

TRIODE-OUTPUT PENTODE

Triode-pentode with separate cathodes.

The triode section is intended for use as A.F. amplifier.

The pentode section is intended for use as A.F. power amplifier.

QUICK REFERENCE DATA

Triode section

Anode current	I_a	1.2 mA
Transconductance	S	1.6 mA/V
Amplification factor	μ	100 -

Pentode section

Anode current	I_a	39 mA
Transconductance	S	10.5 mA/V
Amplification factor	$\mu_{g_2g_1}$	21 -
Output power	W_o	4.1 W

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

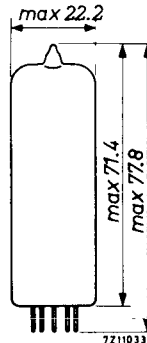
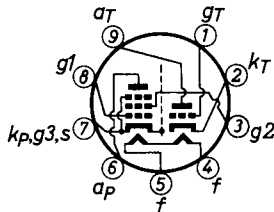
Heater current I_f 300 mA

Heater voltage V_f 13.3 V

DIMENSIONS AND CONNECTIONS

Dimensions in mm

Base: Noval



CAPACITANCES

Triode section

Anode to all except grid	$C_{a(g)}$	2.5 pF
Grid to all except anode	$C_{g(a)}$	2.3 pF
Anode to grid	C_{ag}	1.4 pF
Grid to heater	C_{gf}	max. 0.006 pF

Pentode section

Grid No. 1 to all except anode	$C_{g1(a)}$	10 pF
Anode to grid No. 1	C_{ag1}	max. 0.4 pF
Grid No. 1 to heater	C_{g1f}	max. 0.24 pF

Between triode and pentode sections

Anode triode to grid No. 1 pentode	C_{a-Tg1P}	max. 0.2 pF
Grid triode to grid No. 1 pentode	C_{gTg1P}	max. 0.02 pF
Anode triode to anode pentode	C_{a-Tap}	max. 0.15 pF
Grid triode to anode pentode	C_{gTap}	max. 0.006 pF ¹⁾

TYPICAL CHARACTERISTICS

Triode section

Anode voltage	V_a	230 V
Grid voltage	V_g	-1.7 V
Anode current	I_a	1.2 mA
Transconductance	S	1.6 mA/V
Amplification factor	μ	100

Pentode section

Anode voltage	V_a	230 V
Grid No. 2 voltage	V_{g2}	230 V
Grid No. 1 voltage	V_{g1}	-5.7 V
Anode current	I_a	39 mA
Grid No. 2 current	I_{g2}	6.5 nA
Transconductance	S	10.5 mA/V
Amplification factor	μ_{g2g1}	21
Internal resistance	R_i	45 k Ω

¹⁾ The capacitance between triode grid and pentode anode (C_{gT-ap}) can be reduced to a value of less than 0.002 pF by using a shielding ring with a diameter of 22.5 mm and a height of 15 mm with respect to the tube base.

OPERATING CHARACTERISTICS

Triode sectionA.F. amplifier

Supply voltage	V_b	200	230	200	230	V
Cathode resistor	R_k	0	0	2.6	2.1	$k\Omega$
Anode resistor	R_a	220	220	220	220	$k\Omega$
Grid resistor	R_g	10	10	-	-	$M\Omega$
Grid resistor of following stage	$R_{g'}$	680	680	680	680	$k\Omega$
Signal source resistance	R_s	47	47	-	-	$k\Omega$
Anode current	I_a	0.42	0.52	0.42	0.52	mA
Output voltage	V_o	3.2	3.2	3.2	3.2	V_{RMS}
Voltage gain	V_o/V_i	66	68	66	68	
Distortion	d_{tot}	0.6	0.5	0.6	0.5	%

Microphony

The triode section can be used without special precautions against microphonic effect in circuits in which an output of 50 mW is obtained at an input voltage of not less than 10 mV_{RMS}.

Hum

The hum level will be better than 60 dB under the following conditions;

Input voltage minimum 10 mV_{RMS} for 50 mW output.

Grid circuit impedance max. 0.5 M Ω at 50 Hz.

Cathode decoupling capacitor minimum 100 μ F.

Pin 4 connected to earth.

A.C. voltage between pin 4 and cathode max. 30 V_{RMS}.

OPERATING CHARACTERISTICS

Pentode section

Class A (Measured with V_k constant)

Anode voltage	V_a	200	230	V
Grid No. 2 voltage	V_{g2}	200	230	V
Cathode resistor	R_k	115	125	Ω
(Grid No. 1 voltage)	V_{g1}	-4.7	-5.7	V)
Load resistance	$R_{a\sim}$	5.6	5.1	$k\Omega$
Grid No. 1 driving voltage	V_i	0 0.32 3.2		0 0.34 3.6 V_{RMS}
Anode current	I_a	35 - 34	39 -	40.7 mA
Grid No. 2 current	I_{g2}	6.0 - 9.0	6.5 -	10.5 mA
Output power	W_o	0 0.05 3.1	0 0.05	4.1 W
Distortion	d_{tot}	- 0.9 10	- 0.9	10 %

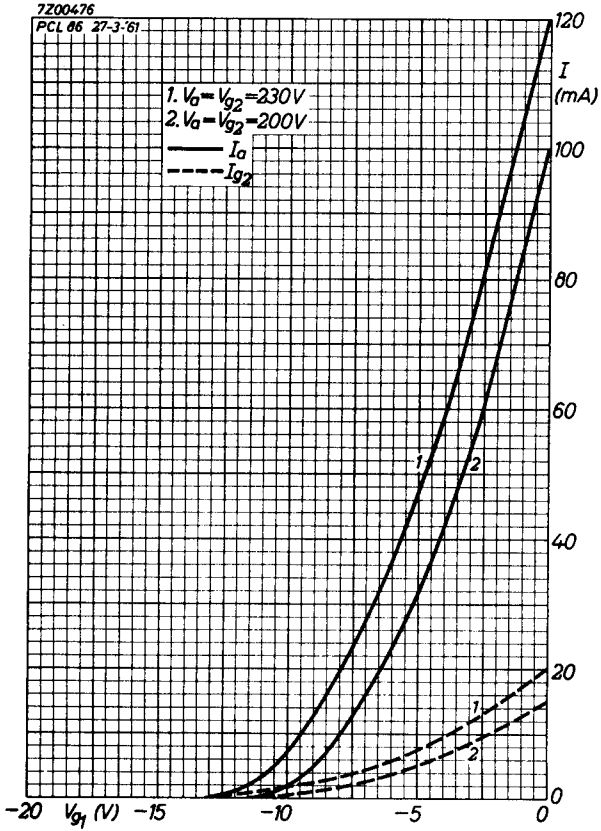
LIMITING VALUES (Design centre rating system)Triode section

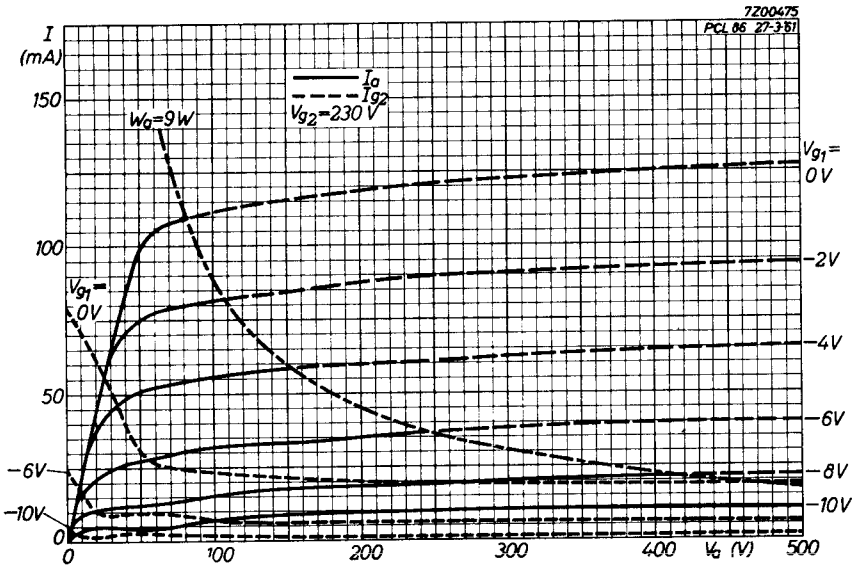
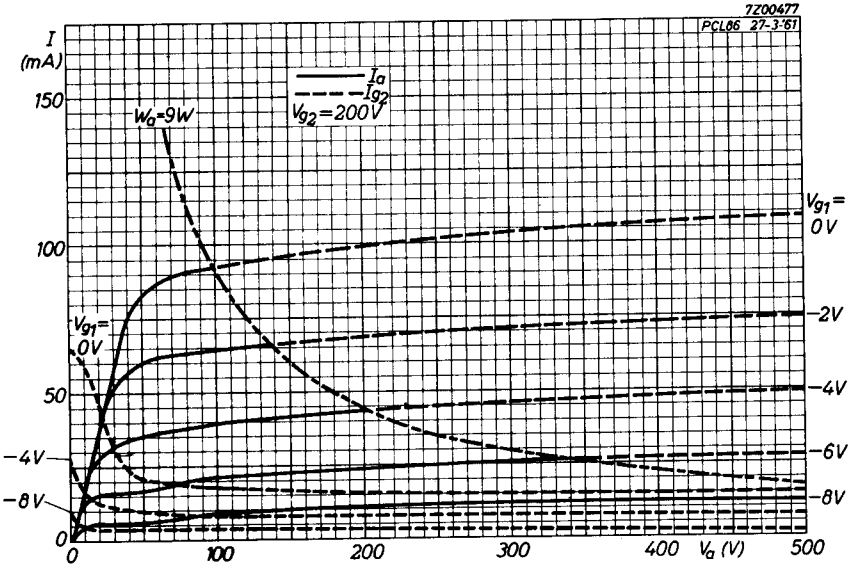
Anode voltage	V_{a0}	max.	550 V
	V_a	max.	300 V
Anode dissipation	W_a	max.	0.5 W
Cathode current	I_k	max.	4 mA
Grid resistor	R_g	max.	1 M Ω ¹⁾
Cathode to heater voltage	V_{kf}	max.	100 V

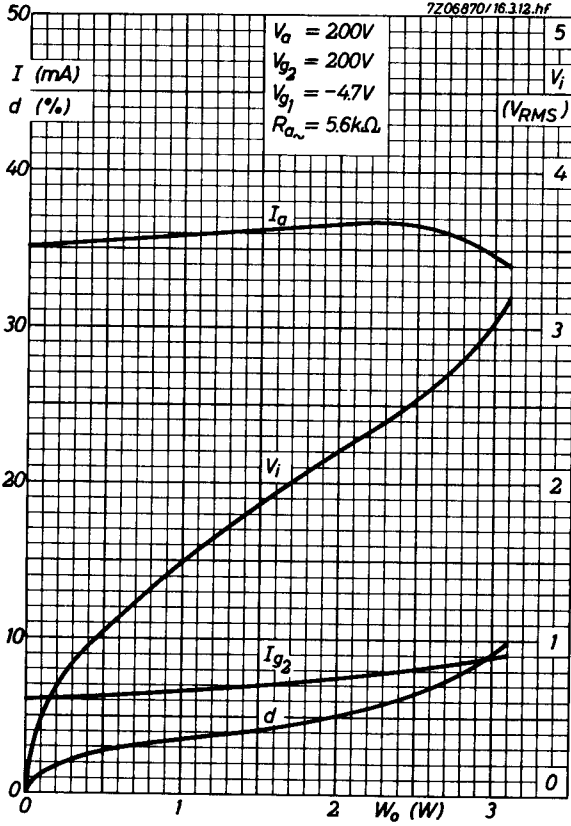
Pentode section

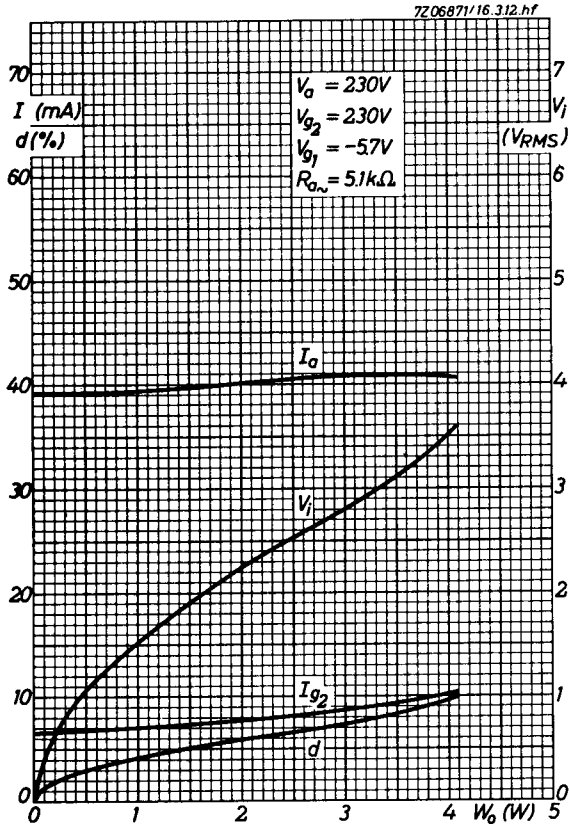
Anode voltage	V_{a0}	max.	550 V
	V_a	max.	300 V
Grid No. 2 voltage	V_{g20}	max.	550 V
	V_{g2}	max.	300 V
Anode dissipation	W_a	max.	9 W
Grid No. 2 dissipation, average peak	W_{g2}	max.	1.8 W
	W_{g2p}	max.	3.25 W
Cathode current	I_k	max.	55 mA
Grid No. 1 resistor, for automatic bias	R_{g1}	max.	1 M Ω
Cathode to heater voltage	V_{kf}	max.	100 V

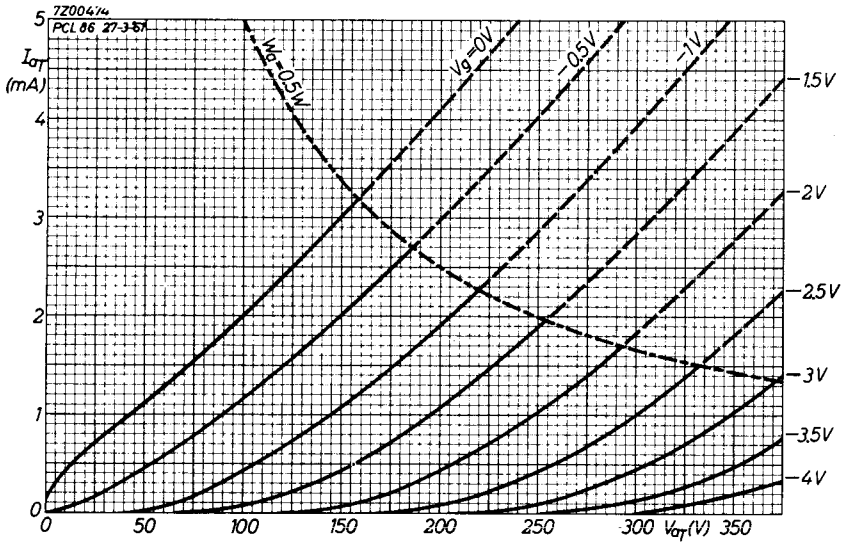
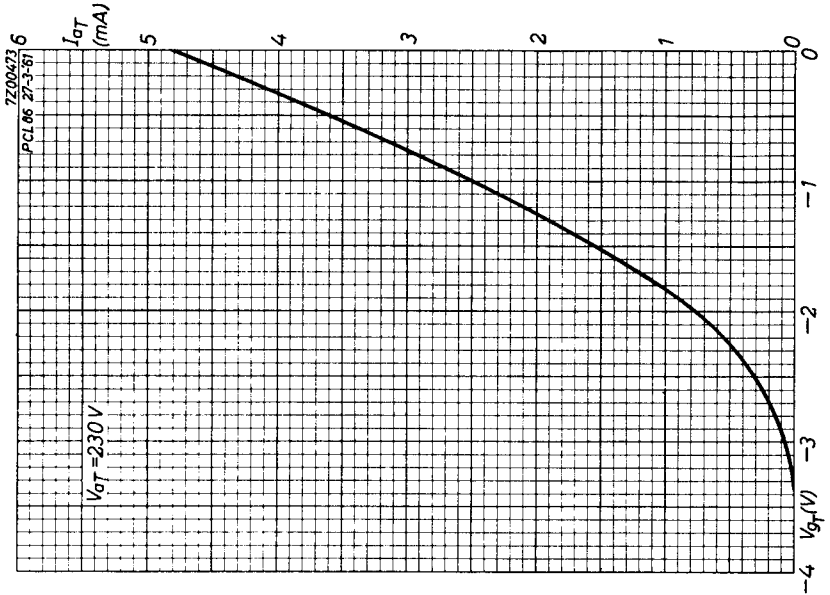
¹⁾ This value applies to operation with fixed bias. It may be multiplied by the D.C. inverse feedback factor resulting from e.g. cathode or anode resistors to a maximum of 10 M Ω .











PHILIPS

Data handbook



Electronic
components
and materials

PCL86

page	sheet	date
1	1	1969.12
2	2	1968.09
3	3	1968.09
4	4	1968.09
5	5	1968.09
6	6	1968.09
7	7	1968.09
8	8	1968.09
9	9	1968.09
10	10	1968.09
11	FP	1999.08.02