MINISTRY OF SUPPLY R.R.E.

VALVE ELECTRONIC CV2116

Specification MOS/CV2116 - Issue 7 Dated February 1957 To be read in conjunction with K1001, excluding clause 5.2.1.2, & BS.448	SECURITY Specification: Unclassified	Valve: Unclassified

→ Indicates a change

TYPE OF VALVE: Velocity modulated oscillator for use with external cavity resonator.

CATHODE: Indirectly heated.

PROTOTYPE: VX5029.

RATING			Note
Heater voltage,	(V)	6.3	F
→ Heater current,	(A)	0.65	
→ Frequency range,	(Mc/s)	1800-4500	E
→ Nominal power output at 3200 Mc/s,	(mW)	140	
Max.resonator dissipation,	(W)	8	A
Normal resonator voltage,	(V)	250	
→ Max.reflector voltage,	(V)	500	B
Cathode shield voltage,	(V)	0	C
Max.permissible source resistance of reflector supply,	(MΩ)	0.25	D
→ Max.heater-cathode voltage,	(V)	90	
→ Min.life expectation,	(hrs)	2000	A,F

MARKING

See K.1001/4

BASE

B7G
See BS.448:B7G/1.1

Connections

Pin	Electrode
1	Cathode Shield
2	Cathode
3	No connection
4	Cathode Shield
5	Heater
6	Cathode Shield
7	Heater
T.C.	Reflector
Disc Seals	Resonator

TOP CAP

CT1. See BS.448:6/1.1

DIMENSIONS

See page 5

PACKAGING

See K1005

MOUNTING POSITION

Any

NOTES

A. The maximum resonator dissipation is dependent on the thermal properties of the external resonator.

→ B. Reflector voltage negative to cathode. The reflector voltage required for oscillation is given approximately by the formula $V_r = \frac{0.013f}{N + .75}(V_a)^{\frac{2}{3}} - V_a$, where f is the frequency in Mc/s, Va the resonator voltage, and N the mode number. Normally N = 1 for 1800 -2700 Mc/s, N = 2 for 2500 - 3900 Mc/s, N = 3 for 3600 - 4500 Mc/s.

C. The valve is designed for use with cathode shield connected to cathode.

D. Provided the reflector is never less than 50 volts below cathode potential (e.g. during switching surges) and maximum power is extracted.

→ E. The valve is subject to tests over the frequency range 2640-4200 Mc/s. These ensure satisfactory operation for Service use over the range 1800-4500 Mc/s.

F. If the heater voltage is maintained at $5.8 \pm 0.1V$ the life expectation will be much greater than that quoted.

To be performed in addition to those applicable in K1001.
Cathode shield connected to cathode throughout.

	Test Conditions			Test	Limits		No. Tested
	V_h	V_a	V_r		Min.	Max.	
(a)	6·3	0	0	Heater current, A	0·6	0.7	100 %
(b)	As K1001/5·3, but also with heater positive to cathode.			Heater-cathode leakage, μA	-40	+40	100 %
(c)	5·8	250	Adjust for max. output				
	See Note 1.						
	With cavity (i)			(c1) Power output (record), mW	100		100 %
	" " (ii)			(c2) " " " mW	100		100 %
	" " (iii)			(c3) " " " mW	100		5 % (5)
	" " (i)			(c4) Resonator current, mA	20	32	100 %
	" " (i)			(c5) Reflector current, μA	-4	4	
(d)	5·8	250	Adjust				
	Vary V_r above and below the optimum so that the power falls to half the value noted in (c). Record frequencies f_1, f_2 and reflector voltages V_{r_1}, V_{r_2} at the half-power points.			Frequency Mc/s			
				(d1) With cavity (i), f_1,	A		100 % all
				f_2,		A	
				(d2) With cavity (ii) f_1,	B		
				f_2,		B	
	See Note 1 and K1001/5B.2.			Electronic Tuning Range $(f_1 - f_2)$, Mc/s			
				(d3) With cavity (i)	18	30	
				(d4) " " (ii)	17	29	
				Reflector Voltage, V			
				(d5) With cavity (i) V_{r1}	95		
				V_{r_2}		95	
				(d6) " " (ii) V_{r_1}	175		
				V_{r_2}		175	
				Voltage Change, $(V_{r_1} - V_{r_2})$, V			
				(d7) With cavity (i)	22	37	
				(d8) " " (ii)	35	49	
				(d9) Continuity. Over the range of variations covered there shall be no discontinuous change in power output.			

TESTS (Cont'd)

Test Conditions			Test	Limits		No. Tested
V_h	V_a	V_r		Min.	Max.	
(e) 6·3	250	100	LIFE The percentage of valves after 2000 hours giving a power output less than half its original value.		50 %	3 per month
See Note 2.						
(f) Adjust	250	as in(c)	Frequency shift due to heater voltage change, Mc/s		3	T.A.
With cavity (ii) Adjust V_h to 5·8 V. and 6·8 V. and measure change of frequency.						
(g) 6.3	250	as in(c)	Microphony Frequency modulation Mc/s		0.5	T.A.
With cavity (ii) See Note 3.						
(h) 6·3	250	as in (c)	Noise Output Ratio of mean noise output per mW to thermal noise at 17°C. See Note 4.		10	T.A.
With cavity (i) Using a broadband crystal mixer and intermediate frequency 13.5 Mc/s.						
(j) 6·3	250	Adjust for max. output	(i) Power Output at 4200 Mc/s, mW	50		T.A.
See Note 5.						

NOTES

1. The valve shall be tested in approved cavities having the following characteristics

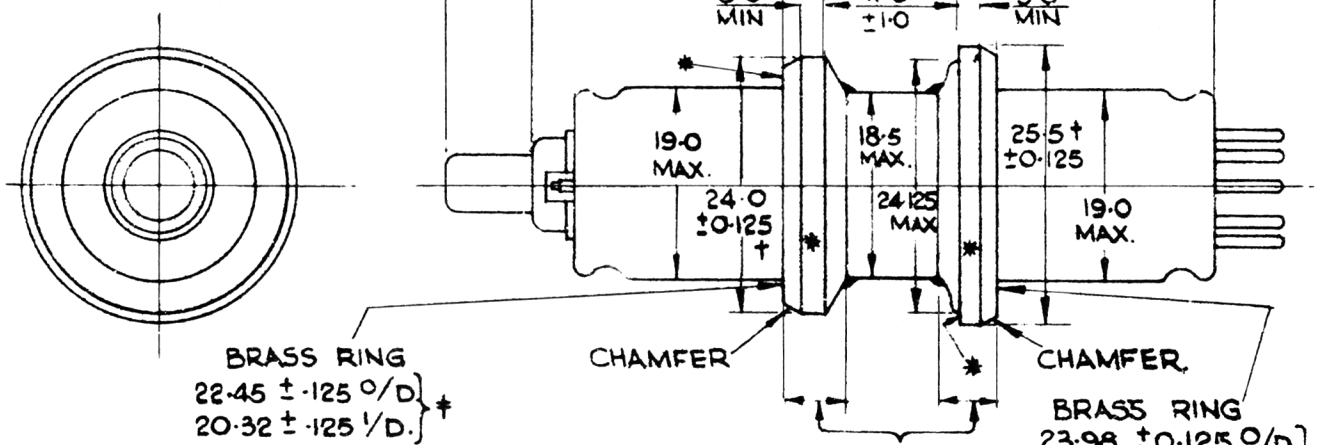
Cavity	Form	Frequency, Mc/s	Loaded Q
(i)	$\lambda/4$ radial	2640 ± 20	140 ± 5
(ii)	$\lambda/4$ radial	3200 ± 20	185 ± 5
(iii)	$3\lambda/4$ co-axial	3700 ± 30	680 ± 20

Standard cavities will be provided by the Approving Authority to be used only for checking the performance of test cavities. The frequency of any test cavity may be determined by comparing the mean frequency of at least six valves with that obtained in the appropriate standard cavity. In Tests (d1) and (d2) A and B are

ECCENTRICITIES MEASURED RELATIVE TO AXIS OF

LARGE COPPER	
SMALL COPPER	0·25 MAX. †
TOP CAP	0·4 MAX †
PITCH CIRCLE OF BASE PINS	0·75 MAX. †

DIMENSIONS MARKED † TO BE TESTED 100%. DIMENSIONS MARKED ‡ ARE NOT TESTED. ALL OTHER DIMENSIONS TO BE TESTED ON 5%.



ALL DIMS. IN MM.

TO BE GOLD FLASHED ON PROJECTING METAL SURFACES BETWEEN THESE LINES. THE SURFACES MARKED * SHALL BE SMOOTH.

CONTACT SURFACE DIAMETERS TO BE TESTED AS FOLLOWS:
THE CONTACTS SHALL PASS THROUGH CIRCULAR HOLES OF DIAMETERS 24·13 AND 25·63 MM.; AT ALL PARTS OF THE SURFACES THEY SHALL NOT PASS BETWEEN TWO PARALLEL PLANE CALLIPERS 1 MM. WIDE SEPARATED BY 23·87 AND 25·37 MM.

CV2116

CV2M 16/7/5

SPECIFICATION CV2116. ISSUE 7 dated February. 1957

AMENDMENT NO.1

PAGE 1. Note B.

AMEND the formula to read:-

$$V_r = \frac{0.023f\ (V_a)^{\frac{1}{2}} - V_a}{N + .75}$$

T.V.C. Office

for Director R.R.E.

June, 1957

N87951R

Amendment No.2
to Specification CV2116 Issue 7 dated February 1957.

Page 6 "Notes"

Add Note 6. The standard cavities are fully described in the following drawings obtainable from R.R.E., Malvern:

Cavity	(i)	RR/B108903 G.A. drawing list and parts list.
"	(ii)	RR/B108902 G.A. drawing list and parts list.
"	(iii)	RR/B108634 G.A. drawing list and parts list.

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

September 1957.

Z.15224.R.

G3/SAD

ELECTRONIC VALVE SPECIFICATIONS

SPECIFICATION MOS/CV 2116, ISSUE 7, DATED FEBRUARY 1957

AMENDMENT NO 3

Insert the following changes:

1. Page 1 a Specification Authority delete
"Ministry of Supply RRE" and substitute
"MINISTRY OF DEFENCE (PE)/RSRE"

b Specification Title delete
"Specification MOS/CV 2116" and substitute
"Specification MOD/CV 2116"

2. Page 2 test d. In the column headed
'Limits - Min' amend
"A" to read "A-20" and in the column headed
'Limits-Max' amend
"A" to read "A + 20"

3. Amendment No 2 amend "Page 6" to read
"Page 4"

January 1979 DSLR for RSRE