

C.V. 4105

Specification M.O.A./CV.4105 Issue No.1A Dated 9.2.1961 To be read in conjunction with K.1001, BS448 and BS1409.		<u>CLASSIFICATION</u> <u>Valve</u> Unclassified		<u>Specification</u> Unclassified	
→ indicates a change					
Type of Valve:- Reliable U.H.F. Low Noise Grounded Grid Triode. Cathode:- Indirectly Heated. Envelope:- Glass. Prototype:- VX3527, CV2453			<u>MARKING</u> K1001/4		
			<u>BASE</u> BS448/B9A		
<u>RATINGS</u> (All limiting values are absolute)			<u>CONNECTIONS</u>		
Heater Voltage	(V)	6.3	PIN	<u>ELECTRODE</u>	
Heater Current	(A)	0.37	1	Control Grid	g
Max. Anode Voltage	(V)	200	2	Cathode	k
Max. Anode Dissipation	(W)	2.5	3	Control Grid	g
Max. Grid Voltage	(V)	0	4	Control Grid	g
Min. Grid Voltage	(V)	-20	5	Anode	a
Max. Cathode Current	(mA)	20	6	Control Grid	g
Max. Heater-Cathode Voltage	(V)	100	7	Heater	h
Max. Bulb Temperature	(°C)	180	8	Heater	h
Max. Shock (Short Duration)	(g)	500	9	Control Grid	g
Max. Acceleration (Continuous Operation)	(g)	2.5	<u>DIMENSIONS</u> BS448/B9A/2.1.		
Mutual Conductance	(mA/V)	14	A		
Amplification Factor		50	A		
Noise Factor	(dB)	11.5	A		
<u>CAPACITANCES (pF) NOTE B.</u>			<u>MOUNTING POSITION</u>		
Cin (nom)		4.5	Any		
Cak (nom)		0.085			
Cout (nom)		1.8			
<u>NOTES</u>					
A. Measured at Va(b) 180V, RL = 3.3kΩ. Rk = 68Ω.					
B. Valve screened.					
C. The Joint Service Catalogue Number is 5960-99-037-2293.					

To be performed in addition to those applicable in K1001.

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

Test Conditions:- Unless otherwise specified												
		Vh (V)	Va(b) (V)	RL (kΩ)	Rk (Ω)	Vg (V)						
		6.3	180	3.3	68	C						
K1001 Ref.	Test	Test Conditions	AQL %	Insp. Level	Symbol	Limits						Units
						Min.	LAL	Bogey	VAL	Max.	ALD	
7.1	Class Strain	No voltages	6.5	I	-	-	-	-	-	-	-	-
	<u>Group A</u>											
	Electrode Insulation	Vh = 6.3V Note 1 Vg1 -all = -20V Va -all = -250V	-	100%	R	20	-	-	-	-	-	MΩ
			-	100%	R	100	-	-	-	-	-	MΩ
	Reverse Grid Current (1)	Vg1 = -1.0V Rg1 = 500KΩ max	-	100%	-Igl	-	-	-	-	1.0	-	μA
	<u>Group B</u>											
		Combined AQL	1.0									
5.3	Heater Current		0.65	II	Ih	330	-	370	-	410	-	mA
	Heater Cathode Leakage Current	Vhk = ± 100V Note 2 Vhk = -100V Cathode posi- tive	0.65	II	Ihk	-	-	-	-	10	-	μA
				V2	Ihk	-	-	-	2	-	-	μA
	Anode Current (1)		0.65	II	Ia	11.5	-	-	-	20	-	mA
				V2	Ia	To be recorded and agreed later						mA
	Mutual Conductance	Max. grid input signal 100mV r.m.s. Note 3	0.65	II	gm	11.0	-	-	-	18.5	-	mA/V
				V2	gm	To be recorded and agreed later						
	<u>Group C</u>											
		Combined AQL	6.5									
	Anode Current (2)	Vg = -4.0V	2.5	I	Ia	-	-	-	-	2.6	-	mA
	Reverse Grid Current (2)	Vh=6.9V, Vg1=-1.0V Rg1 = 500KΩ max Notes 4 and 5	2.5	I	-Igl	-	-	-	-	2.0	-	μA
	Change of Mutual Conductance	Vh = 5.7V Notes 5 & 6	2.5	I	gm	-	-	-	-	15	-	%
11.1	Vibration Noise	RL = 2kΩ Va(b) = 250V Rk = 80Ω Ck = 100μF Cc = 0.1μF Note 7	2.5	I	Va AC	-	-	-	-	15	-	mV rms
	Noise Factor	F = 900 Mc/s Note 8	4.0	I	N	-	-	-	-	12.7	-	dB

K1001 Ref.	Test	Test Conditions	AQL %	Insp. Level	Symbol	Limits						Units	
						Min.	LAL	Sogey	VAL	Max.	AUD		
	<u>Group D</u>												
7.2	Base Strain	No voltages	6.5	IA	-	-	-	-	-	-	-	-	
AIII	Capacitances	Measured on a 1 Mc/s bridge with valve mounted on a fully shielded socket. Valve Screened Note 10.	6.5	IC	Cin	3.6	-	4.5	-	5.4	-	-	pF
					Cak	-	-	-	0.11	-	-	pF	
					Cout	1.4	-	1.8	-	2.2	-	-	pF
11.2	Resonance Search	RL = 2kΩ Va(b) = 250V Frequency (1) 25-200c/s (2) 200-500c/s (3) 500-2500c/s	2.5	IC	Va								
					VaAC)	To be recorded and agreed later						mVrms	
					VaAC)							mVrms	
					VaAC)							mVrms	
11.3	Fatigue	Vh = 6.3V Note 9	-	IA									
	<u>Post Fatigue Tests</u>												
		Combined AQL	4.0	-	-	-	-	-	-	-	-	-	
5.3	Heater Cathode Leakage Current	Vhk = ± 100V	2.5	-	Ihk	-	-	-	-	20	-	μA	
	Reverse Grid Current (1)	Vg1 = -1.0V Rg1 = 500kΩ max	2.5	-	-Ig1	-	-	-	-	1.5	-	μA	
	Mutual Conductance	As in Group A	2.5	-	gm	10.5	-	-	-	-	-	mA/V	
11.1	Vibration Noise	As in Group C	2.5	-	VaAC	-	-	-	-	25	-	mVrms	
11.4	Shock												
	<u>Post Shock Tests</u>												
		Combined AQL	4.0	-	-	-	-	-	-	-	-	-	
5.3	Heater Cathode Leakage Current	Vhk = ± 100V	2.5	-	Ihk	-	-	-	-	20	-	μA	
	Reverse Grid Current (1)	Vg1 = -1.0V Rg1 = 500kΩ max	2.5	-	-Ig1	-	-	-	-	1.5	-	μA	
	Mutual Conductance	As in Group A	2.5	-	gm	10.5	-	-	-	-	-	mA/V	
11.1	Vibration Noise	As in Group C	2.5	-	VaAC	-	-	-	-	25	-	mVrms	
11.4	Shock												
AVI/5	<u>Group F</u> Life												
AVI/5.1	<u>Stability Life</u> (1 hour)												
	Change in Mutual Conductance		1.0	I	Δgm	-	-	-	-	10	-	%	

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Tests (cont'd)

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K1001 Ref.	Test	Test Conditions	AQL %	Insp. Level	Symbol	Limits						Units
						Min.	LAL	Bogey	VAL	Max.	ALD	
AVI/ 5.3	<u>Intermittent Life</u> <u>Test Point</u> <u>500 Hrs.</u>	Combined AQL	6.5	IA	-	-	-	-	-	-	-	-
AVI/ 5.6	Inoperatives		2.5	-	-	-	-	-	-	-	-	-
5.3	Heater Cathode Leakage Current	Vhk = ± 100V	2.5	-	Ihk	-	-	-	-	25	-	μA
	Reverse Grid Current (1)	Vg1 = -1.0V Rg1 = 500k(Ω) max	2.5	-	-Ig1	-	-	-	-	1.5	-	μA
	Mutual Conductance	As in Group B	2.5	-	gm	8	-	-	-	-	-	mA/V
	Average Change in Mutual Conductance		-	-	Δgm	-	-	-	-	22.5	-	%
	Electrode Insulation	Vh = 6.3V Vg1 -all = -20V Va -all = -250V	4.0	-	-	-	-	-	-	-	-	-
			-	-	R	10	-	-	-	-	-	MΩ
			-	-	R	50	-	-	-	-	-	MΩ
	Noise Factor	F = 900 Mc/s Note 8	4.0	-	N	-	-	-	-	14	-	dB
AVI/ 2.5	<u>Group C</u> Electrical retest after 28 days holding period		-	100%								
AVI/ 5.6	Inoperatives		0.5	-	-	-	-	-	-	-	-	-
	Reverse Grid Current (1)	As in Group A	0.5	-	-Ig1	-	-	-	-	1.5	-	μA

NOTES

1. Heater strapped to cathode and considered as a single electrode.
2. Heater positive and negative successively.
3. Measured in a Mutual Conductance bridge, frequency 1 Kcps., or any other approved method.
4. Prior to this test the valve shall be preheated for five minutes under the test conditions.
5. $-I_g$ shall not be rising or out of limit after a minimum time of 10 minutes, (including preheating time).
6. The change of gm is expressed thus:- $\frac{gm \text{ at } 6.3V - gm \text{ at } 5.7V}{gm \text{ at } 6.3V}$
7. The valve shall be mounted so that the direction of vibration is parallel to the minor axis of the electrode structure. The vibration frequency shall be any fixed frequency within the range 25-100 c.p.s. The min. peak acceleration = 2g. The test shall be of sufficient duration to obtain a steady reading of noise output.
8. To be measured in an approved circuit. (See Figs.1 & 2 on page 5). See Specn. CV2453.
9. Valves shall be vibrated in each of three required planes for not less than 30 hrs. and not less than 99 hours (30 + 39 + 30 hrs.). Heater switched one minute on and three minutes off. No other voltages. Min. peak acceleration = 5g. Frequency = 170 c.p.s.
10. Capacitance connections as follows:-

Capacitance	H.P.	L.P.	E
Cin	2, 7, 8	1, 3, 4, 6, 9, C	5
Cek	H.P.	5	1, 3, 4, 6, 9, C
Cout	5	1, 3, 4, 6, 9, C	2, 7, 8

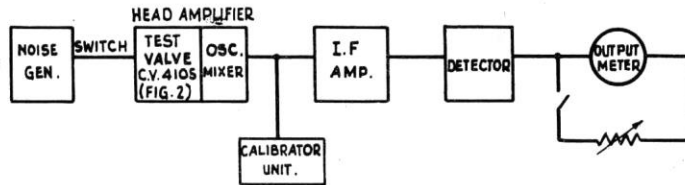


FIG.1 NOISE FACTOR SCHEMATIC DIAGRAM.

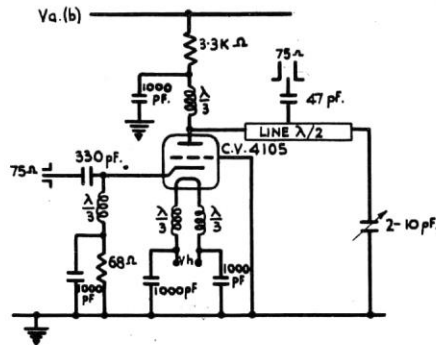


FIG.2. HEAD AMPLIFIER VALVE TEST CIRCUIT.