THE M-O VALVE
COMPANY LIMITED

CV4085

GEC

RUGGED LOW NOISE AF PENTODE

BRIEF DATA

A pentode with low hum and microphony output, suitable for use in low level, low frequency amplifiers, under conditions of abnormal shock and vibration or where statistically controlled major electrical characteristics are required.

HEATER

Heater voltage	6.3	V
Heater current	0.2 (±7.5%)	A

MAXIMUM RATINGS (Absolute)

DC anode supply voltage	550	V
DC anode voltage	300	V
Anode dissipation	1.0	W
DC screen supply voltage	550	V
DC screen voltage	250	V
Screen dissipation	0.2	W
DC cathode current	6.0	mA
DC heater-cathode voltage	100	V
External grid cathode resistor ($p_a > 0.2$ W)	3.0	MΩ
External grid cathode resistor ($p_a < 0.2$ W)	10	MΩ
Bulb temperature	165	°C
Acceleration (continuous vibration)	2.5	g
Shock (short duration)	500	g

CAPACITANCES (Measured on a cold externally unscreened valve)

Grid to anode (max)	0.05	pF
Grid to all less anode	3.8	pF
Anode to all less grid	5.1	pF

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CHARACTERISTICS

Pentode Connection

	Min	Mean	Max	
DC anode voltage	–	250	–	V
DC screen voltage	–	140	–	V
DC suppressor voltage	–	0	–	V
Negative dc grid voltage	–	2.0	–	V
*DC anode current	2.15	3.0	3.85	mA
*DC screen current	–	0.60	0.85	mA
†DC grid current	–	0.05	0.40	μA
*Mutual conductance	1.55	2.00	2.45	mA/V
Internal anode resistance	–	2.5	–	MΩ
‡Inner amplification factor	34	38	42	
*§Grid hum	–	–	8	μV
*§Cathode hum	–	–	60	μV
*§Hiss	–	–	5	μV

*Approximately 99% of all samples lie within these limits.

†All samples lie within these limits.

‡Approximately 94% of all samples lie within these limits.

§These values refer to the equivalent rms voltage at g_1 and are measured in an amplifier specified by the Government Authority.

Triode Connection

DC anode, screen & suppressor voltage	250	V
Negative dc grid voltage (approx)	5	V
DC cathode current	4	mA
DC grid current	0.06	μA
Mutual conductance	2.0	mA/V
Internal anode resistance	16.5	kΩ
Amplification factor	33	

TYPICAL OPERATION

AF Amplifier. Pentode Connection

DC anode supply voltage	200	300	400	200	300	400	V
External anode load resistor	100	100	100	220	220	220	kΩ
DC cathode current	1.65	2.45	3.30	0.75	1.10	1.55	mA
External screen resistor	0.39	0.39	0.39	1.0	1.0	1.0	MΩ
External cathode bias resistor	1.0	1.0	1.0	2.2	2.2	2.2	kΩ
External grid resistor (max)	80	36	22	100	80	44	MΩ
Gain	106	116	124	170	188	200	
*Output voltage	40	64	87	36	54	73	V
*Total distortion	5	5	5	5	5	5	%
Following valve grid resistor	330	330	330	680	680	680	kΩ

*V_{out} and distortion at the start of positive grid current. At lower output values, the distortion is approximately proportional to the input voltage.

AF Amplifier. Triode Connection

$V_{a(b)}$	200	300	400	200	300	400	200	300	400	V
R_a	47	47	47	100	100	100	220	220	220	kΩ
I_a	1.85	2.70	3.70	1.0	1.5	2.0	0.50	0.80	1.05	mA
R_k	1.2	1.2	1.2	2.2	2.2	2.2	3.9	3.9	3.9	kΩ
R_{g1} (max)	33	9	4	72	21	9	100	60	24	MΩ
Gain	23.5	24.0	24.5	27.5	28.5	28.5	30.5	31.0	32.0	
*V_{out}	22	43	64	27.5	50	73	28	51	74	V
*D_{tot}	3.1	3.8	4.5	3.3	3.8	4.0	3.1	3.7	3.8	%
†R_g	150	150	150	330	330	330	680	680	680	kΩ

*V_{out} and distortion at the start of positive grid current. At lower output values, the distortion is approximately proportional to the input voltage.
†Following valve grid resistor.

INSTALLATION

The valve may be mounted in any position. The use of a retaining device is recommended. The valve is internally screened.

TESTING

These valves are manufactured in discrete lots, under carefully controlled conditions. Each lot is very comprehensively tested for electrical and mechanical properties in a manner specified by the relevant Government Authority.

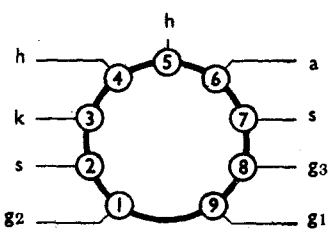
The limits imposed in the electrical tests are usually closer than those used in normal domestic or commercial valve testing, and include control on the spread of characteristic parameters.

Random samples are also taken from each lot, and subjected to specified destructive and electrical and mechanical life tests.

The lot is only released if it passes all the above tests, including the life tests.

The careful control of manufacture and the comprehensive testing and lot release system are designed to reduce microphony, the spread in electrical properties and the incidence of early failures, and to provide known life performance within the specified electrical and mechanical maximum ratings.

BASE CONNECTIONS AND VALVE DIMENSIONS



View from underside of base.

Base :	B9A
Bulb :	Tubular
Max overall length :	56 mm
Max seated length :	49 mm
Max diameter :	22.2 mm

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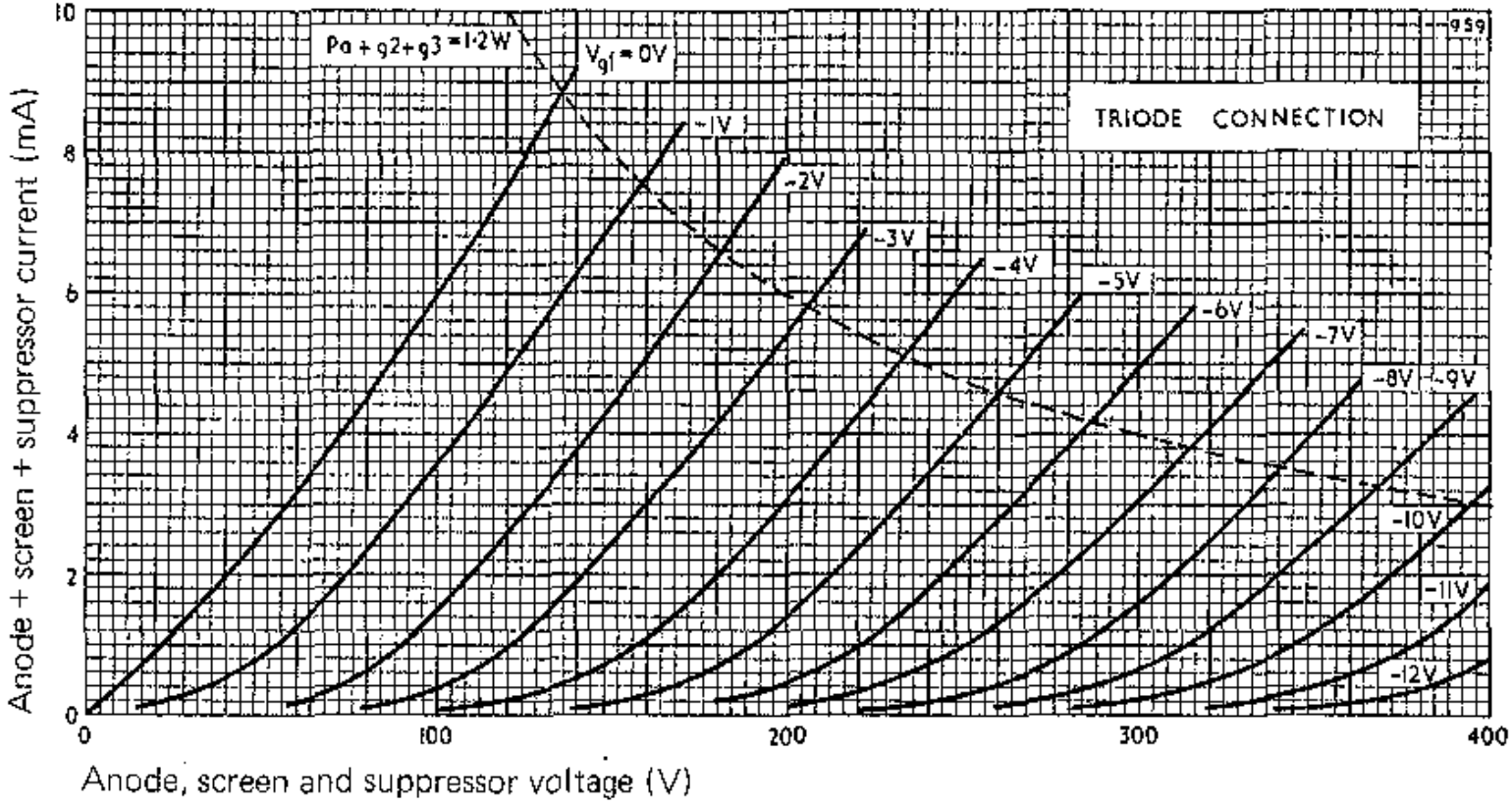
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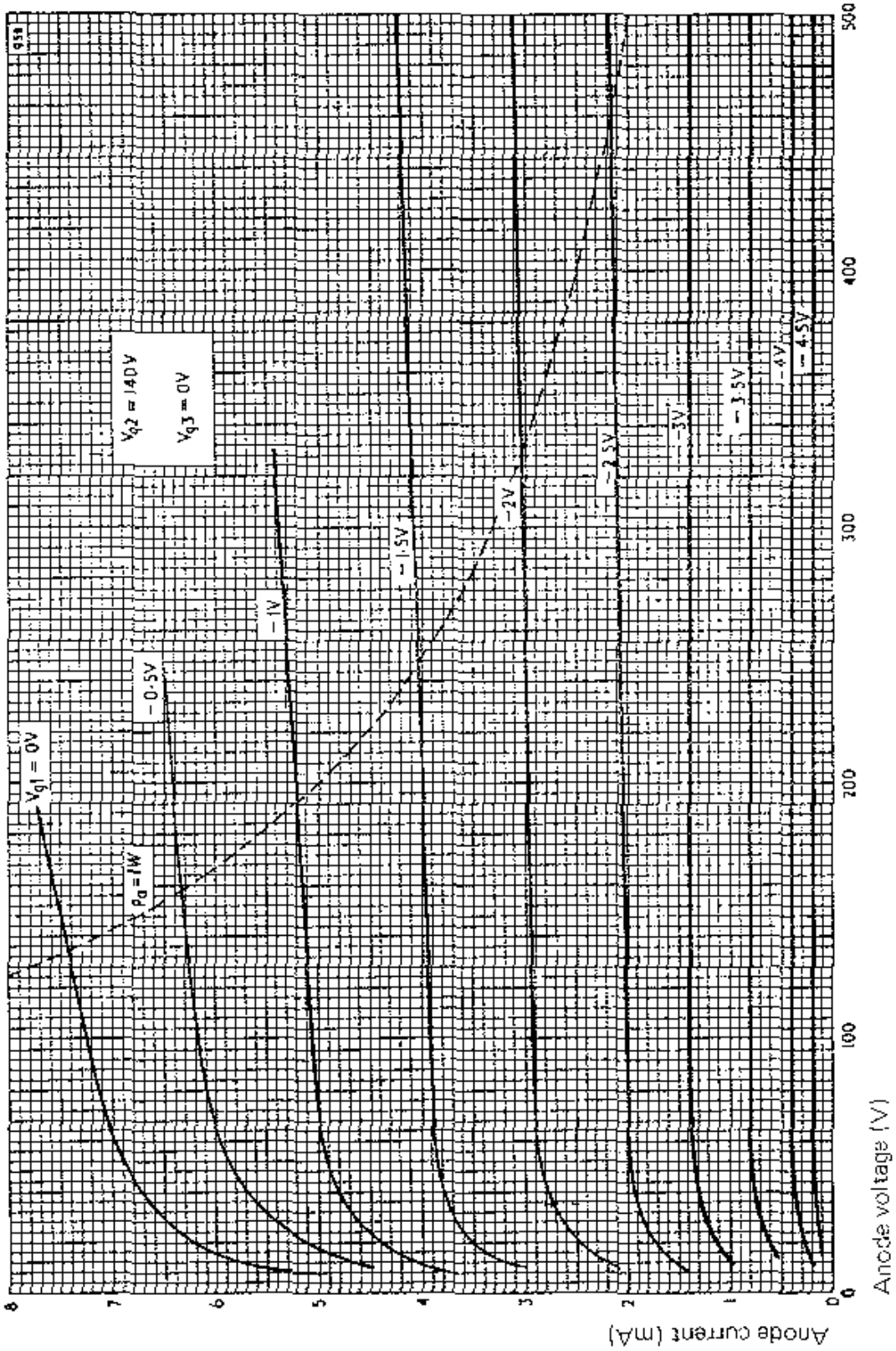
TRIODE CONNECTION
Pa + g2 + g3 = 1·2W
Vg1 = 0V
-1V
-2V
-3V
-4V
-5V
-6V
-7V
-8V
-9V
-10V
-11V
-12V
Anode + screen + suppressor current (mA)
Anode, screen and suppressor voltage (V)
0
2
4
6
8
10
0
100
200
300
400


Anode current (mA)
Anode voltage (V)
V_{g2} = 140V
V_{g3} = 0V
V_{g1} = 0V
P_a = 1W
-0·5V
-1V
-1·5V
-2V
-2·5V
-3V
-3·5V
-4V
-4·5V