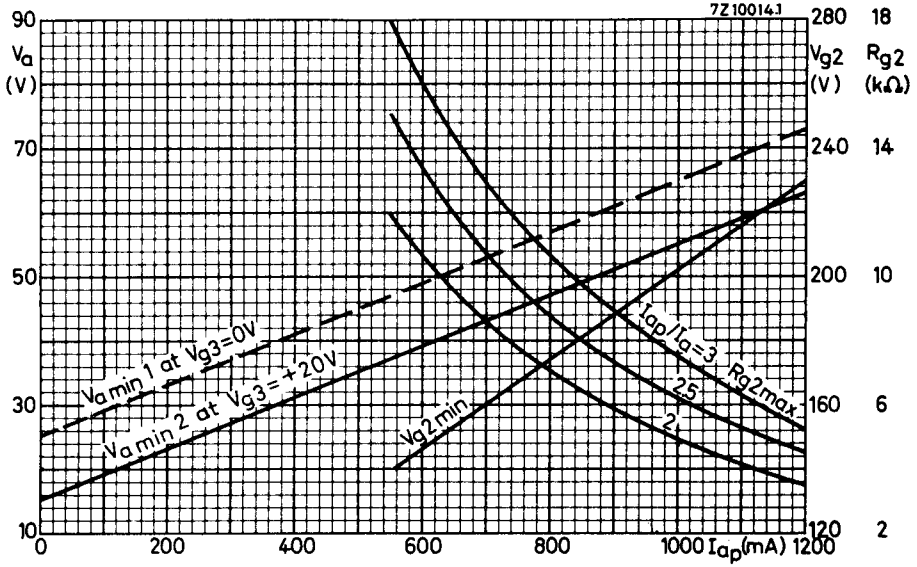
3. The circuit design has to be such that negative control grid currents up to 5 micro-amperes do not have any detrimental effect upon tube adjustment or circuit performance.
   Care should be taken that with 5 micro-amperes grid current the limiting values for I_k, W_a and W_{g_2} are not exceeded.
4. With $R_{g_3} \leq 10$ kΩ capacitive decoupling of g_3 is not required.
5. Absolute max. value.
6. The design maximum limits should not be exceeded with a nominal tube under the worst probable operating conditions at a normal picture width.

Min. required anode voltage.

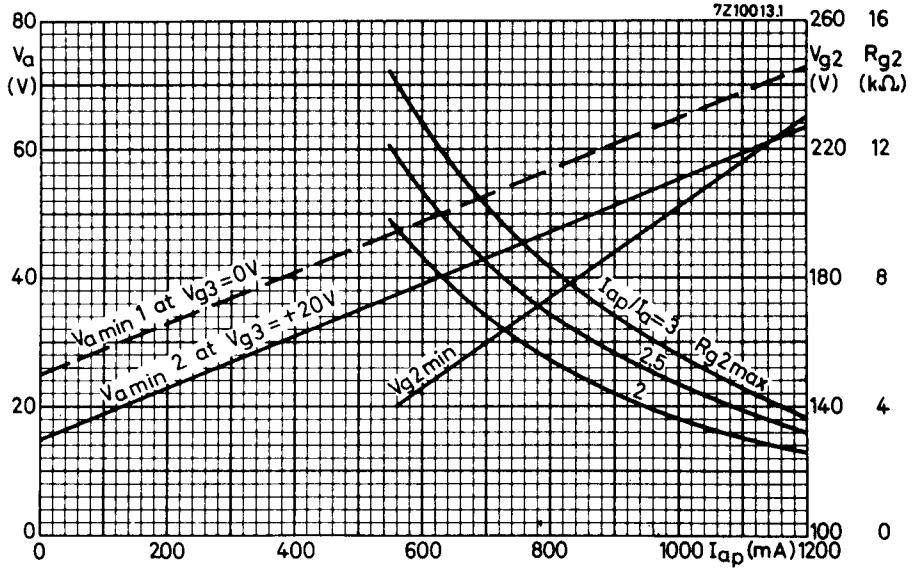
$R_{g_2\ max}$: max. permissible screen grid series resistance for 400 V screen grid supply.

The specified values of I_{a_p} are available at supply voltages 10% below nominal and throughout the tube life.

Remark: $R_{g_2\ min}$ for 400 V screen grid supply is 2.9 kΩ. (See page 3)



Min. required anode voltage.
$R_{g_2\,max}$: max. permissible screen grid series resistance for 350 V screen grid supply.
The specified values of I_{a_p} are available at supply voltages 10% below nominal and throughout the tube life.
Remark: $R_{g_2\,min}$ for 350 V screen grid supply is 2.2 kΩ. (See page 3)

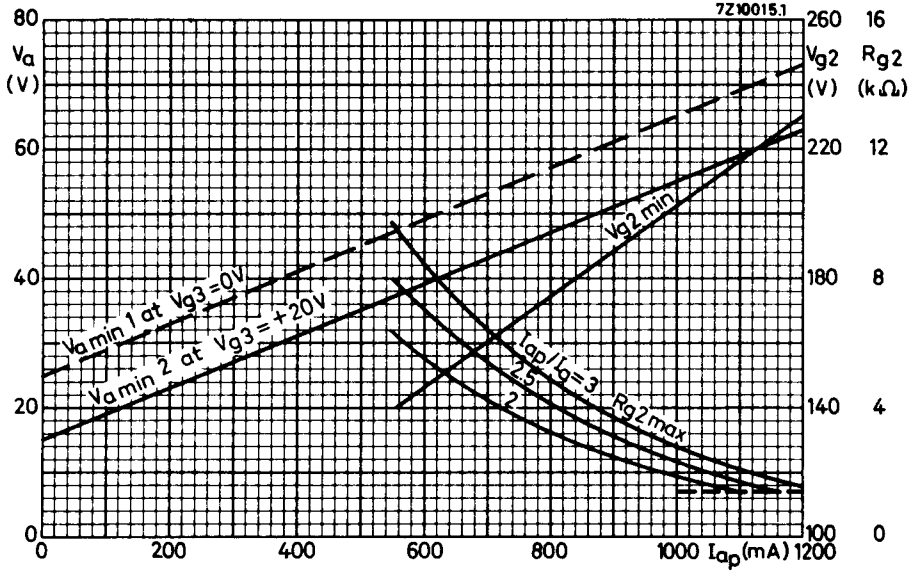


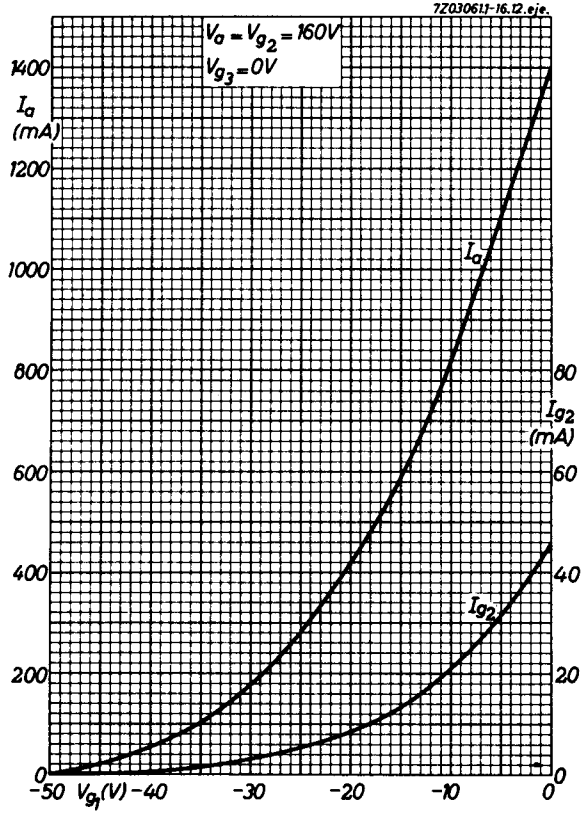
Min. required anode voltage.

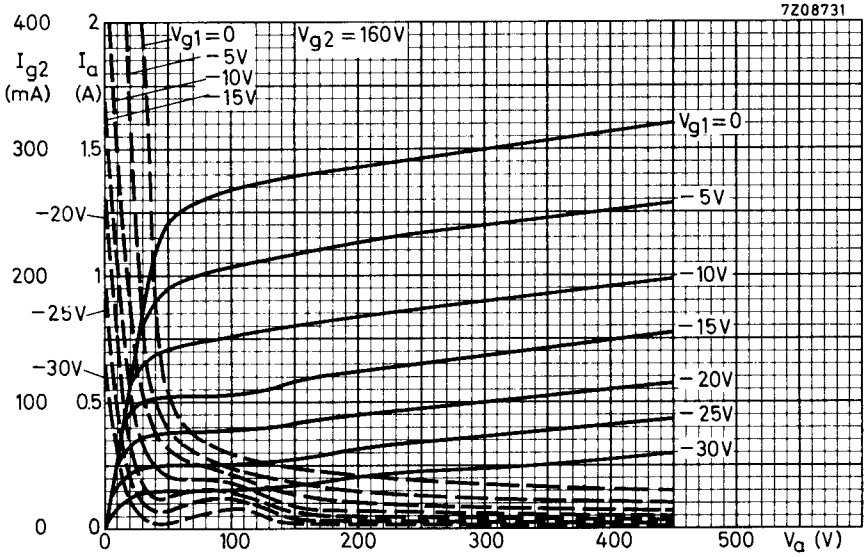
R_{g2} max.: max. permissible screen grid series resistance for 280 V screen grid supply.

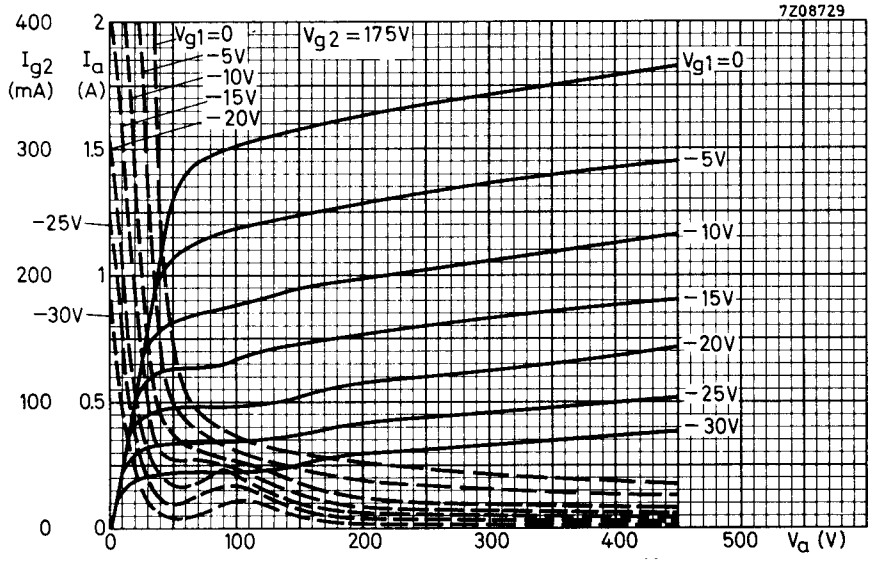
The specified values of I_{a_p} are available at supply voltages 10% below nominal and throughout the tube life.

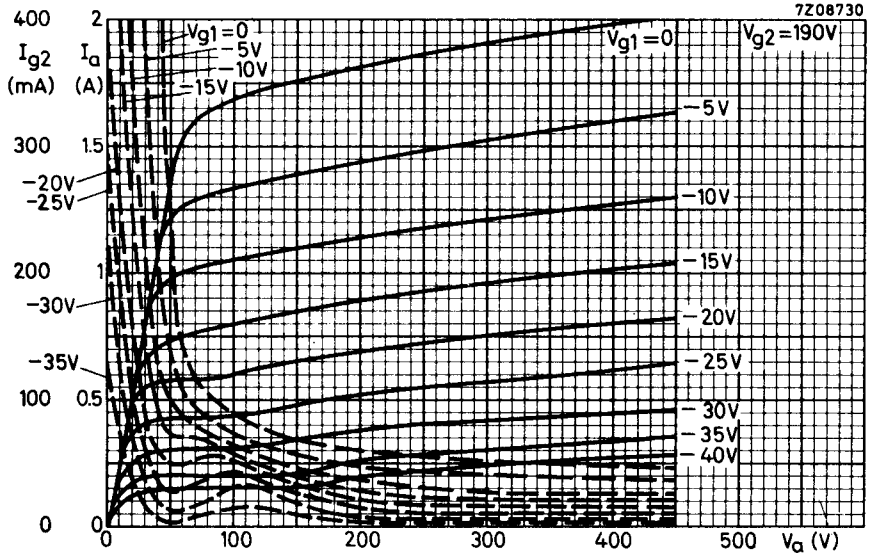
Remark: $R_{g_2\ min}$ for 280 V screen grid supply is 1.4 kΩ. (See page 3)

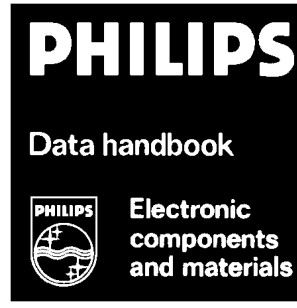



7Z03061J-16.12.ejc.
$V_a = V_{g_2} = 160V$
$V_{g_3} = 0V$
1400
I_a (mA)
1200
1000
800
600
400
200
0
I_a
I_{g_2} (mA)
80
60
40
20
0
I_{g_2}
-50 V_{g_1}(V) -40 -30 -20 -10 0


7Z08731
V_{g2} = 160V
V_{g1} = 0
−5V
−10V
−15V
−20V
−25V
−30V
I_{g2} (mA)
I_a (A)
V_a (V)


7Z08729
V_{g2} = 175V
V_{g1} = 0
−5V
−10V
−15V
−20V
−25V
−30V
I_{g2} (mA)
I_a (A)
V_a (V)


7Z08730
400
300
200
100
0
2
1.5
1
0.5
0
I_{g2} (mA)
I_a (A)
$V_{g1}=0$
−5V
−10V
−15V
−20V
−25V
−30V
−35V
$V_{g1}=0$
$V_{g2}=190V$
−5V
−10V
−15V
−20V
−25V
−30V
−35V
−40V
0
100
200
300
400
500
V_a (V)



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