

<p>Specification MOA/CV6001 Issue 2 dated 5th November 1959 To be read in conjunction with K1001 except where otherwise stated.</p>	<table> <tr> <td data-bbox="718 194 1014 347"> <p><u>SECURITY</u> <u>SPECIFICATION</u> Unclassified</p> </td><td data-bbox="1014 194 1200 347"> <p><u>VALVE</u> Unclassified</p> </td></tr> </table>	<p><u>SECURITY</u> <u>SPECIFICATION</u> Unclassified</p>	<p><u>VALVE</u> Unclassified</p>
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—————> Indicates a change

<u>TYPE OF VALVE</u> - Velocity modulated oscillator with tunable integral cavity and waveguide output				<u>MARKING</u> See K1001/4	
<u>CATHODE</u> - Indirectly heated <u>ENVELOPE</u> - Metal/glass <u>PROTOTYPE</u> - VX 5023				<u>BASE</u> B8-0 See BS448/1953 B8-0/1.1 and K1001/12 and App.IV	
<u>RATING AND CHARACTERISTICS</u> All limiting values are absolute				<u>CONNECTIONS</u>	
				<u>NOTE</u>	<u>PIN</u>
					<u>ELECTRODE</u>
Heater Voltage	(V)	6.3	K	1	Grid g
Heater Current	(A)	0.85 0.7		2	Heater h
Maximum Resonator Voltage	(KV)	2200	A	3	Internal Connection I C
Maximum Resonator Dissipation	(W)	24	B.C	4	Internal Connection I C
Resonator Current Range	(mA)	8-12	C	5	Reflector Ref
Negative Grid Voltage Range	(V)	0-200	A C	6	Internal Connection I C
Negative Reflector Voltage Range	(V)	150-375	A H	7	Heater and Cathode h & k
Minimum R.F. Power Output	(mW)	30	D H	8	Internal Connection I C
Mechanical Tuning Range	(mm)	8.43-8.77			Mounting Plate-Resonator Res
Minimum Electronic Tuning Range	(Mc/s)	60	G H		
Nominal Reflector voltage change	(V)	30	G		
Maximum Total Impedance in Reflector to Cathode Circuit	(kohm)	75	J		
Maximum Mechanical Tuning Torque	(oz.in.)	50			
Minimum overall Tuning rate	(Mc/s Rev)	200	E F		
Maximum Temperature frequency drift	(Mc/s)	50	L		
Average Temperature coefficient (negative)	(Mc/s /°C)	0.6			
				<u>DIMENSIONS</u> See drawing on page 6	
				<u>MOUNTING POSITION</u> Any	
				<u>CLIMATIC</u> Non Tropical	

NOTES

- A. The voltages quoted in this specification are relative to cathode. The valve is normally operated with the resonator at earth potential. One side of the heater is joined internally to cathode. The cathode shall be preheated at normal heater voltage for a minimum period of 1 minute before resonator voltage is applied. Precautions should be taken to prevent damage to the valve in the event of an internal flash-over, especially when the valve is warming up. The use of a 100 ohm limiting resistor is recommended, the valve should not be operated from a low impedance source and, if possible, the resonator potential should be increased gradually to the specified value.
- B. The temperature of the valve envelope should not at any point exceed 150°C. Forced air cooling may be needed if the valve is used in a confined space.
- C. Grid voltage should be adjusted to give maximum power output, provided that limits of Resonator current and dissipation are not exceeded.
- D. The valve is designed to operate into a load having a reflection coefficient not greater than .05.
- E. Measured over $\pm \frac{1}{2}$ turn of the tuning spindle within the specified range.
- F. At optimum fixed reflector voltage. Power shall be greater than half its peak value for $\pm \frac{1}{2}$ turn of tuning spindle from optimum.
- G. Between $\frac{1}{2}$ power points.
- H. The same oscillatory mode is used over the whole wavelength range of the valve.
- J. In order to prevent positive excursions of reflector voltage, a suitable diode should be connected directly between Reflector and Cathode.
- K. To ensure freedom from frequency modulation in the output a D.C. heater supply should be used.
- L. The time to reach nominal operating frequency can readily be reduced by forced air cooling.

Example: With a valve mounted on a $\frac{1}{8}$ " steel panel and with adequate forced air cooling of the valve body, the frequency is about 15 Mc/s above its final value 5 minutes after switching on.

TESTS
To be performed in addition to those applicable
in K1001

TESTS CONDITIONS

Vh(V)
6.3

Vg(V)
Note 1

Vres (KV)
2

Vref (V)
Adjust for
Max P_o

LOAD
VSWR 1.1:1 max
W.G.No.22

Tamb°C
Room
Temperature

The heater voltage shall be applied for 1 minute before the resonator volts are applied.

K1001	TEST	TEST CONDITIONS	AQL %	Insp. Level	Sym- bol	LIMITS		UNIT
						Min	Max	
	<u>GROUP A</u>							
	Heater Current			100%	Ih	0.65	.95	A
	<u>Oscillation (1)</u> Adjust for max.P _o	$\lambda = 8.6$ m.m. Note 2 with I _{res} in range 8-12 mA		100%				
	Negative grid voltage				Vg	-	200	V
	Grid Current				Ig	-	100	/ μ A
	Negative Reflector Voltage				Vref	150	375	V
	Reflector Current				Iref	-	30	/ μ A
	Power Output	V.S.W.R. = 1.1.max.			P _o	30	250	mW
	Electronic Tuning	Adjust Vref. to give half power points			Δf	60	-	Mc/s
	<u>Oscillation (2)</u>	$\lambda = 8.43$ m.m. Note 2		100%				
	Tests, Test conditions and limits as for oscillation (1)							
	<u>Oscillation (3)</u>	$\lambda = 8.77$ m.m. Note 2		100%				
	Tests, Test conditions and limits as for oscillation (1)							
	<u>Emission</u>	As for Oscillation(1)		100%	Ires	-	15	%
	As change of Ires	except Vh varied from 5.8V to 6.8V						
	<u>Tuning</u> <u>Hysteresis</u>	Note 3. As for Oscillation (1)		100%	Δf	-	300	Mc/s

CV 6001

VALVE ELECTRONIC

TESTS (Cont'd)

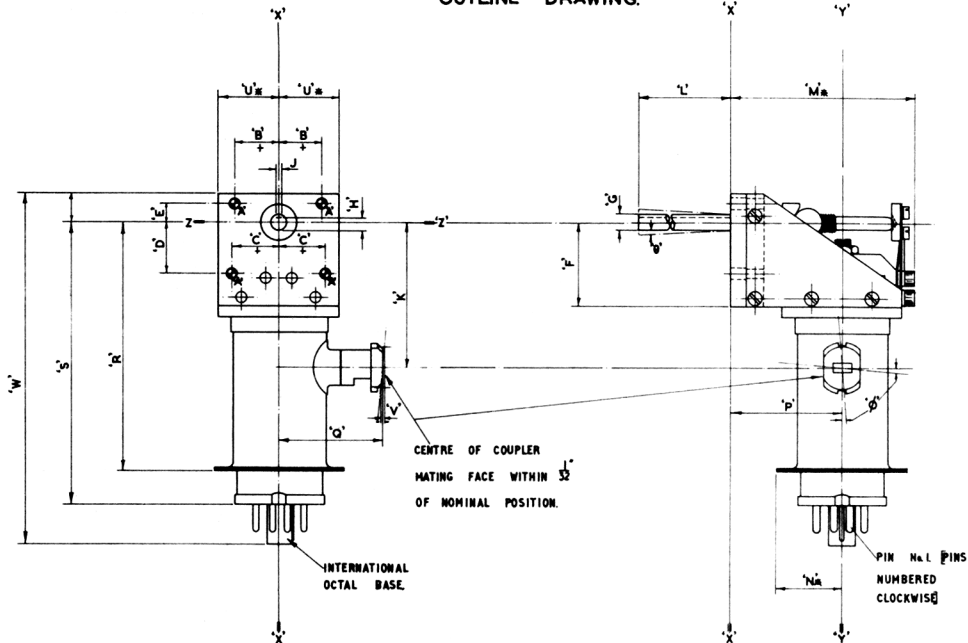
Page 4

K1001	TEST	TEST CONDITIONS	AQL %	Insp. Level	Sym- bol	Limits		UNIT
						Min	Max	
	GROUP B & C Omitted							
	GROUP D <u>Frequency Drift</u>	As for Oscillation (1) Note 4		TA	Δf	RECORD		Mc/s
	<u>Electronic Tuning Hysteresis</u> Note 5	As for Oscillation (1) with the addition of a low frequency sweep voltage applied between Reflector and Cathode of such amplitude as to suppress oscillation at peak sweep voltages						
	<u>Temperature Co-efficient</u> (Negative)	As for Oscillation (1) Tamb varied over 30°C in the range 20°C to 80°C.		TA	$\frac{\Delta f}{\Delta T}$	RECORD - 1.5		Mc/s/°C <i>Ampl 1</i>
	<u>Tuning Torque</u>	No voltages. Tuner set for min λ Tamb = -40°C Tamb = +150°C -35°C		TA		- 50 50		oz/ins oz/ins <i>Ampl 1</i>
	<u>Tuning Rate</u> (1)	As for Oscillation (1) Notes 6 and 7		TA	Δf	200	800	Mc/s/ turn
	<u>Tuning Range</u> (1) Ratio of max to min power in range	As for Oscillation (1) Notes 6 and 7		TA		-	50	%
	<u>Tuning Rate</u> (2)	(As for Oscillation (2)		TA				
	<u>Tuning Range</u> (2)	(Tests, test conditions (and limits as for (TUNING RATE and RANGE (1)		TA				
	<u>Tuning Rate</u> (3)	(As for Oscillation (3)		TA				
	<u>Tuning Range</u> (3)	(Tests, Test conditions (and limits as for (TUNING RATE & RANGE (1)		TA				
	GROUP E - deleted							
	GROUP F <u>Life</u> Life test end point 500 hours Percentage change in power output	As for Oscillation (1)		Note 8	P _o	RECORD		%
	GROUP G Electrical re-test after 28 days storage Inoperatives Power Output Reflector Current	No voltages As for Oscillation (1) in Group A		Record rejects 100% 100%	P _o I _{ref}	30 -	- 30	mW μA

NOTES

1. Grid voltage should be adjusted to give maximum power output, provided that limits of Resonator Current and dissipation are not exceeded.
2. The same reflector mode shall be used for all oscillatory tests.
3. The valve shall be cycled over the complete tuning range 3 times, after all pre-set adjustments have been made, the tuning spindle being returned to its mid point. The frequency is then measured, and the spindle turned in the same direction to the end of the range, and again returned to the mid position. The frequency is again measured. The difference between these frequencies is the ^{tuning} hysteresis. Valves which fail this test are acceptable provided they pass the Type Approval test for mechanical tuning rate.
4. The valve shall be connected by its flange to WG22 and with full ventilation, but without forced cooling, the valve shall be within 50 Mc/s of its final frequency, in about 15 minutes after all supplies have been switched on.
5. Any interval over which oscillation is observed for one direction of sweep only shall be considered as exhibiting hysteresis. Hysteresis shall be expressed as the ratio of the highest power level at which hysteresis occurs to the maximum power level obtained during the sweep.
6. If the stops limit the travel of the tuner spindle to less than $\frac{1}{2}$ turn beyond the setting giving the required nominal wavelength, measurements of tuning range and rate shall be made between the limit setting of the tuner and that with the spindle turned one full turn towards the mid-band position.
7. The tuning spindle shall be rotated through $\pm \frac{1}{2}$ turn about the position giving the nominal test frequency. This shall be continued until substantially repeatable frequency changes are observed. The reflector voltage may then be adjusted if necessary to give optimum power output over this mechanical tuning range. The values of power output and frequency with fixed electrode voltages, at the $\pm \frac{1}{2}$ turn settings of the mechanical tuning shall be observed.
8. At least one valve per month shall be life tested and the results recorded and supplied to the T.A. Authority.

OUTLINE DRAWING.



THE VALVE IS DESIGNED FOR USE WITH A FLOATING BASE SOCKET & NO UNDUE STRAIN SHOULD BE PUT ON THE OUTPUT COUPLER.
 DIMENSIONS MARKED: \square DEFINE MAXIMUM ENVELOPE OF THE ASSEMBLY, & + TRUE GEOMETRIC POSITION [T.P.]

front
front
 'X-X', 'Y-Y' & 'Z-Z' ARE REFERENCE AXES ONLY. THE PLANE 'X-Z' IS THE PLANE OF THE MOUNTING SURFACE. SEE DIM. 'P' HOLES 'A' BEING THE MOUNTING HOLES. 'X-X' & 'Z-Z' PASS THROUGH THE NOMINAL AXIS OF SPINDLE. THE PLANE THROUGH 'X-X' & 'Y-Y' IS PERPENDICULAR TO THE PLANE 'X-Y'. THE AXIS 'X-X' & 'Y-Y' ARE 'P' APART, AS SHOWN. THE WAVEGUIDE OUTPUT MATES WITH A STANDARD INTERSERVICE COUPLER LOCATING RING [REF. Z83001] & RING NUT [REF. Z83002] TO WG.22 [280° ±40° DIMS]. THE INTERNATIONAL OCTAL BASE IS WITHIN $\frac{1}{8}$ OF NOMINAL AXIS & HAS $\pm 15^\circ$ ANGULAR TOLERANCE.

CONNECTIONS:

PIN 1	PIN 2	PIN 3	PIN 4	PIN 5	PIN 6	PIN 7	PIN 8	ENVELOPE
CATHODE SHIELD	HEATER	INTER-ALLY CONNECT	INTER-ALLY CONNECT	RE FLECTION	INTER-ALLY CONNECT	HEATER	INTER-ALLY CONNECT	INTER-ALLY CONNECT TO RESONATOR

DIMENSIONS ARE:

SYMBOL	DIM ^{IN}	TOL ^{IN}	REMARKS
A	4 BATH	0.00	TAPPED $\frac{1}{2}$ DEEP $\pm \frac{1}{64}$ DRILLED $\frac{1}{4}$ DIA. $\frac{1}{4}$ DEEP $\pm \frac{1}{32}$
B	±.625	T.P.	
C	±.6875	T.P.	
D	±.750	T.P.	
E	±.275	T.P.	
F	1.250	MAX.	
G	250 DIA.	±.000	
H	18.4	±.003	
J	±.094	±.003	
K	2.103	T.P.	
L	2 $\frac{1}{4}$	± $\frac{1}{4}$	SPINDLE MOVES AXIALLY WHEN ROTATED.
M	2 $\frac{3}{4}$	MAX.	
N	1° RAD	MAX.	FROM AXIS 'Y-Y'
P	1 $\frac{3}{4}$	T.P.	
Q	1 $\frac{3}{16}$	±.020	
R	3 $\frac{3}{4}$	MAX.	
S	4 $\frac{1}{2}$	MAX.	
T	7 $\frac{1}{16}$	MAX.	
U	3 $\frac{7}{8}$	MAX.	
V	10	±.010	MAX. TLT OF MATING SURFACE OVER $\pm .520$ DIA.
W	5 $\frac{3}{32}$	MAX.	
ϕ	—	± 3°	ANGULAR TOLERANCE OF WAVEGUIDE OUTPUT.
θ	—	3° $\frac{1}{4}$	IN ANY DIRECTION MAY OCCUR WITH SPINDLE ROTATION.

ELECTRONIC VALVE SPECIFICATIONS

SPECIFICATION MOA/CV6001

ISSUE 2 - DATED 5th NOVEMBER, 1959

AMENDMENT No. 1

Page 1 RATING AND CHARACTERISTICS

<u>Amend</u>	Heater Current from "0.7" to	..	"0.85"
<u>Amend</u>	"Resonator Current Range	..	8-12"
	to:-		
	"Resonator Current	..	12"
<u>Add</u>	"Average Temperature Co-efficient (Mc/s/°C)		0.6"
	(Negative)		

Page 4 GROUP D TESTS

<u>Temperature Co-efficient (Negative)</u>	In columns headed "Limits Min" and "Limits Max"
	Delete "RECORD"
	<u>Substitute</u> <u>Limits</u>
	<u>Min.</u> <u>Max.</u>
	- 1.5

P.T.O.

Page 4 Tuning Torque In Column headed "Test Conditions"

Amend "-40°C" to -35°C".

Page 5 Note 3. In 6th line

Amend "turning" to "tuning".

Page 6 Lower note In 3rd line,

Amend "X-Y" to "X-X"

In 4th line (at end of line)

Amend "X-Y" to "X-Z".

October, 1960

T.V.C. for R.R.E.

N. 34245/D

JAK 2%