SURFACE WEAPONS
ADMIRALTY ~~SIGNAL AND RADAR~~ ESTABLISHMENT

VALVE ELECTRONIC

CV2306
CV2307

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

→ Indicates a change

TYPE OF VALVE: Broad-band T.R. Valve

→ **PROTOTYPE:** BS156 (CV2306)
BS158 (CV2307)

MARKING

See K1001/4

RATINGS

All limiting values are absolute

			Note
→ Operating Frequency:-			
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	(/uA)	150	C

DIMENSIONS & CONNECTIONS

See Drawing on Page 6.

NOTES

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 Min.	Limits Max.	No. Tested	Note
a	Primer supply voltage to be -900V. Test to be performed at least 7 days after any previous discharge.	Primer Breakdown The delay between application of primer voltage and initial breakdown to be measured. (Secs.)	-	5	100%	1
→ b	As for test "a"	Primer Operating Current The primer current to be measured after breakdown has occurred. (/uA)	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.	VSWR 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	Low Level Insertion Loss (dB) Measured at frequencies:- CV2306:- 9000 9300 and 9600 Mc/s CV2307:- 8500, 8800 and 9100 Mc/s	-	0.8	100%	1

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TESTS

To be performed in addition to those applicable in K1001.

	Test Conditions	Test	Limits Min.	Limits Max.	No. Tested	Note
e	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	High Power Leakage 1. Spike energy (ergs/pulse) 2. Total Leakage power (mW)	- -	0.2 100	100% 100%	1 2
f	tp = 1 µS ± 10%. Other conditions as in test "e".	Recovery Time 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".	Low Power Leakage 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".	Position of Short 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 Min.	Limits Max.	No. Tested	Note
j	Line to be energised with 4 kW peak RF power measured immediately after the valve. tp = 1 μS ± 10%. Other conditions as in test "e".	Arc Loss (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.	Temperature Cycling 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.	Life Test 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".	Crystal Protection Mean Crystal Noise factor deterioration in dB per 500 hrs. (dB)		3	T.A.	4,5

NOTES

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. ...

N O T E S (Contd.)

2. High power leakage to be measured by using two pulse length T_1 nominal value 0.15 µS and T_2 nominal value 1.0 µS. 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 Mc/s ± 100 Mc/s for CV2306 and 8800 Mc/s ± 100 Mc/s for CV2307.

If the measured leakage powers be P1 and P2 micro-watts respectively, then

2.1. Spike energy = $\frac{10\ P1}{E \times (PRF)}$ erg/Pulse.

2.2. Total leakage power = $\frac{P2 \times 10^3}{T2 \times E \times PRF}$ 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.

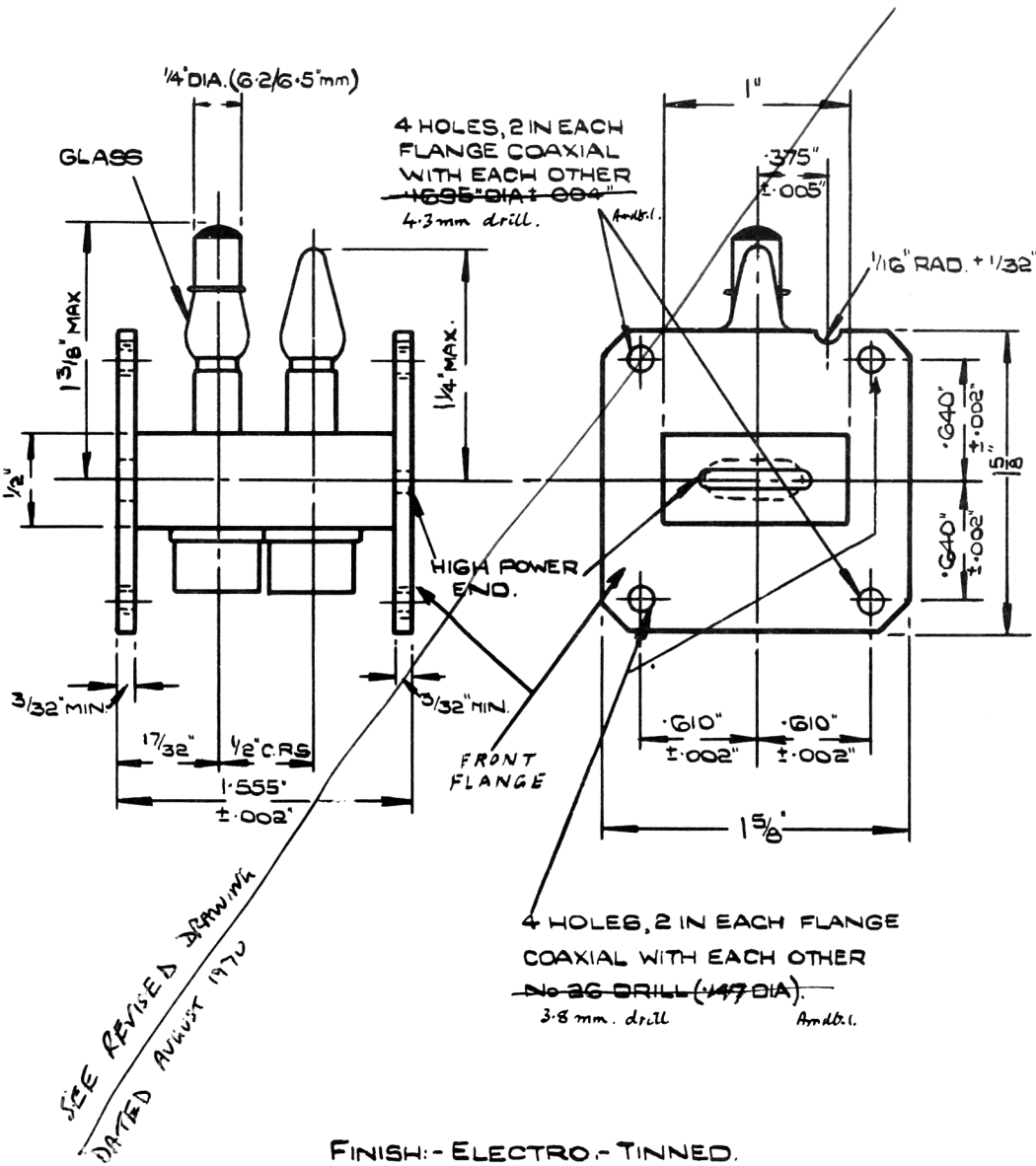
6. Where life tests are carried out as laid down in Section 13 of K1001, end of life will be indicated by failure to pass any of the b, c, d, e, f tests with the following relaxations of limits:-

(c) VSWR Max. 1.4.

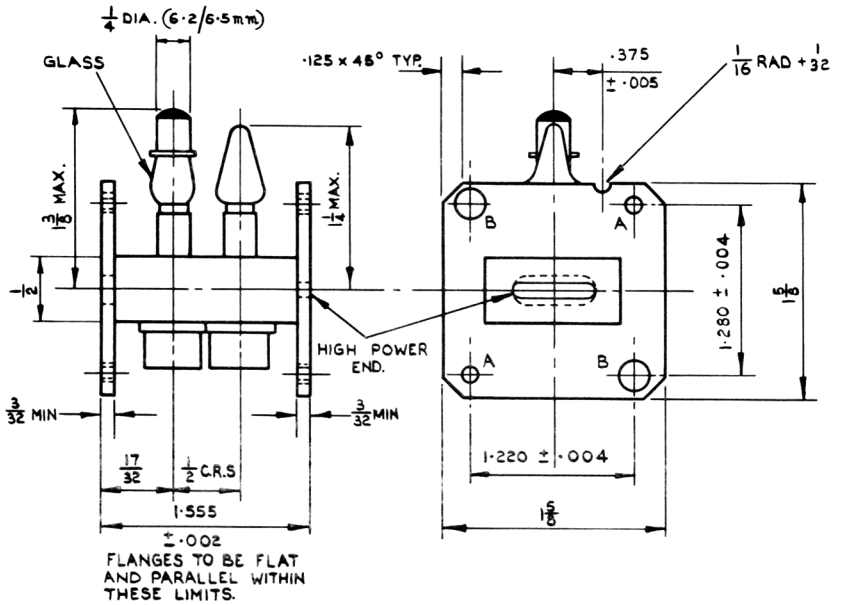
(d) Insertion Loss Max. 1.5 dB.

(e) Spike Energy 0.25 ergs/Pulse Max.

(f) Recovery Time 10 dB 4 µS.



FINISH:- ELECTRO.- TINNED.



FINISH:- ELECTRO-TINNED

'A' HOLES 3·8mm DRILL- 2 IN EACH FLANGE COAXIAL TO EACH OTHER
'B' HOLES 4·3mm DRILL- 2 IN EACH FLANGE COAXIAL TO EACH OTHER

DIMENSIONS IN INCHES

TOLERANCES (UNLESS OTHERWISE INDICATED) :-
FRACTIONAL ± 1/64 IN.
DECIMAL ± ·005IN.

ELECTRONIC VALVE SPECIFICATIONS

SPECIFICATION AD/CV2306,CV2307 ISSUE No.3 DATED 19.11.57

AMENDMENT No.1.

Page 6. In the two Notes referring to the flange holes:-

(i) Delete '.1695 "dia ± .004"' and substitute '4.3 m.m. drill'

(ii) Delete 'No.26 Drill (.147 DIA.)' and substitute '3.8 m.m. drill'

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

January, 1964.

(213544)

AMS 28/5/64

ELECTRONIC VALVE SPECIFICATION
SPECIFICATION AD/CV2306, CV2307 ISSUE NO 3 DATED 19.11.57
AMENDMENT NO 2

Page 1 DELETE: Admiralty Signal and Radar Establishment

INSERT: Admiralty Surface Weapons Establishment

Page 6 Cross out but do not remove existing outline drawing
INSERT: New outline drawing dated August 1970

ASWE - 27 August 1970