

SPECIFICATION M.O.A./CV.6091 ISSUE No. 1 DATED 1.9.61 To be read in conjunction with K.1001, BS.448 and BS.1409	<table border="1"> <tr> <th colspan="2">SECURITY</th></tr> <tr> <th>SPECIFICATION</th><th>VALVE</th></tr> <tr> <td>Unclassified</td><td>Unclassified</td></tr> </table>	SECURITY		SPECIFICATION	VALVE	Unclassified	Unclassified
SECURITY							
SPECIFICATION	VALVE						
Unclassified	Unclassified						

TYPE OF VALVE: Double Triode (with separate cathodes)	<u>MARKING</u>
CATHODE: Indirectly Heated	See K.1001/4
ENVELOPE: Glass	<u>BASE</u>
PROTOTYPE: A.2900	BS448 /B9A/1.1

RATINGS			NOTES		CONNECTIONS	
(All limiting Values are absolute)					Pin	Electrode
Heater Voltage	(V)	12.6	A,C	1	Anode 2	a"
Heater Current	(A)	0.2	C	2	Grid 2	g"
Max. Heater Cathode Voltage	(V)	±250	A,B,C	3	Cathode 2	k"
Max. Anode Voltage (I _{amo})	(V)	550	A,D	4	Heater	h
Max. Operating Anode Voltage	(V)	500	A,D	5	Heater	h
Max. Negative Grid Voltage	(V)	100	D	6	Anode 1	a'
Max. Anode Dissipation	(W)	3.5	A,D,E	7	Grid 1	g'
Max. Anode Current	(mA)	12.0	A,D	8	Cathode 1	k'
Max. Grid Resistance (Fixed Bias)	(MΩ)	1.5	A,D	9	Heater	hot
Max. Grid Resistance (Auto Bias)	(MΩ)	3.0	A,D		(centre tap)	
Max. Bulb Temperature	(°C)	180	A			

CAPACITANCES (pF)		TYPICAL OPERATING CONDITIONS		DIMENSIONS		
C in', C in"	3.0	Va	(V)	250	BS.448/B9A/2.1 Size Ref. No. 2	
C out'	0.32	Vg	(V)	0		
C out"	0.23	Rk	(Ω)	200	Dimension (m.m.)	Min. Max.
Ca'g', Ca"g"	2.6	Ia	(mA)	10.0	'A' Seated height	43 49
Ca'g'	0.08	gm	(mA/V)	6.2	'C' Diameter	19 22.2
Ca"g'	0.11	μ		62	'D' Overall height	49 56
Ca'a"	0.68	ra	(kΩ)	10	MOUNTING POSITION	
Ch-k+all	9.3				Any	

NOTES
A. This valve is essentially a long life valve, (average life expectancy is 10,000 hours) and this may be expected if (1) Heater voltage is maintained within the limits of +2.5% and -0%. (2) Valve heaters switched not more than 12 times per 24 hours and (3) Environment completely static.
B. To ensure a long life this voltage should not exceed ±100V.
C. Centre tapped heater. For operation at 6.3V, connections should be made to pins 4 and 5 strapped together and pin 9.
D. Each section.
E. With both sections operating the total anode dissipation must not exceed 6.0 watts.
F. The Joint Services Catalogue Number is: 5960-99-037-2477.

TESTS

To be performed in addition to those applicable in K.1001.

TEST CONDITIONS: Unless otherwise specified:-									
	V _h (V)	V _{a(b)} (V)	V _g (V)	R _k (Ω)	G _k (μ F)				
	12.6	250	0	200	100C				
K.1001 Ref.	Test	Test Conditions	AQL %	Insp. Level	Symbol	LIMITS			Units
						Min.	Bogey	Max.	
	Insulation	<u>Group A</u> V _g -all = -100V d.c. V _a -all = -300V d.c.		100% 100%	R R	100 100	- -	- -	M. Ω M. Ω
	Reverse Grid	R _g = 3M Ω max. Note 1,2		100%	-I _g	-	-	0.1	μ A
		<u>Group B</u> Combined AQL	1.0						
	Heater Current		0.65	II	I _h	0.19	0.20	0.21	A
	Heater Cathode Leakage Current	V _{hk} = $\pm$ 100V d.c. Note 3	0.65	II	I _{hk}	-	-	6.0	μ A
	Anode Current (1)	Note 4	0.65	II	I _a (1)	8.4	10.0	11.6	mA
	Anode Current (2)	V _g = -11.0V d.c. Note 4	0.65	II	I _a (2)	-	-	10	μ A
	Mutual Conductance	Note 4	0.65	II V2	g _m	5.3	6.2	7.0	mA/V
		<u>Group C</u> Combined AQL	1.5						
	Anode Current Difference (between sections)		1.0	I	I _a	-	-	1.25	mA
	Mutual Conductance Difference (between sections)		1.0	I	g _m	-	-	1.0	mA/V
	Mutual Conductance	V _h = 11.4V Note 5	1.0	I	g _m	4.9	-	-	mA/V
AIII	Amplification Factor	<u>Group D</u>	6.5	IC	μ	52	62	72	-
	Capacitances	Measured on a 1 Mc/s bridge with the valve mounted in a fully shielded socket. Valve unscreened. Note 7.	6.5	IC					

K.1001 Ref.	Test	Test Conditions	AQL %	Insp. Level	Symbol	LIMITS			Units
						Min.	Bogey	Max.	
					C in'	2.5	3.0	3.5	pF
					C out'	0.24	0.32	0.40	pF
					Ca'-g'	2.0	2.6	3.2	pF
					C in"	2.5	3.0	3.5	pF
					C out"	0.1	0.23	0.36	pF
					Ca"-g"	2.0	2.6	3.2	pF
7.1	Glass Strain	<u>Group E</u> No voltages	6.5	I	-	-	-	-	-
7.2	Base Strain	No voltages	6.5	IA	-	-	-	-	-
AVI/5	Life	<u>Group F Note 4</u> Vh=12.6V, Va(b) = 250V Rk = 200 Rg = 3mA max. Ck = 1000 uF, Vhk = 100V r.m.s.	-	-	-	-	-	-	-
AVI/5.1	<u>Stability Life</u> (1 hour)								
	Change in Mutual Conductance		1.0	I	Δgm	-	-	10	%
AVI/5.3	<u>Intermittent Life</u>								
	<u>Test Point 1000 hours</u>								
		Combined AQL	4.0	IA	-	-	-	-	-
AVI/5.6	Inoperatives		2.5	-	-	-	-	-	-
	Heater Cathode Leakage Current	As in Group B	2.5	-	Ihk	-	-	8.0	μA
	Anode Current (1)	Note 4	2.5	-	Ia	8.0	-	-	mA
	Mutual Conductance		2.5	-	gm	5.25	-	-	mA/V
	Reverse Grid Current	As in Group A	2.5	-	-Igl	-	-	0.12	μA
	Interface Resistance	Note 6	2.5	-	Ri	-	-	12	
AIX/2.5	Electrical Retest after 28 days holding period.	<u>Group G</u>	100%	-	-	-	-	-	-
AVI/5.6	Inoperatives		0.5	-	-	-	-	-	-
	Reverse Grid Current	As in Group A	0.5	-	-Igl	-	-	0.12	μA

NOTES

1. Both sections operating, total grid current to be measured.
2. This test shall be performed with heaters connected in parallel at 6.3V.
3. Test with both sections connected together.
4. Both sections operating, test each section separately.
5. Preheat the valves at $V_h = 11.4V$, $V_a(b) = 250V$, $R_k = 200\Omega$, $R_g = 3M\Omega$ (both sections operating) for five minutes before testing. Test each section separately.
6. This test to be performed in an approved equipment.
7. The connections for the measurement of the valve capacitances shall be:-

Capacitance	H.P.	L.P.	E.
C in'	7	4,5,8,9,G	1,2,3,6 C
C out'	6	4,5,8,9,G	1,2,3,7 C
Ca'-g'	6	7	1,2,3,4,5,8,9,C
C in"	2	3,4,5,9,G	1,6,7,8 C
C out"	1	3,4,5,9,G	2,6,7,8 C
Ca" g"	1	2	3,4,5,6,7,8,9,C

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ELECTRONIC VALVE SPECIFICATION

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AMENDMENT NO. 1

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Capacitance:- C in ', C out', C in", and C out",
transfer the symbol 'C' in the column headed "L.P." to
the column headed 'E'.

Royal Aircraft Establishment.

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