MINISTRY OF SUPPLY - DLRD/RRE

VALVE ELECTRONIC **CV 6002**

SPECIFICATION MOS/CV6002

Issue 2 dated 17th September, 1959

To be read in conjunction with K1001 (omitting Sections 5.2 and 5.3) and BS448.

SECURITY	
SPECIFICATION	VALVE
Unclassified	Unclassified

→ Indicates a change

Type of valve - Velocity modulated oscillator for use with external cavity resonator

Cathode - Indirectly heated

Prototype - VX5069

RATING AND CHARACTERISTICS

All limiting values are absolute

			Note
Heater Voltage	(V)	6.3	A
Heater Current	(A)	0.65	
Maximum Resonator Voltage	(V)	350	A.B.D.
Maximum Resonator Dissipation	(W)	16	A.D.
Negative Reflector Voltage Range	(V)	100 to 300	B.C.
Minimum R.F Power Output	(mW)	20	E
Frequency Range	(Mc/s)	9125 9265	F
Maximum Total Impedance in Reflector to Cathode Circuit	(Megohm)	0.25	G
Minimum Electronic Tuning Range	(Mc/s)	25	E
Electronic Tuning Rate	(Mc/s/V.)	1.2	

MARKING

See K1001/4

BASE

B7G
See B.S.488: B7G/1.1

CONNECTIONS

Pin	Electrode
1.	Internally connected
2.	Cathode
3.	Internally connected
4.	Internally connected
5.	Heater
6.	Cathode Screen (Note H)
7.	Heater
T.C.	Reflector
Discs.	Resonator

TOP CAP

CT 1
See B.S.448: 6/1.1

DIMENSIONS

See Drawing on Page 5

MOUNTING POSITION

Any

Z.20396.

NOTES

A. For maximum life, operating conditions V_{res} = 300V. V_h = 5.8 ± 0.1V, are recommended. V_{res} = 350V will usually give increased power output with about 25% reduction in average life.

B. The voltages quoted in this Specification are relative to Cathode. The Valve is normally operated with resonator at earth potential. One side of the heater should preferably be connected to cathode.

C. The ratings refer to the $4\frac{3}{4}$ cycle reflector mode.

D. The temperature of the glass envelope should not at any point exceed 150°C, nor should that of the external metal parts at any point exceed 150°C. Forced air cooling may be needed if the valve is mounted in a confined space.

E. With V_{res} = 300V and $4\frac{3}{4}$ cycle reflector mode. The electronic tuning range Δf is measured between the half power points of the mode using the specified tuning cavity.

F. The valve is designed to plug into an external resonator. The frequency coverage and other properties in the rating refer when the valve is used in the specified Tuning Cavity. For details of the mechanical design and of the valve seating and contact arrangement see Page 5.

G. If a high impedance reflector supply is used the circuit must include a diode to prevent V_{ref} becoming positive.

H. The cathode screen (g1) should normally be connected to cathode. By applying a negative bias of 100-200V to this electrode it is usually possible to prevent oscillation, but factory tests do not guarantee this; there may be appreciable leakage resistance between this electrode and cathode.

Tests

VALVE ELECTRONIC **CV 6002**

To be performed in addition to those applicable in K1001

Test conditions unless otherwise specified

Vh (V)	Vg1 (V)	V_{res} (V)	V_{ref} (V)	Load
6.3	0	300	Adjust for max. P_o	VSWR 1.05 max WG 16

Test Cavity - See Note 1
Temperature - all tests shall be made at room ambient temp.

K1001	TEST	TEST CONDITIONS	AQL %	Insp. Level	Symbol	Limits Min.	Limits Max.	Units
	GROUP A Heater Current			100%	I_h	0.6	0.7	A
	Oscillation (1)	Test cavity adjusted to f=9125 Mc/s		100%				
	Power Output				Po	20	80	mW
	Negative reflector Voltage				Vref	140	210	V
	Electronic tuning	Note 2			Δf	25	-	Mc/s
	Reflector current	Vref = - 100V			Iref	-	4	/uA
	Resonator current				Ires	22	35	mA
	Oscillation (2)	Test cavity adjusted to f= 9265 Mc/s		100%				
	Power Output				Po	20	80	mW
	Negative reflector Voltage				Vref	140	210	V
	Electronic tuning	Note 2			Δf	25	-	Mc/s
	Emission As change of Ires	Vref approx. 100v Valve not oscillating. Vh varied from 5.8v to 6.8v		100%	Ires	-	15	%
	GROUPS B AND C omitted							
	GROUP D Warm-up time	As for oscillation (1) Note 3		T.A	Tw	-	90	secs
	Negative Temp. Coefficient (1) and (2)	As for Oscillation (1) and also as for oscillation (2) T_{amb} varied over 50°C in the range 20° to 80°C		T.A	$\frac{\Delta f}{\Delta T}$	-	250	Kc/s/°C
	GROUP E deleted							

CV 6002

VALVE ELECTRONIC

Tests (cont'd)

K1001	TEST	TEST CONDITIONS	AQL %	Insp. Level	Symbol	Limits Max.	Limits Min.	Units
	GROUP F Life	Note 4 V_h = 6.3V±0.1V		Note 5				
	Life Test end point -500 hrs Change in Power Output	At any one frequency within the range 9125-9265 Mc/s			Po	Record		%
	GROUP G Electrical re-test after 14 days storage period		Record Rejects					
	Power Output	As for Oscillation (1)		100%	Po	20	-	mW
	Reflector Current	V_{ref} = - 100V		100%	Iref	-	4	/uA

NOTES

1. The Cavity shall be in accordance with R.R.E. drawing RR/C.611710. A typical valve and cavity combination has a loaded Q value of 300. The tuning rod shall provide tuning over the range 9125 Mc/s and 9265 Mc/s with a tuning rate of 10 Mc/s per turn approx.

2. The elctronic tuning range, ΔF is measured between the half power points of the mode at the two specified frequencies. There must be no discontinuity in the mode at values of power greater than Po/2 as the peak of the mode is approached from values of Vref which are sufficient to suppress oscillation.

3. The warm-up time shall be measured from the time of the application of the heater voltage to the time when the power output reaches 10 mW.

4. The life test shall be done with the valve inserted into a typical cavity with a heat sink and with free ventilation.

5. At least one valve per month shall be life-tested and the results recorded and supplied to the T.A. authority.

CV6002

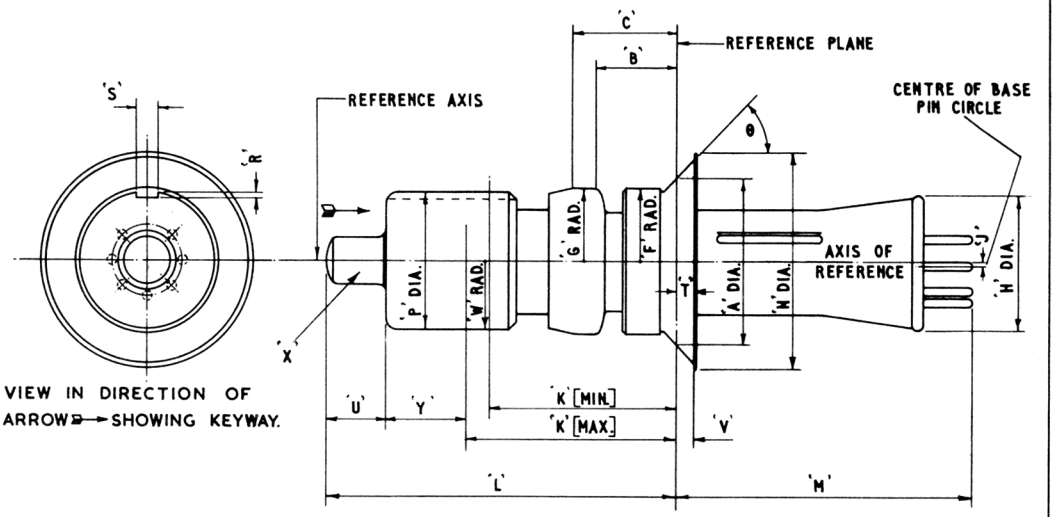

FIG. 1.

OUTLINE DRAWING FOR VALVE TYPE.

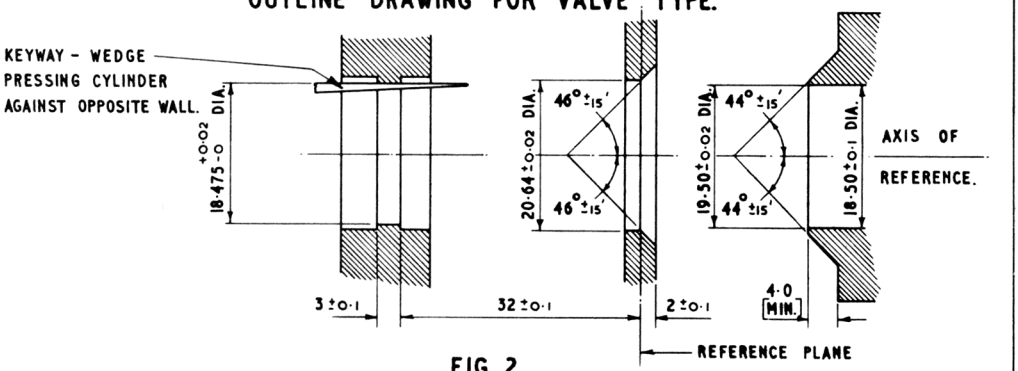

FIG. 2.

TEST JIG, DEFINING REFERENCE PLANE AND AXIS.

DIMENSIONS IN MILLIMETRES.

SYMBOL.	DIM. (M.M.)	TOLERCE	REMARKS.	SYMBOL.	DIM. (M.M.)	TOLERCE	REMARKS.
A	·8125" 20·64	—	CIRCLE OF CONTACT BETWEEN CONE AND CAVITY.	R	·825	±0·1	
B	10·0	MAX.		S	2·25	±0·1	SLOT IN LINE ±10° WITH VACANT BASE PIN POSITION.
C	13·6	MIN.		T	3·0 3·5	MIN. MAX.	
F	9·9	MAX.		U	7·0 8·0	MIN. MAX.	
G	9·34 9·71	MIN. MAX.	APPLIES BETWEEN POINTS 'B' & 'C'.	V	2·25	MIN.	
H	18·4	MAX.		W	9·37	MAX.	
J	1·0	MAX.	ECCENTRICITY OF CENTRE OF B7G BASE PIN CIRCLE RELATIVE TO REFERENCE AXIS	X	—	—	TOP CAP - C.T.I. CONFORMS TO B.S.S. 448: 1953 SECTION 6/1.1
K	25·0 28·0	MIN. MAX.		Y	9·0	—	
L	44·0 47·5	MIN. MAX.					
M	36·5 41·5	MIN. MAX.		θ	45°	—	
N	28·7	MAX.		NOTE. ALL PROJECTIONS ARE AMERICAN			
P	18·3	+·125 −0	OVER WHOLE LENGTH OF CYLINDER APPLIES OVER DIM. 'Y' ONLY.				

DEFINES RADIAL MOVEMENT REQUIRED OF CONTACT SPRINGS