30C1/PCF80 ←

TRIODE PENTODE FREQUENCY CHANGER

GENERAL

The 30C1/PCF80 is a miniature based indirectly heated triode-pentode valve which has been designed for use as a frequency changer at V.H.F. It is suitable for use in AC/DC powered equipment having series connected heater chains. The two sections of the valve are provided with separate cathodes.

RATING

Heater Current (amps)	I_h	0·3
Heater Voltage (volts)	V_h	9·0

		Pentode	*Triode*
Maximum Anode Voltage (volts)	V_a (max)	250	250
Maximum Screen Voltage (volts)	V_{g2} (max)	175	—
Mutual Conductance (mA/V)	g_m	6·2*	5·0†
Amplification Factor	μ		20
Maximum Anode Dissipation (watts)	P_a (max)	1·7	1·5
Maximum Screen Dissipation (watts)	P_{g2} (max)	0·5	
Maximum Cathode Current (mA)	I_k (max)	14	14
Maximum Heater to Cathode Voltage (volts r.m.s.)	V_{h-k}	200 ‡‡	

* Taken at $V_a = 170$: $V_{g_2} = 170$: $I_a = 10mA$: $V_{g_1} = -2V$

† Taken at $V_a = 100$: $I_a = 14mA$

‡‡ Measured with respect to the higher potential heater pin.

Indicates a change ←

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INTER-ELECTRODE CAPACITANCES (pF)

		‡	§
Grid I (Pentode)/All	$c_{g1(p)-all}$	6·1	7·35
Anode (Pentode)/All	$c_{a(p)-all}$	4·9	6·15
Grid I (Pentode)/Anode (Pentode)	$c_{g1(p)-a(p)}$	0·013	0·014
Grid (Triode)/Earth	$c_{in(t)}$	3·1	4·4
Grid (Triode)/Anode (Triode)	$c_{g(t)-a(t)}$	1·7	1·7
Anode (Triode)/Earth	$c_{out(t)}$	2·9	4·2
Grid (Triode)/Anode (Pentode)	$c_{g(t)-a(p)}$	0·007	0·01
Grid I (Pentode)/Anode (Triode)	$c_{g1(p)-a(t)}$	0·3	0·6
Anode (Pentode)/Anode (Triode)	$c_{a(p)-a(t)}$	0·023	0·023

‡ Inter-electrode capacitances taken with holder capacity balanced out, but with cylindrical screen can.

§ Total capacity including ceramic B9A holder with cylindrical screen, Carr Fastener type 76/804E/T.

" Earth " denotes electrodes of any second valve section and the remaining earthy potential electrodes of the section under measurement, heater and shields joined to cathode.

DIMENSIONS

Maximum Overall Length (mm)	56
Maximum Diameter (mm)	22·2
Maximum Seated Height (mm)	49
Approximate Nett Weight (ozs)	½
Approximate Packed Weight (ozs)	¾

MOUNTING POSITION—Unrestricted

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TYPICAL OPERATION—As a frequency changer with oscillator volts applied to g_1.

Pentode Section		*	
Anode Voltage (volts)	V_a	170	180
Screen Voltage (volts)	V_{g2}	145	165
Grid 1 Resistance for grid current bias (ohms)	R_{g1}	33,000	33,000
Grid 1 Current (μA)	I_{g1}	130	130
Conversion Conductance (mA/V)	g_c	2·0	2·1
Peak Heterodyne Voltage (volts)	$V_{het(pk)}$	5·0	5·0
Anode Current (approx) (mA)	I_a	6·8	7·7
Screen Current (approx) (mA)	I_{g2}	2·0	2·4

* If the design of the tuner is such that it is possible for the 30C1/PCF80 to be left running without the triode section oscillating (e.g., by being switched to blank coil positions), the lower screen and anode voltage should be employed.

Triode Section		
Anode Voltage (volts)	V_a	120
Anode Current (average) (mA)	$I_{a(av)}$	6·0

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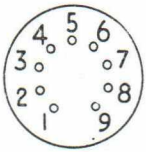
BASE - Noval (B9A)



Viewed from Free End of Pins

CONNECTIONS

Pin 1	Triode Anode	a_t
Pin 2	Pentode Grid 1	g_1
Pin 3	Pentode Grid 2	g_2
Pin 4	Heater	h
Pin 5	Heater	h
Pin 6	Pentode Anode	a_p
Pin 7	Pentode Cathode Shield and Grid 3	k_{p,s,g_3}
Pin 8	Triode Cathode	k_t
Pin 9	Triode Grid	g_t

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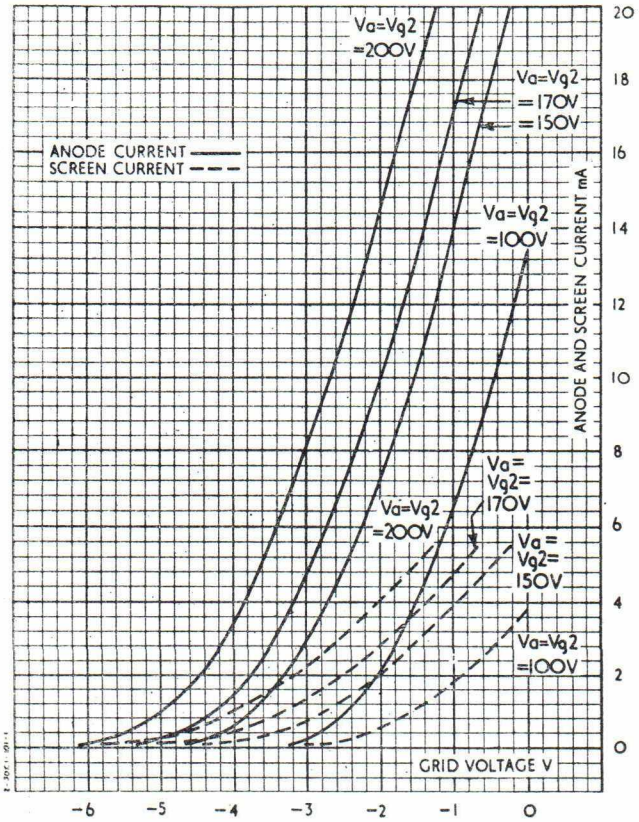
TRIODE PENTODE FREQUENCY CHANGER

Indirectly heated—for series operation

AVERAGE CHARACTERISTIC CURVES : I_a, I_{g2}/V_g

Pentode Section



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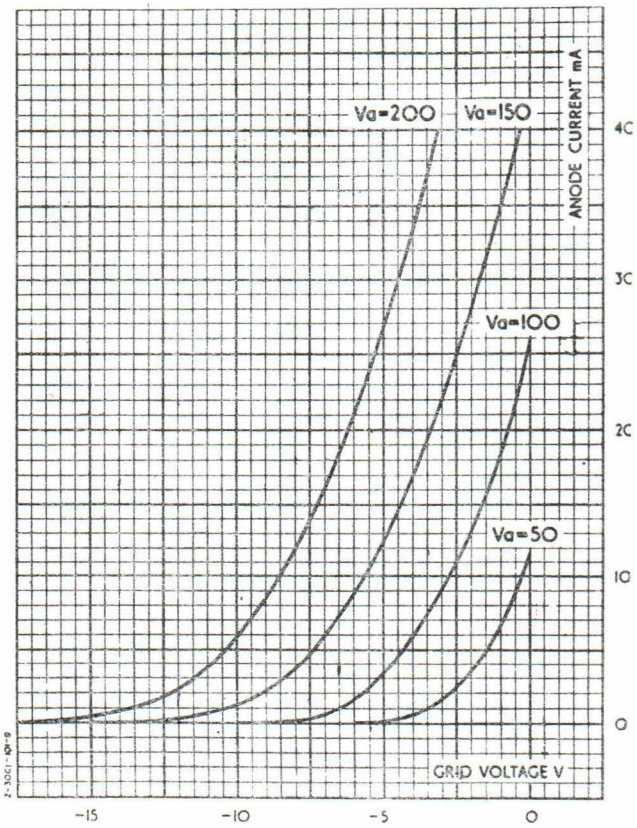
Indirectly heated—for series operation

AVERAGE CHARACTERISTIC CURVES : I_a/V_g

Triode Section



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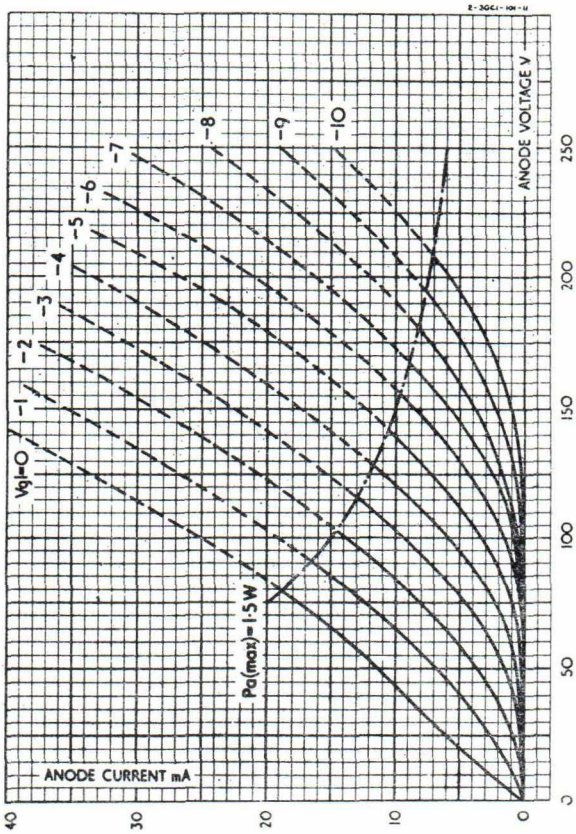
Indirectly heated—for series operation

AVERAGE CHARACTERISTIC CURVES : I_a/V_a

Triode Section



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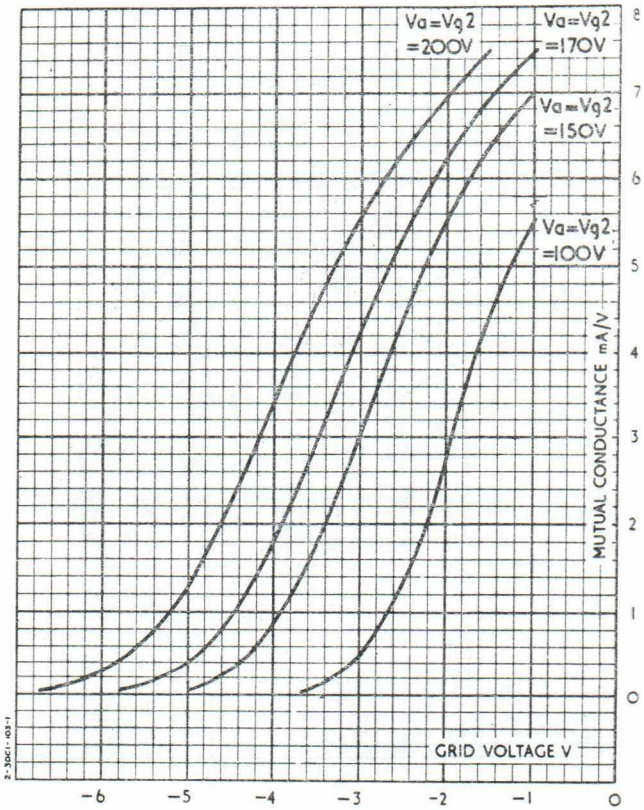
AVERAGE CHARACTERISTIC CURVES: g_m/V_g

Pentode Section



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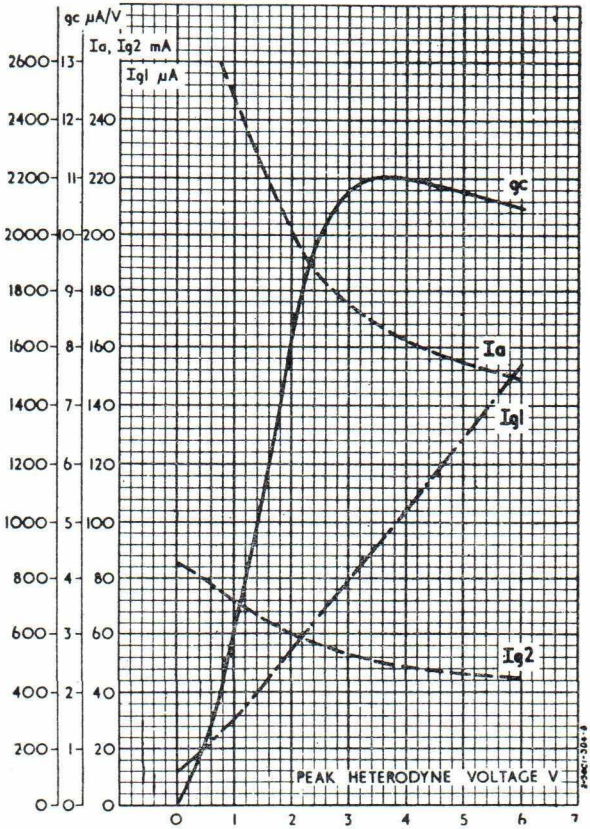
Indirectly heated—for series operation

TENTATIVE

CHARACTERISTIC CURVES: I_a, I_{g2}, I_{g1}, g_c/V_{het} (pk)

R2=2.2KΩ R3=15KΩ

See "Test Circuit"



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TRIODE PENTODE FREQUENCY CHANGER

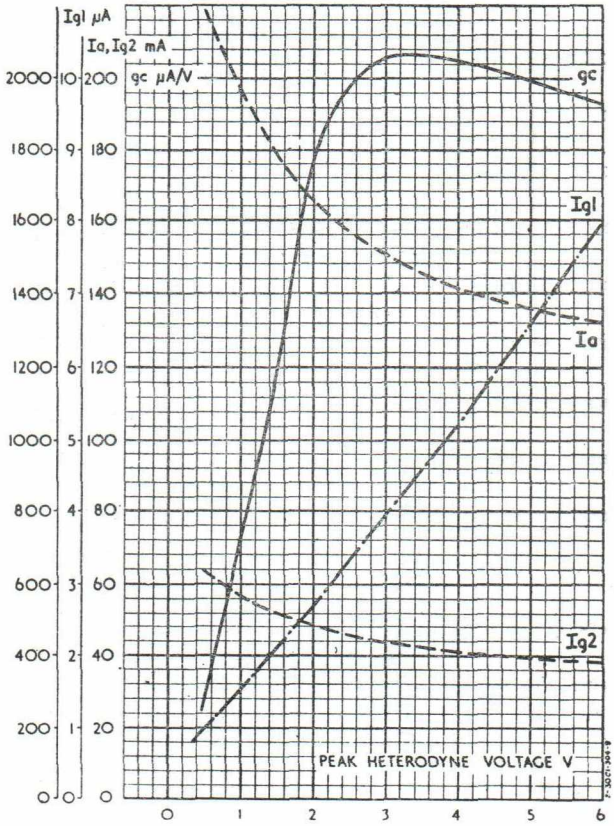
Indirectly heated—for series operation

TENTATIVE

CHARACTERISTIC CURVES: I_a, I_{g2}, I_{g1}, g_c/V_{het} (pk)

R2=4.7KΩ R3=27KΩ

See "Test Circuit"



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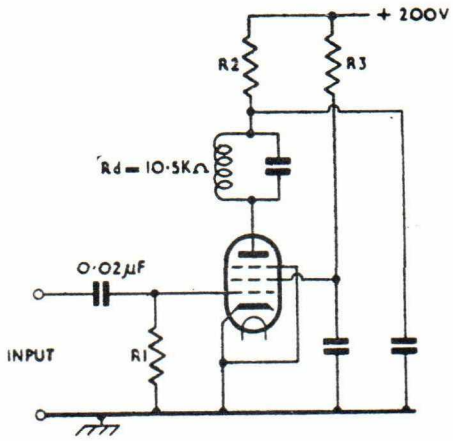
Indirectly heated—for series operation

TENTATIVE

TEST CIRCUIT

for

CHARACTERISTIC CURVES: I_a, I_{g2}, I_{g1}, $g_c/V_{het(pk)}$

f = 1 Mc/s.