

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

July 1959

R.R.E.

N.70803/D

MINISTRY OF SUPPLY - DLAD/RRE.

VALVE ELECTRONIC

CV 4038

Specification <u>MDG/CV4038</u> . Issue 3 Dated 6.11.56. To be read in conjunction with K1001, B844B and BS 1409	<u>SECURITY</u>	
	<u>Specification</u> UNCLASSIFIED	<u>Valve</u> UNCLASSIFIED

Indicates a change →

TYPE OF VALVE - Reliable Low Impedance Triode with Flexible Leads suitable for Series Stabiliser Service				<u>MARKING</u>		
CATHODE - Indirectly heated				K1001/4		
ENVELOPE - Glass				<u>BASE</u>		
PROTOTYPE - VX3208; E2359				B9A/F		
<u>RATING</u>				<u>CONNECTIONS</u>		
All limiting values are absolute				Lead	Electrode	
		Note				
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			
Max. Bulb Temperature	(°C)	225	C			
Max. Shock (short duration)	(g)	500				
Max. Acceleration (continuous operation)	(g)	2.5				
				<u>DIMENSIONS</u>		
				See K1001/A1/D11.		
<u>CAPACITANCES (pF)</u>				Dimension (mm)	Min.	Max.
C <sub>g</sub> (nom.)		10.0	D	A	-	66
C <sub>i</sub> (nom.)		6.8	D	B	19	22.2
C <sub>out</sub> (nom.)		3.0	D	D	38	-
				<u>MOUNTING POSITION</u>		
				Any		

NOTESB. Measured at  $V_a = 150V$ ,  $I_a = 100 mA$ .

C. Caution to Electronic Equipment Design Engineers: 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.

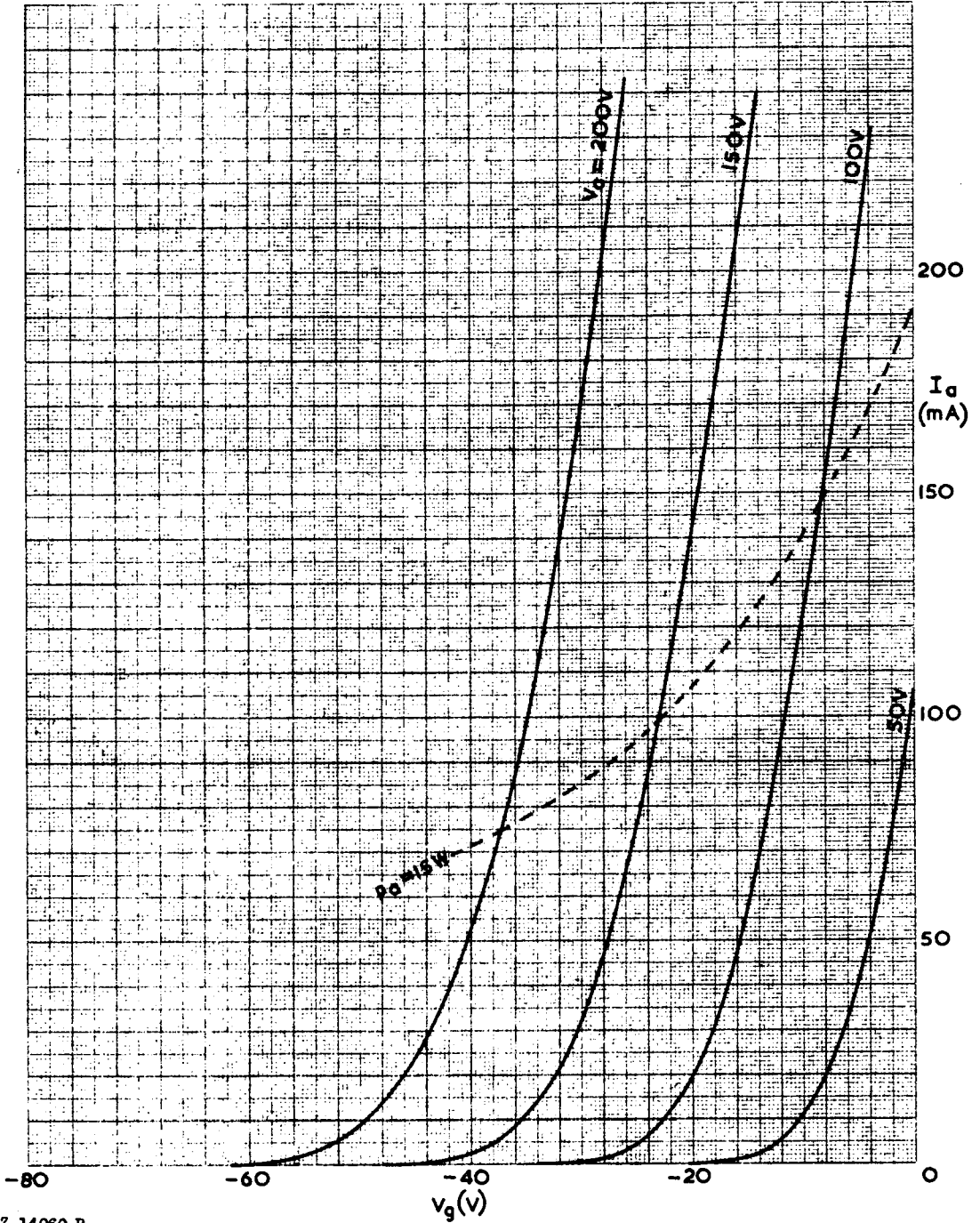
Test Conditions - unless otherwise specified												
		Vh (V)	Va (V)			Ia (mA)						Units
		6.3	150			100	Limits					
K1001	Test	Test Conditions	AQL %	Insp. Level	Sym-bol	Min	LAL	Bogay	UAL	Max	ALD	Units
→ 7.1	Glass Strain	No voltages	6.5	I								
	<b>GROUP A</b>											
	Insulation	Vg1-all--100V Va - all--300V		100% 100%	R R	100 100	- -	- -	- -	- -		MΩ MΩ
	Reverse Grid Current	Rg = 500kΩ Max		100%	Ig	-	-	-	-	2.5		μA
	<b>GROUP B</b>	Combined AQL	1.0									
	Heater Current		0.65	II	th	0.85	-	-	-	1.05		A
	Heater Cathode Leakage Current	Vhk = 250V cathode positive to heater	0.65	II V2	thk thk	- -	- -	- -	10	-		μA μA
	Negative Grid Voltage		0.65	II V2	Vg Vg	18 -	- 21.5	- 24	- 26.5	29 -	5.55	V V
	Mutual Conductance		0.65	II V2	gm gm	9 -	- 10.5	- 12.0	- 13.5	15 -	3.33	mA/V mA/V
	Negative Grid Cut-off Voltage	Va = 100V Ia = 2 mA	0.65	II	Vg	-	-	-	-	35		V
	<b>GROUP C</b>											
→ 11.1	Emission	Va = Vg = 15V	2.5	I	Ia+g	200	-	-	-	-		mA
	Vibration Noise	Va(b) = 150V RL = 2k, Rk = 150 Ck = 200 μF	2.5	I	VaAC	-	-	-	-	75		mV r.m.s.
	<b>GROUP D</b>											
5.12	Amplification Factor		6.5	IA	μ	3.5	-	-	-	5.5		
	Lead Fragility	No voltages	6.5	IA								
	Capacitances	Measured on 1Moh Bridge with the valve mounted in a fully screened socket. No shield.	6.5	IC	Ca,g C in C out	8.5 5.0 2.0	- - -	10.0 - 3.0	- - -	11.5 8.4 4.0		pF pF pF
	Cathode Heating Time	Va = 170V Vg = 0 Rk = 230 ohms Measure time for Ia = 100 mA Note 2.	6.5	IA	thk	-	-	-	-	40		secs.

K1001	Test	Test Conditions	AQL %	Insp. Level	Symbol	Limits						Units
						Min	LAL	Bogey	UAL	Max	ALD	
11.2	<u>GROUP E</u>											
	Resonance Search	Va(b) = 150V, RL=1kΩ 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											
	Leakage Current	Vhk = 250V	2.5		Ihk	-	-	-	-	100		μA
	Reverse Grid Current	Rg = 500kΩ Max	2.5		Irg	-	-	-	-	5.0		μA
	Mutual Conductance		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											
	Leakage Current	Vhk = 250V	2.5		Ihk	-	-	-	-	100		μA
	Reverse Grid Current	Rg = 500kΩ Max	2.5		Irg	-	-	-	-	5.0		μA
	Mutual Conductance		2.5		gm	8	-	-	-	-		mA/V
A VI/ 5	<u>GROUP F</u>											
	Life	Vhk = 200V, 50c/s Va = 120 V Ia = 125mA										
	<u>Stability Life Test</u>											
A VI/ 5.1	Change in Mutual Conductance		1.0	I	Δgm	-	-	-	-	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											
	Leakage Current	Vhk = 250V	2.5		Ihk	-	-	-	-	50		μA
	Reverse Grid Current	Rg = 500kΩ Max	2.5		Irg	-	-	-	-	3.0		μA
	Mutual Conductance		2.5		gm	8.5	-	-	-	15		mA/V
	do. Average change				Δgm	-	-	-	-	15		%
	Negative Grid Voltage		4.0		Vg	17	-	-	-	29		V
Insulation	Vg-all= -100V ) Va-all= -300V )	4.0		R	50	-	-	-	-		MΩ	

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 26 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

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DATA SHEET

