VALVE ELECTRONIC **CV 2311**

MINISTRY OF TECHNOLOGY - DLRD/RRE.

Specification Mintech/CV2311	SECURITY	
	Specification	Valve
Issue No. 4A, Dated May 1968.		
To be read in conjunction with K1001	UNCLASSIFIED	UNCLASSIFIED

⟶ Indicates a change

TYPE OF VALVE - Twin-primer Broad-band TR Cell (improved version)

PROTOTYPE - VX1027

MARKING

See K1001/4.

RATING

			Note
Operating Frequency Range	(MHz)	9180 to 10000	
Max. Peak Power	(kW)	250	A,B
Min. Peak Power	(kW)	4	A
Min. Primer Supply Voltage	(V)	-950	
Max. Main Primer Current	(μA)	185	C
Min. Main Primer Current	(μA)	100	C
Max. Auxiliary Primer Current	(μA)	80	C
Min. Auxiliary Primer Current	(μA)	50	C

DIMENSIONS AND CONNECTIONS

See Drawing on Page 6

TOP CAPS

CT1

(See BS 448, 6/1.1)

Notes

A. With duty cycle of 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 resistance 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.

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TESTS

To be performed in addition to those applicable in K1001

	Test Conditions		Test	Limits		No. Tested	Note
				Min.	Max.		
	Primer Supply Voltage (V)						
a	-900	Test shall be performed at least 7 days after any previous discharge	Primer Breakdown (secs) The delay between the application of primer voltage simultaneously to each primer, and the breakdown, shall be measured.	-	5	100%	1
b	-1000		Primer Operating Voltage (V) The voltage of both primers shall be measured after breakdown has occurred.	180	340	100%	1
c	-1000	Line to be energised with not more than 10 mW r.f. and terminated in a load matched better than 1.02 v.s.w.r.	VSWR (i) Measured at frequencies 9180 MHz and 10,000 MHz.	-	1.30	100%	1
			(ii) Measured at frequencies 9400 MHz, 9600 MHz, 9800 MHz.	-	1.20	100%	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 r.f. Test frequency = 10,000 MHz.	Insertion Loss (db)	-	0.8	100%	1&2

TESTS (Cont'd)

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Test Conditions			Test	Limits		No. Tested	Note
				Min.	Max.		
e	-1000	Test frequency = 9375 MHz ± 50 MHz, prf = 1000 Hz ± 10%. Power output 200 kW ± 15%. Rate of rise of magnetron voltage 100 kV/ sec ± 10%. Pulse length measured to 10% of peak power. (i) 0.15 µS ± 15%. (ii) 1.0 µS ± 10%.	High Power Leakage (i) Spike energy (ergs/pulse) (ii) Total power (mW Peak)	- 35	0.3 100	100% 100%	1, 3 and 4
f	-1000	The test frequency of the simulated echo pulse shall be within the range 9180 to 10,000 MHz, and its power, incident on the cell, shall be less than 10 mW peak rf. Test frequency of the transmitter pulse shall be 9375 ± 50 MHz and power 200 kW ± 15%. Tp = 1.0 µS. ± 10%. prf = 1000 Hz ± 10%.	Recovery Time 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 (µS) (ii) 2 db (µS)	- -	3 8	5% (6) 5% (6)	1&5 1&5
g	-1000	Applied power varied from 100 mW to 100 W. Tp = 1.0 µsec ± 10% Other conditions as Test (e).	Low Power Leakage (mW Peak) Maximum total leakage power is recorded.	-	250	5% (6)	1

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TESTS (Cont'd)

Test Conditions			Test	Limits Min.	Limits Max.	No. Tested	Note
h	-1000	Test frequencies, 9180, 9600 and 10,000 MHz. Line shall be energised at a convenient low power level.	Electrical Length The length of RCSC No. 16 waveguide having the same effective electrical length as the cell, shall be determined at the following three frequencies (i) at 9180 MHz (degrees) (ii) at 9600 MHz (degrees) (iii) at 10,000 MHz (degrees)	 192 280 366	 232 320 406	5% or 6 per week whichever is the greater	1 and 2
j	-1000	As for Test (e)	Position of Short (ins) The distance of the effective rf short behind the front flange of the cell shall be measured.	0.014	0.028	QA	1
k	-1000	Line shall be energised with not more than 4 kW rf measured immediately after the cell. Other conditions as for Test (e).	Arc Loss (db)	-	0.8	QA	1
l	-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).	Life Test Valves to be run for 500 hrs. Tests 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	QA	1 & 5

TESTS (Cont'd)

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Test Conditions			Test	Limits		No. Tested	Note
				Min.	Max.		
m	-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 µsec ± 10%. Other conditions as for Test (e).	High Power	-	-	QA	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 ± 5% and to the auxiliary primer through resistances totalling 12.5 megohms ± 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 Valve Type CV2284 (4J50 magnetron). Measurements are to be made with a thermistor mount having the following characteristics:-

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

   V.S.W.R. to be greater than 0.9 over 9375 ±100 MHz and greater than 0.75 over 9375 ± 250MHz.

   If the measured leakage powers are P_1 and P_2 in µW at pulse durations of 0.15 µS (t_1) and 1.0 µS (t_2), and the pulse repetition frequency is f then

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

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

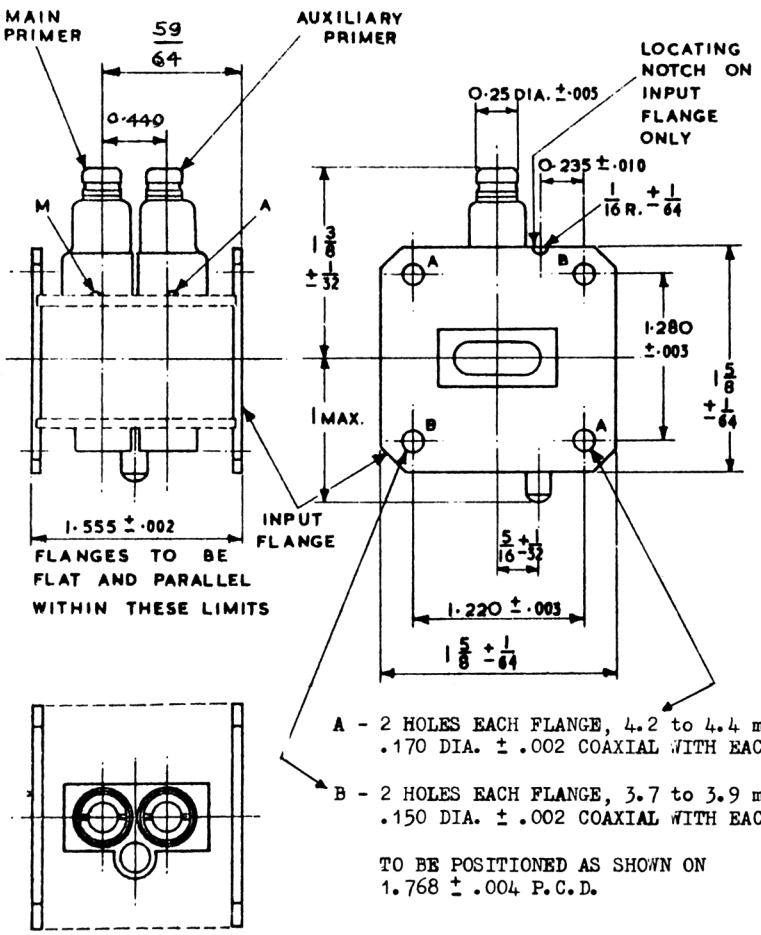
4. The minimum limit for total leakage is a manufacturing test limit applying to new valves only.

NOTES (Cont'd)

5. Life Test Limits

V.S.W.R. (all test frequencies)	Max. 1.4
Insertion loss (db)	Max. 1.0
Breakthrough (i) spike (ergs/pulse)	Max. 0.3
(ii) total power (mW peak)	Max. 100
Recovery time (i) 6 dB (μS)	Max. 10
(ii) 2 db (μS)	Max. 20
Low Power Leakage (mW)	Max. 250

OUTLINE DRAWING



THIRD ANGLE PROJECTION
ALL DIMENSIONS IN INCHES