

AVIATION  
MINISTRY OF SUPPLY DLRD/RRE

Amtd 2

VALVE ELECTRONIC CV2312

MOA Specification <del>MOS(A)</del> /CV2312 Issue 4 dated 20.11.58. To be read in conjunction with K1001 and BS.448	Amtd 2 <u>SECURITY</u> <u>Specification</u> UNCLASSIFIED <u>Valve</u> UNCLASSIFIED
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→ Indicates a change

<u>TYPE OF VALVE</u> - Twin-primer Broad-Band TR Cell (Improved version)			<u>MARKING</u>  See K1001/4	
<u>PROTOTYPE</u> - VX1028				
<u>RATING</u>		<u>DIMENSIONS AND CONNECTIONS</u>		
Operating Frequency range (Mc/s)		See Drawing on Page 6. <u>See Note E</u>		
Max. Peak Power (kW)		<u>TOP CAPS</u>		
Min. Peak Power (kW)		CT1		
Min. Primer Supply Voltage (V)		See BS. 448 : 1953		
Max. Main Primer Current (uA)		6/1.1		
Min. Main Primer Current (uA)				
Max. Auxiliary Primer Current (uA)				
Min. Auxiliary Primer Current (uA)				
<u>NOTES</u>				
A. With duty cycle not exceeding 0.001.				
B. Operation at this power level results in considerably reduced life. For satisfactory operation at power levels above 50 KW it is recommended that the valve be preceded by a pre - TR Cell.				
C. The Primer Currents shall be limited by series resistances of which at least 1 megohm must be placed adjacent to each primer.				
D. If necessary the valve may be used with single primer operation. This must be the MAIN primer.				

Z.18170.R. e. The superstructure of the cell which has no dimensions specified CV2312/4/1 is providing support for the cell and electrodes. Any stress or strain applied to the superstructure may possibly impair the performance or reliability of the cell. Under no circumstances should such superstructure be used wholly or in part as a location reference plane or for the purpose of a support for component parts of auxiliary equipment

Amtd 2

To be performed in addition to those applicable in K1001

Test Conditions			Test	Limits		No. Tested	Note
				Min.	Max.		
a	Primer Supply Voltage (V)						
	-900	Test shall be performed at least 7 days after any previous discharge	<u>Primer Breakdown</u> (secs) The delay between the application of primer voltage simultaneously to each primer and the breakdown shall be measured	-	5	100%	1
b	-1000		<u>Primer Operating Voltage</u> (V) The voltage of both primers shall be measured after breakdown has occurred.	180	<del>200</del> 340	100%	1
c	-1000	Line shall be energised with not more than 10 mW RF and terminated in a load matched better than 1.02 VSWR	<u>VSWR</u> Measured at frequencies 8500, 8700, 8900, 9100 and 9300 Mc/s.	-	1.50	100% or S	1, 2
d	-1000	Valve shall be mounted between impedances matched better than 1.10 VSWR. Line shall be energised with not more than 10 mW RF. Test Frequency = 8500 Mc/s	<u>Insertion Loss</u> (db)	-	0.8	100% or S	1, 2
e	-1000	Test Frequency = 8900 Mc/s $\pm$ 75 Mc/s. PRF = 1000 c/s $\pm$ 10%. Power Output = 200 KW Peak $\pm$ 15%. Rate of Rise of Magnetron voltage = 100 KV/usec $\pm$ 10%. Pulse lengths measured at 10% of peak amplitude (i) 0.15 $\mu$ sec $\pm$ 15%. (ii) 1.0 $\mu$ sec $\pm$ 10%.	<u>High Power Leakage</u> (i) Spike Energy (e/p) (ii) Total Power (mW Peak)	- 35	0.30 100	100% 100%	1, 3 and 4

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Superseded by 4941-1

Test Conditions			Test	Limits		No. Tested	Note
				Min.	Max.		
f	-1000	The test frequency of the simulated echo pulse shall be within the range 8500 to 9300 Mc/s, and its power incident on the cell shall be less than 10 mW peak RF. Test frequency of the transmitter pulse shall be 8900 $\pm$ 75 Mc/s and power 200 KW $\pm$ 15% peak RF. tp = 1.0 $\mu$ sec $\pm$ 10% PRF = 1000 c/s $\pm$ 10%	<u>Recovery Time</u> ( $\mu$ secs) The time shall be measured from the trailing edge of the transmitter pulse for an insertion loss exceeding that immediately before the transmitter pulse by:-  (i) 6 db (ii) 2 db	-	3 8	5% (6) 5% (6)	1
g	-1000	Applied power varied from 100 mW to 100W. tp = 1.0 $\mu$ sec $\pm$ 10%. Other conditions as for Test e(ii)	<u>Low Power Leakage</u> (mW peak) The total leakage power through the cell shall be measured as the applied power is varied from 100 mW to 100W.	-	250	5% (6)	1
h	-1000	Test frequencies 8500, 8900 and 9300 Mc/s. Line shall be energised at a convenient low power level.	<u>Electrical Length</u> The length of RCSC No. 16 Waveguide having the same effective electrical length as the cell shall be determined.  (i) at 8500 Mc/s (degrees) (ii) at 8900 Mc/s (degrees) (iii) at 9300 Mc/s (degrees)	137 234 312	177 274 352	100% or S	1 and 2
j	-1000	As for Test e(ii)	<u>Position of Short</u> (ins) The distance of the effective RF short behind the front flange of the cell shall be measured.	0.04	0.08	TA	1

Test Conditions			Test	Limits		Tested	Note
				Min.	Max.		
k	-1000	The line shall be energised with not more than 4 KW RF measured immediately after the cell. Other conditions as for e(ii)	<u>Arc Loss</u> (db)		0.8	T.A.	1
m	-1000	6 valves to be mounted on E plane T junctions followed by a matched load. Input power not exceeding 60 KW, output power not less than 40 KW. Other conditions as in test e (ii)	<u>Life Test</u> Valves to be run for 500 hours. Test c - g to be performed at 0, 50, 100, 200, 300 and 500 hours. Number of valves which at any one time exceed life test limits in any respect. (Note 5) (No.)		1	T.A.	1, 5
n	-1000	The cell shall be operated for one hour with the air pressure in the waveguide on the input side maintained at 30 lbs/sq. in. absolute. TP = 1.0 $\mu$ sec + 10%. Other conditions as for Test e(ii)	<u>High Power</u>		-	T.A.	1

NOTES

1. The primer supply shall be D.C. having a peak-to-peak ripple voltage not exceeding 1% and shall be negative with respect to the body of the cell. The regulation of the supply shall be negligible at load currents up to 0.3 mA. The supply shall be connected to the main primer through resistances totalling 5.5 megohms  $\pm$  5% and to the auxiliary primer through resistances totalling 12.5 megohms  $\pm$  5%. At least 1 megohm shall be placed adjacent to each primer terminal.
2. An approved sampling test may be employed. If a batch fails to meet this, all valves shall be subjected to the specification test.
3. This test is to be performed using a 4J50 Type magnetron. Measurements are to be made with a thermistor mount having the following characteristics:-

Efficiency E ( $\frac{\text{ratio of measured power}}{\text{incident power}}$ ) to be greater than 90%

V.S.W.R. to be greater than 0.9 over 8900  $\pm$  100 Mc/s and greater than 0.75 over 8900  $\pm$  250 Mc/s.

If the measured leakage powers are  $P_1$  and  $P_2$  microwatts at pulse lengths of 0.15 ( $t_1$ ) and 1.0 ( $t_2$ ) microseconds, and the pulse repetition frequency is  $f$  then

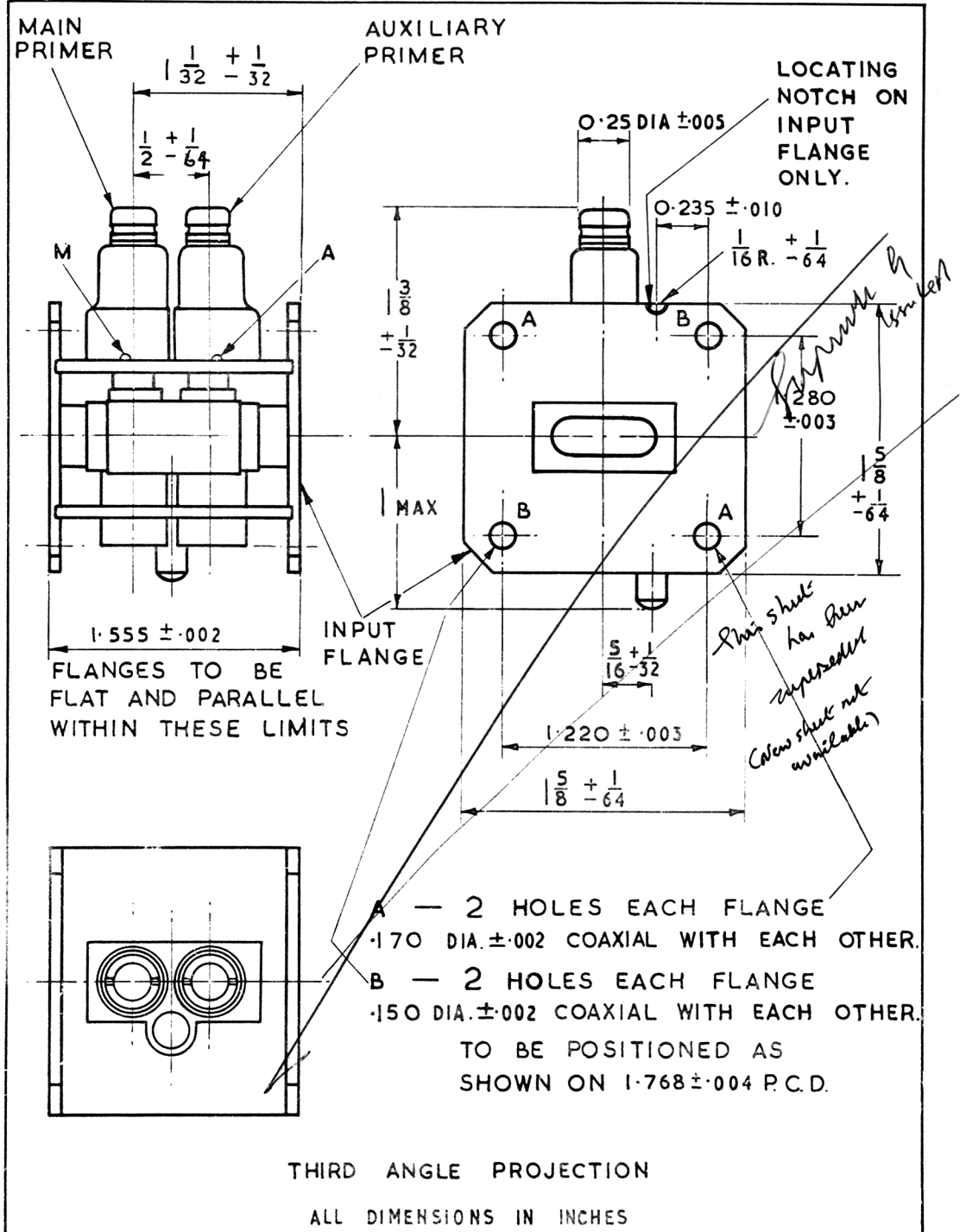
$$(i) \text{ spike energy} = \frac{10P_1}{Ef} \quad \text{ergs/pulse}$$

$$(ii) \text{ total power} = \frac{1000P_2}{Ef t_2} \quad \text{mw peak}$$

4. The minimum limit for total leakage is a manufacturing test limit applying to new valves only.

5. Life Test Limits During Life Test, the limits applicable to the tests contained in clauses C-3 (inclusive) shall be amended to the following:-

V.S.W.R. (all test frequencies)	Max. 1.4
Insertion Loss (dbs)	Max. 1.0
Breakthrough (i) spike (ergs/pulse)	Max. 0.3
(ii) total power (mw peak)	Max. 100
Recovery time (i) 6 db's ( $\mu$ sec)	Max. 10
(ii) 2 db's ( $\mu$ sec)	Max. 20
Low Power Leakage (mw)	Max. 250



SPECIFICATION M.O.S.(A)/CV.2312

ISSUE 4 DATED 20.11.58

AMENDMENT NO. 1

*Superseded by  
Issue 4A*

Page 5    Note 5

Immediately following note heading

Insert    "During Life Test, the limits applicable to  
the tests contained in Clauses c-g (inclusive)  
shall be amended to the following:-"

Page 6    At top left hand corner

Amend page number to "Page 6"

February, 1959

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

N.54376/p

*✓ AAS*

ELECTRONIC VALVE SPECIFICATIONS

SPECIFICATION MOS(A)/CV2312 ISSUE 4 DATED 20.11.58  
AMENDMENT No.2.

*Superimposed by  
ISSUE 4A*

- (i) Page 1. Top of Page. Amend, "Ministry of Supply DLRD/RRE" to read "Ministry of Aviation DLRD/RRE".
- (ii) Page 1. Specification Title. Amend "Specification MOS(A)/CV2312" to read "Specification MOA/CV2312."
- (iii) Page 1. In the 'box' headed "DIMENSIONS AND CONNECTIONS" add "See Note E".
- (iv) Page 1. NOTES Add new 'NOTE E' as follows:-

"The superstructure of the cell which has no dimensions specified is providing support for the cell and electrodes. Any stress or strain applied to the superstructure may possibly impair the performance or reliability of the cell. Under no circumstances should such superstructure be used wholly or in part as a location reference plane or for the purpose of a support for component parts of ancillary equipment."

September, 1964.  
(228878)

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

*/AAB  
19/11/64*



ELECTRONIC VALVE SPECIFICATIONS

SPECIFICATION MOA/CV2312 ISSUE 4 DATED 20.11.58

AMENDMENT No. 3

Page 6 Outline Drawing  
(amended from Page 5 by Amendment No. 1)

Cancel but do not remove existing Page 6 and  
substitute new Page 6, dated 30.12.64, attached hereto.

January, 1965

T.V.C. for A.S.W.E. NJ253641

*Superseded by  
Issue 4d*

*not attached*

There appears to have been  
no Amal No. 3. AAS

ELECTRONIC VALVE SPECIFICATIONS

SPECIFICATION M.O.A/CV.2312 ISSUE No. 4

DATED 20th NOVEMBER 1958

AMENDMENT No. 4

Page 2 Test Clause (b) Primer Operating Voltage

In column headed "LIMITS, Max", delete "280"  
and substitute "340".

May, 1965.

NM.278491

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

*Supplied by  
Issue 4A*

*V.A.S.  
10/8/65*