

Specification AD/CV2306, CV2307 Issue No. 3 dated 19.11.57 To be read in conjunction with K1001 and BS1409	<u>SECURITY</u>	
	<u>Specification</u> Unclassified	<u>Valve</u> Unclassified

—————> Indicates a change

<u>TYPE OF VALVE:</u> Broad-band T.R. Valve		<u>MARKING</u> See K1001/4	
<u>PROTOTYPE:</u> BS156 (CV2306) BS158 (CV2307)			
<u>RATINGS</u> All limiting values are absolute		<u>DIMENSIONS & CONNECTIONS</u> See Drawing on Page 6.	
		Note	
<u>Operating Frequency:-</u>			
CV2306 (Mc/s)	9000 to 9600		
CV2307 (Mc/s)	8500 to 9100		
Max. Peak Power (kW)	200	A, B	
Min. Peak Power (kW)	4		
Primer Supply Voltage (V)	-1000	C	
Max. Primer Current (µA)	150	C	
<u>NOTES</u>			
A. 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-T.R. valve.			
B. With duty ratio not exceeding 0.001.			
C. Primer current to be limited by a series resistance of 5.5 Megohms of which at least 0.5 megohms must be placed adjacent to the valve.			

TESTS

To be performed in addition to those applicable in K1001,
and after a Holding Period of at least 7 days.

	Test Conditions - unless otherwise specified:- Primer supply voltage = -1000V	Test	Limits		No. Tested	Note
			Min.	Max.		
a	Primer supply voltage to be -900V. Test to be performed at least 7 days after any previous discharge.	<u>Primer Breakdown</u> The delay between application of primer voltage and initial breakdown to be measured. (Secs.)	-	5	100%	1
b	As for test "a"	<u>Primer Operating Current</u> The primer current to be measured after breakdown has occurred. (μ A)	75	150	100%	1
c	Line to be energised with not more than 10 mW RF power and terminated in a load matched better than 1.02 VSWR.	<u>VSWR</u> Measured at frequencies: CV2306:- 9000, 9300 and 9600 Mc/s CV2307:- 8500, 8800 and 9100 Mc/s	-	1.2	100%	1
d	Valve to be mounted between impedances matched better than 1.1 VSWR. Line to be energised with not more than 10 mW RF power	<u>Low Level Insertion Loss</u> (dB) Measured at frequencies:- CV2306:- 9000, 9300 and 9600 Mc/s CV2307:- 8500, 8800 and 9100 Mc/s	-	0.8	100%	1

CV2306, CV2307/3/2

TESTS

To be performed in addition to those applicable in K1001.

Test Conditions	Test	Limits		No. Tested	Note
		Min.	Max.		
• Line to be energised using 50 kW ± 10% peak RF power with PRF = 1000 c/s ± 10% terminated in a matched load. tp = 1.0 μS ± 10% and 0.15 μS ± 15%. Test frequency = CV2306:- 9300 Mc/s ± 100 Mc/s CV2307:- 8800 Mc/s ± 100 Mc/s	<u>High Power Leakage</u> 1. Spike energy (ergs/pulse)	-	0.2	100%	1
	2. Total Leakage power (mW)	-	100	100%	2 ←
f tp = 1 μS ± 10%. Other conditions as in test "e".	<u>Recovery Time</u> The time to be measured from the trailing edge of the applied pulse until the insertion loss has fallen to a value 3 dB above its value immediately before the pulse is applied. (μS)	-	4	100%	1
g Applied peak RF power varied from 100 mW to 100 Watts. tp = 1 μS ± 10%. Other conditions as in test "e".	<u>Low Power Leakage</u> The total leakage through the valve is to be measured as the applied power is varied. (mW peak)	-	250	5% (5)	1 ←
h tp = 1 μS ± 10%. Other conditions as in test "e".	<u>Position of Short</u> The distance of the effective RF short circuit behind the front flange of the valve is to be measured. (in.)	0.014	0.028	5% (5)	1,3 ←

TESTS

To be performed in addition to those applicable in K1001.

	Test Conditions	Test	Limits		No. Tested	Note
			Min.	Max.		
→ j	Line to be energised with 4 kW peak RF power measured immediately after the valve. $t_p = 1 \mu S \pm 10\%$. Other conditions as in test "e".	<u>Arc Loss</u> (dB)	-	0.8	T.A.	1
k	The valve shall be stored at 100°C. for one hour, followed by one hour at room temperature and one hour at -40°C; this cycle to be repeated six times.	<u>Temperature Cycling</u> Tests "a" and "b" to be repeated after temperature cycling.			T.A.	
→ l	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" 2.	<u>Life Test</u> Valves to be run for 500 hrs. Tests "b" to "f" to be performed at 0, 50, 100, 200, 300 and 500 hrs. Number of failures.		1	T.A.	4,5,6
→ m	Crystal type CV2154. to be mounted behind each T.R. valve. This test to be performed in conjunction with test "l".	<u>Crystal Protection</u> Mean Crystal Noise factor deterioration in dB per 500 hrs. (dB)		3	T.A.	4,5
<u>NOTES</u>						
→	1. Primer Supply Voltage to be D.C., having a peak-to-peak ripple voltage not exceeding 1%, and the primer shall be negative with respect to the body of the valve. Primer current to be limited by a series resistance of 5.5 megohms of which at least 0.5 megohms must be placed adjacent to the valve.					
						/2. ...

NOTES (Contd.)

2. High power leakage to be measured by using two pulse length T_1 nominal value $0.15/\mu\text{S}$ and T_2 nominal value $1.0/\mu\text{S}$. The actual values of T_1 and T_2 are found by measurement of the pulse length at 10% of peak power output and these should be used in the calculation of Spike energy and Total leakage power. Measurements are to be made with a thermistor mount for which the efficiency E , (i.e. the ratio of the measured power to the incident power, is greater than 0.9.

VSWR to be less than 1.1 over the frequency bands
 $9300 \text{ Mc/s} \pm 100 \text{ Mc/s}$ for CV2306 and $8800 \text{ Mc/s} \pm 100 \text{ Mc/s}$ for CV2307.

If the measured leakage powers be P_1 and P_2 micro-watts respectively, then

$$2.1. \text{ Spike energy} = \frac{10 P_1}{E \times (\text{PRF})} \quad \text{erg/Pulse.}$$

$$2.2. \text{ Total leakage power} = \frac{P_2 \times 10^3}{T_2 \times E \times \text{PRF}} \quad \text{mW.}$$

3. This may be done by using a ring circuit magic T with a metal plate termination. Adjust the tuning plunger for optimum matching; then replace the metal plate by the valve and readjust. The distance moved by the tuning plunger gives the distance of the effective RF short circuit from the front flange.
4. Maintenance of T.A. quality to be agreed with the manufacturer.
5. A further six sample valves to be provided by the manufacturer for T.A. life tests.
6. Where life tests are carried out as laid down in Section 13 of K1001, end of life will be indicated by failure to pass any of the b, c, d, e, f tests with the following relaxations of limits:-
- (c) VSWR Max. 1.4.
 - (d) Insertion Loss Max. 1.5 dB.
 - (e) Spike Energy 0.25 ergs/Pulse Max.
 - (f) Recovery Time 10 dB $4/\mu\text{S}$.

