

MINISTRY OF SUPPLY - DLAD/RRE.

VALVE ELECTRONIC

CV 4038

Specification <u>MOD/CV4038</u> .	<u>SECURITY</u>	
Issue 3 Dated 6.11.56.	<u>Specification</u> UNCLASSIFIED	<u>Valve</u> UNCLASSIFIED
To be read in conjunction with K1001, BS448 and BS 1409		

Indicates a change →

TYPE OF VALVE - Reliable Low Impedance Triode with Flexible Leads suitable for Series Stabiliser Service				<u>MARKING</u> K1001/4			
CATHODE - Indirectly heated							
ENVELOPE - Glass				<u>BASE</u> B9A/F			
PROTOTYPE - VX3208; E2359 <i>OK L2</i>							
<u>RATING</u> All limiting values are absolute				<u>CONNECTIONS</u>			
				Note	Lead	Electrode	
Heater Voltage	(V)	6.3	C	1	Internally connected		
Heater Current	(A)	0.95		2	Cathode	k	
Max. Anode Voltage	(V)	300		3	Anode	a	
Max. Anode Voltage at $I_a = 0$	(V)	500		4	Heater	h	
Max. Cathode Current	(mA)	120		5	Heater	h	
Max. Anode Dissipation	(W)	15		6	Grid	g	
Max. Heater-cathode Voltage (cathode positive)	(V)	250		7	Internally connected		
Mutual Conductance	(mA/V)	12.0	B	8	Internally connected		
Anode Impedance	(ohms)	375	B	9	Anode	a	
Amplification Factor		4.5	B	<u>DIMENSIONS</u> See K1001/A1/D11.			
Max. Bulb Temperature	(°C)	225	C				
Max. Shock (short duration)	(g)	500					
Max. Acceleration (continuous operation)	(g)	2.5					
<u>CAPACITANCES (pF)</u>					Dimension (mm)	Min.	Max.
C_{ag} (nom.)		10.0	D	A	-	66	
C_{in} (nom.)		6.8	D	B	19	22.2	
C_{out} (nom.)		3.0	D	D	38	-	
				<u>MOUNTING POSITION</u> Any			
<u>NOTES</u>							
B. Measured at $V_a = 150V$, $I_a = 100$ mA.							
C. <u>Caution to Electronic Equipment Design Engineers</u> : Special attention should be given to the temperature of valves to be operated in aircraft. Reliability will be seriously impaired if the maximum bulb temperature is exceeded. The life expectancy may be reduced if conditions other than those specified for life test are imposed on the valve and will be reduced appreciably if absolute maximum ratings are exceeded. Both reliability and performance will be jeopardised if heater voltage ratings are exceeded: life and reliability performance are directly related to the degree that regulation of the heater voltage is maintained at its centre-rated value.							
D. Measured without shield.							

To be performed in addition to those applicable in K1001

Tests shall be performed in the specified order unless otherwise agreed with the Inspection Authority.

Test Conditions - unless otherwise specified

Vh (V)

6.3

Va (V)

150

Ia (mA)

100

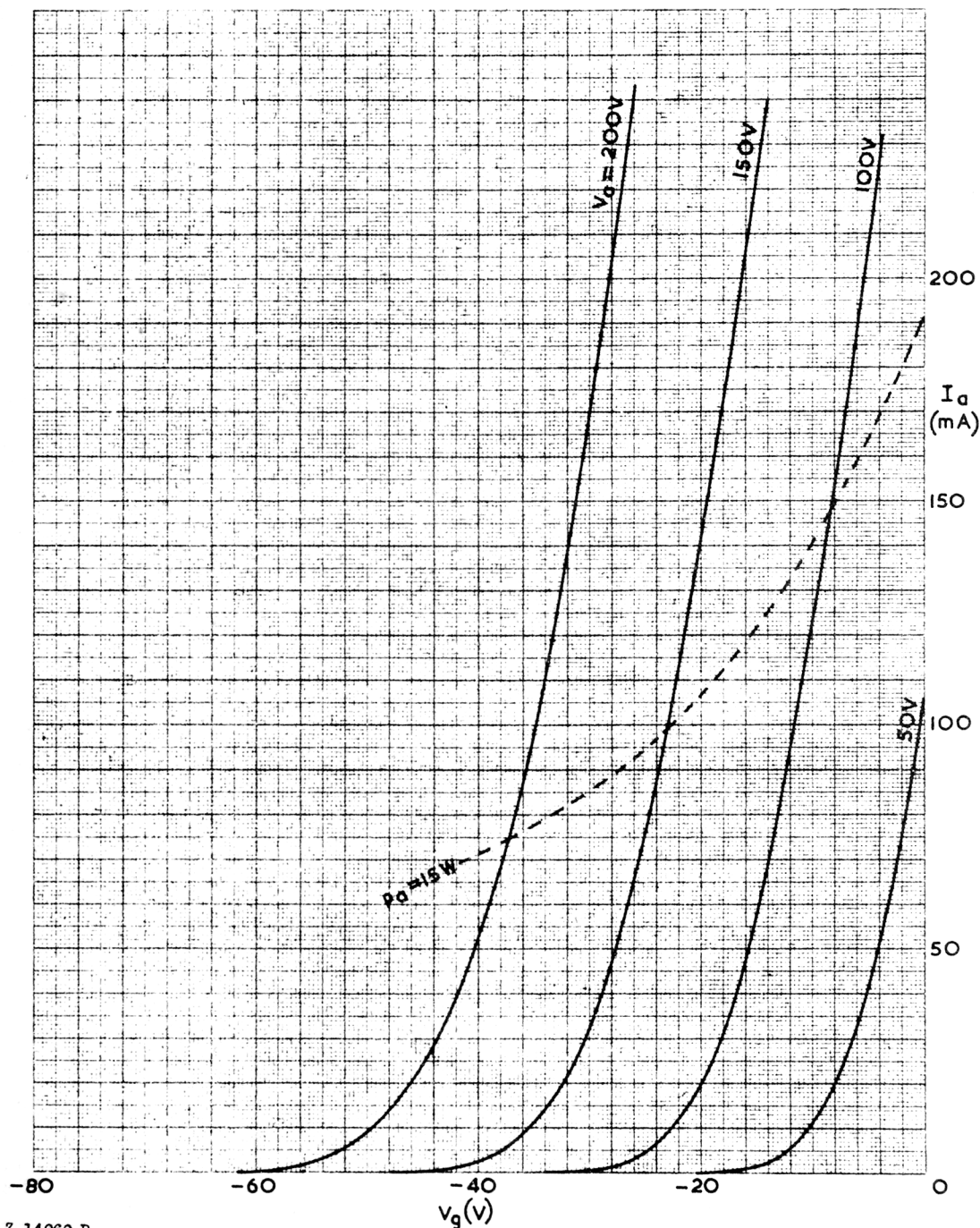
K1001	Test	Test Conditions	AQL %	Insp. Level	Sym- bol	Limits						Units
						Min	LAL	Bogey	UAL	Max	ALD	
7.1	Glass Strain	No voltages	6.5	I								
	<u>GROUP A</u> Insulation	Vg1-all = -100V Va - all = -300V		100% 100%	R R	100 100	- -	- -	- -	- -		MΩ MΩ
	Reverse Grid Current	Rg = 500kΩ Max		100%	IG	-	-	-	-	2.5		μA
	<u>GROUP B</u> Heater Current Heater Cathode Leakage Current Negative Grid Voltage Mutual Conductance Negative Grid Cut-off Voltage	Combined AQL Vhk = 250V cathode positive to heater Va = 100V Ia = 2 mA	1.0 0.65 0.65 0.65 0.65 0.65	II II V2 II V2 II	Ih Ihk Ihk Vg Vg gm gm Vg	0.85 - - 18 - 9 - -	- - - 21.5 - 10.5 -	- - - 24 - 12.0 -	- - 10 - 26.5 - 13.5 -	1.05 50 - 29 - 15 - 35	 5.55 3.33	A μA μA V V mA/V mA/V V
11.1	<u>GROUP C</u> Emission Vibration Noise	Va = Vg = 15V Va(b) = 150V RL = 2k, Rk = 150 Ck = 200 μF	2.5 2.5	I I	Ia+g VaAC	200 -	- -	- -	- -	- 75		mA mV r.m.s.
5.12	<u>GROUP D</u> Amplification Factor Lead Fragility Capacitances Cathode Heating Time	No voltages Measured on 1 MΩ Bridge with the valve mounted in a fully screened socket. No shield. Va = 170V Vg = 0 Rk = 230 ohms / 80 Measure time for Ia = 100 mA Note 2.	6.5 6.5 6.5 6.5	IA IA IC IA	μ Ca, g C in C out thk	3.5 8.5 5.0 2.0 -	- - - - -	- 10.0 6.8 3.0 -	- - - - -	5.5 11.5 8.4 4.0 40		pF pF pF secs.

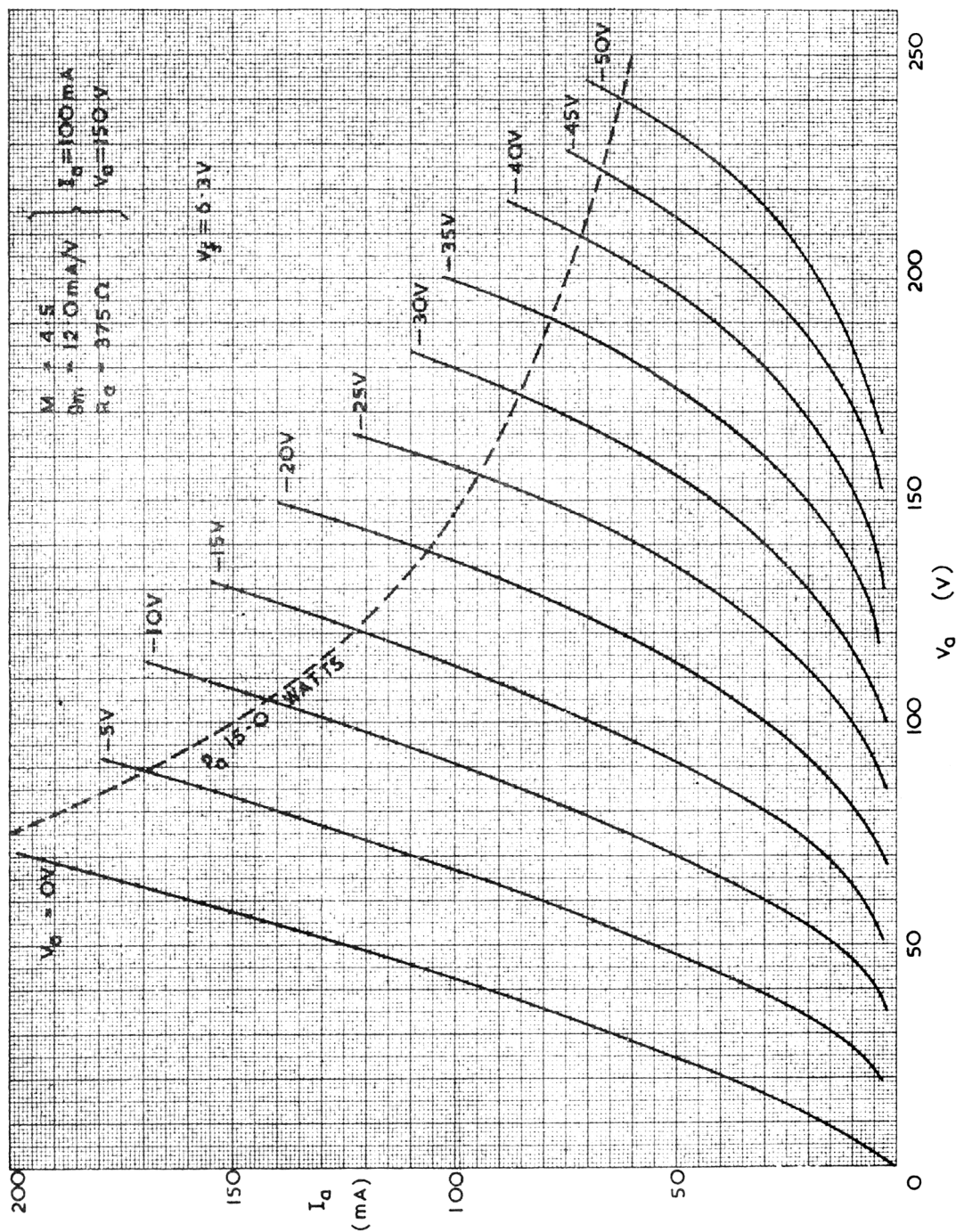
K1001	Test	Test Conditions	AQL %	Insp. Level	Sym- bol	Limits						Units
						Min	LAL	Bogey	UAL	Max	ALD	
11.2	<u>GROUP E</u> Resonance Search	Va(b) = 150V, RL=1k Ω Frequency 25-500 c/s	2.5	IC	VaAC f	- 200	-	-	-	Record	-	mV rms c/s
	Fatigue Test	Vh = 6.9V switched 1 min. on, 3 mins. off Va = 0. Min. peak Acceleration = 5g Duration = 30, 39, 30 hrs Frequency = 170 c/s		IA								
	<u>Post Fatigue Tests</u>	Combined AQL	6.5									
11.1	Vibration Noise	Note 1	2.5		Va(AC)	-	-	-	-	100		mV rms
	Heater Cathode				Ihk	-	-	-	-	100		μ A
	Leakage Current	Vhk = 250V	2.5		Ig	-	-	-	-	5.0		μ A
	Reverse Grid Current	Rg = 500k Ω Max	2.5		gm	8	-	-	-	-		mA/V
11.5	<u>Shock Test</u>	Hammer Angle = 30° No voltages.		IA								
	<u>Post Shock Tests</u>	Combined AQL	6.5									
11.1	Vibration Noise	Note 1	2.5		Va(AC)	-	-	-	-	100		mV rms
	Heater Cathode				Ihk	-	-	-	-	100		μ A
	Leakage Current	Vhk = 250V	2.5		Ig	-	-	-	-	5.0		μ A
	Reverse Grid Current	Rg = 500k Ω Max	2.5		gm	8	-	-	-	-		mA/V
	Mutual Conductance		2.5									
A VI/ 5	<u>GROUP F</u> Life	Vhk = 200V, 50c/s Va = 120 V Ia = 125mA										
A VI/ 5.1	<u>Stability Life Test</u> Change in Mutual Conductance		1.0	I	Δ gm	-	-	-	-	10		%
A VI/ 5.3	<u>Intermittent Life Test</u>	See above		IA								
	<u>Life Test End-point (500 hours)</u>	Combined AQL	6.5									
	Inoperatives		2.5									
	Heater Current		2.5		Ih	0.85	-	-	-	1.05		A
	Heater Cathode				Ihk	-	-	-	-	50		μ A
	Leakage Current	Vhk = 250V	2.5		Ig	-	-	-	-	3.0		μ A
	Reverse Grid Current	Rg = 500k Ω Max	2.5		gm	8.5	-	-	-	15		mA/V
	Mutual Conductance		2.5		Δ gm	-	-	-	-	15		%
	do, Average change				Vg	17	-	-	-	29		V
	Negative Grid Voltage		4.0									
	Insulation	Vg-all= -100V) Va-all= -300V)	4.0		R	50	-	-	-	-		M Ω

K1001	Test	Test Conditions	AQL %	Insp. Level	Symbol	Limits						Units
						Min	LAL	Bogey	UAL	Max	ALD	
	<u>GROUP F (Cont'd)</u>											
	<u>Life Test End-point (1000 hours)</u>	Combined AQL	10.0									
	Inoperatives		4.0									
	Heater Current		4.0		Ih	0.85	-	-	-	1.05		A
	Heater Cathode Leakage Current	Vhk = 250V	4.0		Ihk	-	-	-	-	50		μA
	Reverse Grid Current	Rg = 500kΩ Max	4.0		Ig	-	-	-	-	3.5		μA
	Mutual Conductance		4.0		gm	8.0	-	-	-	-		mA/V
	Negative Grid Voltage		6.5		Vg	16	-	-	-	29		V
	<u>GROUP G</u>											
A IX/ 2.5	Electrical Re-test after 28 days holding period			100%								
	Inoperatives		0.5									
	Reverse Grid Current	Rg = 500kΩ Max	0.5		Ig	-	-	-	-	3.5	-	μA

NOTES

1. The test conditions for Vibration Noise in Group C shall apply.
2. Valve to be cold when plugged into socket or switched on. A cold valve is one which has had its heater supply switched off for at least 2 hours.



VALVE
 ELECTRONIC
 TYPE
CV4038


SPECIFICATION MOS/CV4038

ISSUE 3 DATED 6.11.56

AMENDMENT No.1

Page 2 TESTS

Group D Cathode Heating Time.
 Under Test Conditions Col:
 Amend $R_K = 230$ ohms to read $R_K = 180$ ohms

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R.R.E.



N.70803/D