MINISTRY OF AVIATION - DLRD/RRE

VALVE ELECTRONIC CV 6003

Specification MOA/CV6003 Issue 1 Dated 6th May 1959 To be read in conjunction with K1001 except where otherwise stated	SECURITY Specification Unclassified	Valve Unclassified

→ Indicates a change

TYPE OF VALVE - Rugged velocity modulated Oscillator with tunable integral cavity and waveguide output.
CATHODE - Indirectly heated
PROTOTYPE - VX 2537

MARKING
See K1001/4
Additional marking Serial No._____

BASE
See drawing page 7

CONNECTIONS
See drawing page 7

PACKAGING
See K1005

DIMENSIONS
See outline drawing page 7.

MOUNTING POSITION
Any

RATINGS AND CHARACTERISTICS

All limiting values are absolute

			Note
Heater Voltage	(V)	6.3	
Heater Current	(A)	0.57	
Overall Tuning Frequency Range	(Mc/s)	8500 to 9000	A
Minimum R.F. output power	(mW)	30	
Maximum Resonator Voltage	(V)	400	B
Maximum Resonator Dissipation	(W)	18	
Negative Reflector Voltage Range	(V)	140 to 255	B.C
Minimum Electronic Tuning Range	(Mc/s)	± 15	
Minimum Reflector Sensitivity	(Mc/s/V)	0.5	
Maximum Body Temperature	(°C)	150	
Maximum Impedance in Reflector Cathode Circuit	(Megohm)	0.5	
Maximum Vibration (10 min.duration)	(g)	20	
Minimum Operating Pressure	(mms.Hg)	20	

NOTES

A. Clockwise rotation of the tuning shaft increases frequency.

B. The reflector and resonator voltages quoted in this specification are relative to the cathode. The cathode shall be pre-heated at the rated heater voltage for one minute before the resonator voltage is applied. Normally the resonator is at earth potential.

C. The reflector voltage must always remain negative with respect to the cathode. Under A.F.C. working the possibility of the reflector voltage becoming equal to or more positive than that of the cathode should be prevented by adding a protective diode between Reflector and Cathode.

Z.20395.

To be performed in addition to those applicable in K 1001

TEST CONDITIONS - unless otherwise stated

Vh (V) 6.3 | V_{res} (V) 350 | V_{ref} (V) Adjust for Po max. | Load VSWR1.1:1 Max. | T_{amb} °C Room temperature

K1001	TEST	TEST CONDITIONS	AQL %	Insp. Level	Symbol	LIMITS Min.	LIMITS Max.	UNITS
	GROUP A							
	Heater Current			100%	Ih	0.52	0.62	A
	R.F.Tests	Note 1						
	Oscillation (1) Power Output	Frequency 8500 Mc/s		100%	Po	30	-	mW
	Negative Reflector Voltage			100%	V_{ref}	140	255	V
	Electronic Tuning Range	Adjust V_{ref} from mode optimum to give half power points Note 2.		100%	Δf	±15	-	Mc/s
	Oscillation (2) Tests, individual test conditions and limits as for oscillation (1) together with -	Note 3						
	Resonator Current			100%	I_{res}	25	40	mA
	Electronic Tuning Gradient	Note 4		100%	$\frac{\Delta f}{\Delta V_{ref}}$	0.5	1.2	Mc/s/V
	Ratio of Electronic Tuning Gradient at mode optimum to that at ± 15 Mc/s points.	Note 4		100%		0.3	-	
	Oscillation (3) Tests, individual test conditions and limits as for oscillation(1)	Frequency 9000 Mc/s.						
	Vibration	Notes 3 and 7		100%				
	Frequency Modulation Deviation (peak to peak)				Δf	-	0.5	Mc/s
	GROUPS B & C OMITTED							

TESTS (Cont'd)

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K1001	TEST	TEST CONDITIONS	AQL %	Insp. Level	Symbol	LIMITS Min.	LIMITS Max	UNITS
	GROUP D Note 8							
	Overall Tuning Gradient	Note 5	6.5	IA	$\frac{\Delta f}{\text{turn}}$	5.0	9.5	Mc/s/ turn
	Pulling	Notes 3 and 6	6.5	IA				
	Frequency Deviation				Δf	-	$\pm$ 5	Mc/s
	Power Output				Po	20	-	mW
	Temperature Tests	Note 3	6.5	IA				
	Frequency drift	Measured between 4-15 mins after switching on all supplies			Δf	-	6	Mc/s
	Negative Temperature Coefficient	T_{amb} to be varied over 30°C in the range 20° to 80°C			$\frac{\Delta f}{\Delta T}$	-	0.325	Mc/s/ °C
	GROUP E Note 8							
A/IX 2.4.3	Fatigue	No voltages f = 170 c/s Acceleration = 5g max Duration 3 x 23hrs		IC				
A/IX 2.4.4	Shock	No voltages Hammer angle = 30°		IC				
	Post Fatigue & Shock Tests	Notes 3 and 9 Overall AQL	10					
	Inoperatives		6.5					
	Resonator Current		6.5		I_{res}	25	40	mA
	Electronic Tuning	Adjust V_{ref} from mode optimum to give half power points. Note 2	6.5		Δf	$\pm$15	-	Mc/s
	Power Output		6.5		Po	30	-	mW

K1001	TEST	TEST CONDITIONS	AQL %	Insp. Level	Sym-bol	LIMITS Min.	LIMITS Max.	Units
	GROUP E (cont'd)							
	Constant Acceleration	Note 3 Acceleration = 13 g in direction along valve axis	6.5	IC				
	Frequency Deviation				Δf	-	2	Mc/s
	Power Deviation				ΔPo	-	10	%
	GROUP F Note 8							
A VI/ 5.3	Intermittent Life	Note 3 and 10	6.5	IC				
	Test point (500 hrs) % change in Power Output				ΔPo	-	50	%
	GROUP G Note 11							
A IX/ 2.5	Electrical re-test after 28 days holding period	Note 3						
	Inoperatives	No voltages	1.0	100%				
	Power output		1.0	100%	Po	30	-	mW

NOTES

1. The tuning range 8,500 to 9,000 Mc/s must be continuous and must be covered in one reflector mode. The maximum total impedance in the reflector cathode circuit must not exceed 0.5 Mohm. These tests may be combined.

2. Measured with the reflector voltage traversed in both an increasing and decreasing direction to the extinction points.

3. Test to be carried out at a random point in the band 8,500 to 9,000 Mc/s.

4. The Electronic Tuning Gradient is defined as the frequency deviation caused by a reflector voltage deviation of 1.0 volt.

NOTES (Con'd)

5. The frequency of oscillation with the reflector voltage adjusted for mode optimum shall be plotted as a function of the angular position of the tuning shaft over the frequency range 8,500 to 9,000 Mc/s taken at intervals corresponding to approximately 100 Mc/s. The limits apply to the minimum and maximum gradients of this plotted curve.

6. Pulling effects shall be measured with the valve working into a load of V.S.W.R. not greater than 1.5:1 moved through all phases. The power output versus reflector voltage characteristic and the frequency versus reflector voltage characteristic must be continuous between the 63dB points of the mode. Amdt 1

7. The valves shall be subjected to vibrational accelerations along the axis, the amplitudes of vibration being defined by Fig.3(a) Curve A of specification DES 1 as modified by the transmissibility curve of Fig.4. At no vibration frequency shall the maximum displacement amplitude exceed ± 0.050 inches. During this test the valve shall be clamped to the vibration generator by its flange.

8. The minimum sample size shall be according to the following table:-

Lot size	Sample size	
	Normal	Reduced
2 - 15	2	1
16 - 40	3	2
41 -110	5	3
111 -300	7	4
301 -800	10	5
801 and above as K1001 App.XI		

The manufacturer may test additional samples at his discretion.
(obtained from the tests which are subject to sampling inspection)
Copies of all test results shall be sent to the Approval Authority. Amdt.1

If, at the end of the life test period there have been no failures, the lot shall be accepted without prior notification from the Approval Authority.

In the event of any failures at any stage of the acceptance sampling tests, the acceptance or rejection of the lot will be made by mutual agreement between the Manufacturers, the Inspection Authority and the Approval Authority.

Test results on Groups A, D and E may be submitted before the results of life test, Group F to enable an early decision to be made.

Reduced Inspection shall be permitted after 10 consecutive lots have been accepted.

NOTES (Cont'd)

9. Fatigue and Shock Tests. These tests are destructive and valves which are rejects for frequency or have initial Power Outputs below the lower limit but above 20 mW may be used for the tests. If the manufacturer so desires valves used for shock test may be used for fatigue test and vice versa.

10. Life Tests. The criterion for acceptance shall be that the average life expectancy at 500 hours shall be at least 90% where

$$\text{Life expectancy} = \frac{\text{Total hours of life operation}}{\text{Total possible hours}} \times 100$$

The lot shall be rejected if the life expectancy falls below 90%.
The manufacturer may increase the number of valves on life test at his discretion.
ALTERNATIVELY - The manufacturer may put at least twice the normal sample size on life test for a period of 250 hours. The criteria for acceptance and rejection of lot, and for reduced sampling shall be as in the 500 hour test. This 250 hour life test is non-destructive.

11. Group G. The lot shall be held in store for at least 28 days and shall then be tested for Inoperatives and Power Output. If there are no failures the lot shall be accepted. Where there are failures and if the overall process is worse than 2% the lot shall be held for afurther 14 days. The lot shall be rejected if there are any further failures.

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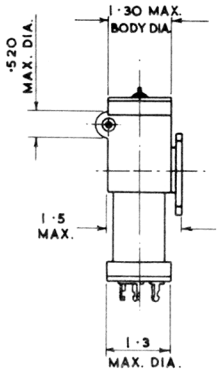
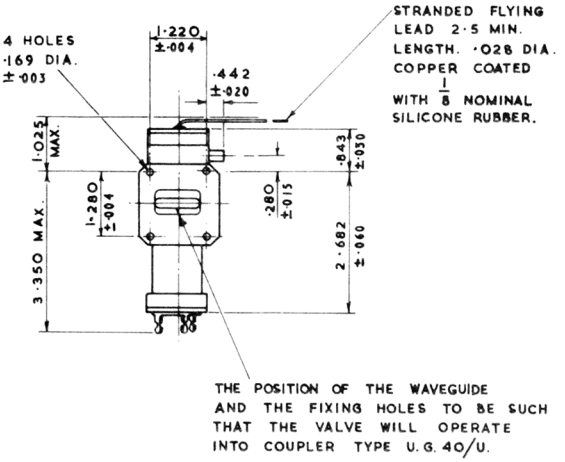
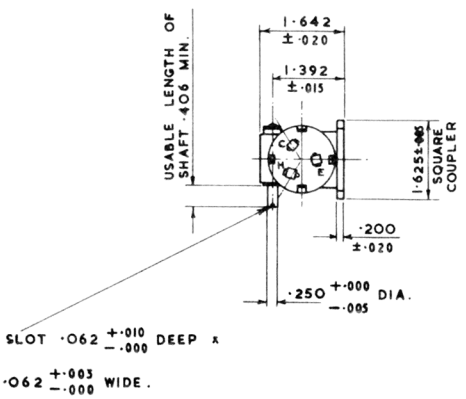
OUTLINE DRAWING

THIRD ANGLE PROJECTION







PIN No.	CONNECTION
H	HEATER
C	HEATER & CATHODE
E	RESONATOR
FLYING LEAD	REFLECTOR

DIMENSIONS IN INCHES

ELECTRONIC VALVE SPECIFICATIONS

Specification MOA/CV6003 Issue 1 Dated 6th May, 1959
Amendment No. 1.

Page 5 Note 6 Last Line
Amend "6dB" to read "3dB"

Page 5 Note 8 Third Sentence
This shall be amended to read:-

"Copies of all test results obtained from the tests which are subject to sampling inspection, shall be sent to the Approval Authority".

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

22.8.62

(40629)