MINISTRY OF AVIATION - DLRD/RRE

VALVE ELECTRONIC CV2303

Specification MOA/CV2303	SECURITY				
Issue 3A Dated 1st July, 1966	Specification	<u>Valve</u>			
To be read in conjunction with K1001	UNCLASSIFIED	UNCLASSIFIED	-		

4	Indicates	change
_	THIRTCALOR	CHELLE

TYPE OF VALVE - Twin-primer Broad-band TR	MARKING	
PROTOTYPE - VX3153	See K1001/4	
RATINGS AND CHARACTERISTICS		
	No	ote <u>DIMENSIONS</u>
Operating Frequency Range (Mc/s	3275 to 3325	See Drawing on Page 6.
Max. Peak Power (kW	250	A
Min. Peak Power Min. Primer Supply Voltage Max. Main Primer Current Min. Main Primer Current Max. Auxiliary Primer Current Min. Auxiliary Primer Current (pA	-950 160 75 80 40	В

NOTES

- A. Duty cycle not greater than 0.001.
- B. The primer currents shall be limited by series resistances of which at least one megohm must be placed adjacent to each electrode.

TESTS

To be performed in addition to those tests applicable in K1001

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K1001 R ef5H	Test	Test	Conditions	Insp leve	AQL %	Sym bol		Max	Unit
	Primer Breakdown The delay between the application of the primer voltage simultaneously to each primer and the resulting breakdowns shall be measured.	Primer Currents	Test shall be performed at least 7 days after any previous discharge. The primer supply voltage shall be 900V.	100%			-	5	Seca
	Running Voltage The voltage drop across each electrode shall be measured by an approved method, after breakdown has occurred.	Main:- 100 µA ± 3% Auxil- iary: 50 µA± 3%	Notes 1 and 5	100%			240	400	Volta
- 1	Yacuum Test After completing tests (a) and (b) the cell shall re- main inactive for one month, after which time tests (a) and (b) shall be repeated. If the voltage drop across either electrode has increased by more than 10% the cell shall be rejected; otherwise the re- maining tests of the specification shall be completed.		Note 1	100%					
₩1.3 ₩2303/		Main:- 100mA ± 35 Auxiliary 50mA±35	Line shall energised with not more than 10 mW RF and terminated in a load matched better than 1.02 VSWR. (Cont'd	100%			-	1.10	Ratio

Test	Test	Conditions			Sym bol	Lim Min	its Max	Unit
(d) cont'd.	Primer Currents	Measured at frequencies 3275 ± 2, 3300 ± 2, 3325 ± 2 Mc/s.						
(e) Insertion Loss (db)	Main:- 100 µA ± 3% Auxil- iary: 50 µA ± 3%.	to VSWR better than 1.10. Line shall be energised				-	1.0	dВ
(f) High Power Leakage (i) Spike Energy (ii) Flat Power	Main:- 100 µA ± 3% Auxil- iary: 50 µA ± 3%	Test frequency = 3300 ± 12 Mc/s Line shall be energised with 180 ± 40 kW peak RF with PRF = 1000 c/s ± 10%, and terminated in a matched load. The apparatus used for this test shall be approved. Notes 1.2 & 3	100%			10	0.30 75	Erg/ Pulse mW
(g) 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:- (1) 6 db (11) 2 dB	Main:- 100 µA ± 3% Auxil- iary: 50 µA ± 3%	The test frequency of the simulated echo pulse shall be the same as the frequency of the magnetron, and its power incident on the cell shall be less than 10 mW meak RF. The test frequency of the transmitter pulse	10%			-	3	يدود بدود
	(d) cont'd. (e) Insertion Loss (db) (f) High Power Leakage (i) Spike Energy (ii) Flat Power 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	(d) cont'd. (e) Insertion Loss (db) Main:- 100 µA ± 3% Auxil- iary: 50 µA ± 3%. (f) High Power Leakage (i) Spike Energy (ii) Flat Power (ii) Flat Power Main:- iary: 50 µA ± 3% Auxil- iary: 50 µA ± 3%	(d) cont'd. Primer Currents Measured at frequencies 3275 ± 2, 3300 ± 2, 3325 ± 2 Mc/s. Note 1 (e) Insertion Loss (db) Main:- 100 µA ± 3% Auxil- iary: 50 µA ± 3%. (i) Spike Energy (i) Spike Energy (ii) Flat Power (ii) Flat Power Main:- 100 µA ± 3% Auxil- iary: 50 µA ± 3% Auxil- iary: 50 µA ± 3% Auxil- iary: 50 µA ± 3% Auxil- iary: 50 µA ± 3% Auxil- iary: 50 µA ± 3% Main:- 100 µA Ecovery Time The time shall be measured at frequencies 3275 ± 2, 3300 ± 2 Mc/s. Note 1 Cell shall be mounted between impedances matched to VSWR better than 1.10. Line shall be energised with not more than 10 mW F. Test frequency = 3300 ± 12 Mc/s Line shall be energised with 180 ± 40 kW peak RF with PRF = 100 µA 180 ± 40 kW peak RF with PRF = 100 µC /s ± 10%, and terminated in a matched load. The apparatus used for this test shall be approved. Notes 1.2 & 3 The test frequency of the simulated echo pulse shall be the same as the frequency of the magnetron, and its frequency of the magnetron, and its frequency of the magnetron, and its frequency of the magnetron impedances matched to VSWR better than 1.10. Line shall be energised with not more than 10 mW F. Test frequency = 3300 ± 12 Mc/s Notes 1 The test frequency of the simulated echo pulse shall be the same as the frequencies and the coll shall be less than 10 mW meak RF. The test frequency of the transmitter pulse shall be 3300 ± 12 Mo/s. Notes 1 & 4 Mo/s. Notes 1	(d) cont'd. Primer Currents Reasured at frequencies 3275 ± 2, 3300 ± 2, 3325 ± 2 Mc/s. Note 1 (e) Insertion Loss (db) Main: 100 µA ± 3% Auxil- iary: 50 µA ± 3%. Main:- 10 mW RF. Test frequency = 3300 ± 12 Mc/s. Note 1 (f) High Power Leakage (i) Spike Energy (ii) Flat Power (ii) Flat Power (iii) Flat Power Main:- 100 µA ± 3% Auxil- iary: 50 µA ± 3% Line shall be energised with 180 ± 40 kW peak RF with PRF = 100% 100% Line shall be energised with 180 ± 40 kW peak RF with PRF = 100% Notes 1.2 & 3 (g) Recovery Time The time shall be measured from the trailing edge of the transmitter pulse for an insertion lose sexceeding that immediately before the transmitter pulse for an insertion lose sexceeding that immediately before the transmitter pulse for an insertion lose sexceeding that immediately before the transmitter pulse for an insertion lose sexceeding that immediately before the transmitter pulse for an insertion lose sexceeding that immediately before the transmitter pulse for an insertion lose sexceeding that immediately before the transmitter pulse for an insertion lose sexceeding that immediately before the transmitter pulse shall be less than 10 mW meak RF. The test frequency of the transmitter pulse is shall be also the transmitter pulse less than 10 mW meak RF. The test frequency of the transmitter pulse is shall be also the test frequency of the transmitter pulse is shall be also the test frequency of the transmitter pulse is shall be also the t	(d) cont'd. Primer Currents Measured at frequencies 3275 ± 2, 3300 ± 2, 3325 ± 2 Mc/s. Note 1 (e) Insertion Loss (db) Main: 100 µA ± 3% Auxil- iary: 50 µA ± 3%. (i) Spike Energy (i) Spike Energy (ii) Flat Power (ii) Flat Power Main: 100 µA ± 3% Auxil- iary: 50 µA ± 3% Main: 100 µA ± 3% Auxil- iary: 1000 c/s ± 10%, and terminated in a matched load. The apparatus used for this test shall be approved. Notes 1,2 & 3 (g) 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 for an insertion loss exceeding that immediately before the transmitter pulse by: (i) 6 db Main: 100 µA ± 3% Auxil- iary: 1000 c/s ± 10%, and terminated in a matched load. The apparatus used for this test shall be approved. Notes 1,2 & 3 The test frequency of the simulated echo pulse shall be the same as the frequency of the same as the frequency of the transmitter pulse by: (i) 6 db	Test Conditions level % bol (d) cont'd. Primer Currents Measured at frequencies 3275 ± 2, 3300 ± 2, 3325 ± 2 Mc/s. Note 1 (e) Insertion Loss (db) Maini- 100 µA ± 36	Test Conditions level % bol Min (d) cont'd. Primer Currents Measured at frequencies 3275 ± 2, 3300 ± 2, 3325 ± 2 Mc/s. Note 1 (e) Insertion Loss (db) Main:- 100 µA ± % Auxil- iary: 50 µA ± 3%. (i) Spike Energy (i) Spike Energy (ii) Flat Fower (ii) Flat Fower Main:- 100 µA ± % Auxil- iary: 50 µA ± 3% Test frequency - 3300 ± 12 Mc/s. Note 1 Test frequency - 3300 ± 12 Mc/s. Note 1 100 µA ± % Auxil- iary: 50 µA ± 3% The time shall be energised with 180 ± 40 kW peak RF with PRF - 1000 c/s ± 10%, and terminated in a matched load. The apparatus used for this test shall be approved. Notes 1.2 & 3 (g) (g) (g) (g) (g) (g) (g) (g	Test Test Conditions level % bol Min Max (d) cont'd. Primer Currents Measured at frequencies 3275 ± 2, 3300 ± 2, 3325 ± 2 Mc/s. Note 1 (e) Insertion Loss (db) Maini-100 µA ± 36 Auxil-iary: 50 µA ± 36. Note 1 (f) Righ Power Leakage Maini-100 W RF. Test frequency = 3300 ± 2 Mc/s. Note 1 (f) Righ Power Leakage Maini-100 µA ± 36 Auxil-iary: 50 µA ± 36 Auxi

(g) Recovery [ime (Cont'd)							Max	
		and the power 180 ± 40 kW peak RF. Tp = 0.5 µsec ± 10% PRF = 1000 c/s ± 10%. Note 1						
(h) Low Power Leakage The total leakage through the cell shall be measured as the applied power is raised from 500 mW to 100W peak.	Main:- 100 µA ± 3% Auxil- iary: 50 µA ± 3%	Applied power raised from 500 mW to 100W peak. Tp = 0.5 µsec ± 10%. Other conditions as for Test (f).	5%			-	500	m₩
Position of Short The position of the effective RF short behind the front flange of the cell shall be measured.	Main:- 100 μA ± 3% Auxil- iary: 50 μA ± 3%.	Tp = 0.5 µsec ± 10%. Other conditions as for Test (f). Note 1	QA.			Q 065	0.0 85	ins
(k) Arc Loss	Main:- 100 µA ± 3% Auxil- iary: 50 µA ± 3%	Line shall be energised with not more than 4 kW peak RF power measured immediately after the cell. Tp = 0.5 µsec ± 10%. Other conditions as for Test (f). Note 1.	3 4			-	0.8	đВ
Litteaufu Prebt	he total leakage hrough the cell hall be measured s the applied ower is raised rom 500 mW to 100W eak. (j) osition of Short he position of the ffective RF short ehind the front lange of the cell hall be measured. (k)	he total leakage he total leakage hrough the cell hall be measured s the applied ower is raised rom 500 mW to 100W eak. (t) osition of Short he position of the ffective RF short ehind the front lange of the cell hall be measured. (k) Arc Loss 100 µA ± 3% Main:- 100 µA ± 3% Main:- 100 µA ± 3% Main:- 100 µA ± 3% Auxil- iary: 50 µA	raised from 500 mW to 100W peak. The applied season of the season of the position of the ffective RF short ehind the front lange of the cell hall be measured. (x) (x) (x) (x) (x) (x) (x) (x	raised from 500 mW to 100W peak. Auxil- iary: 50 pA the position of Short he position of the ffective RF short ehind the front lange of the cell hall be measured. (x) (x) (x) (x) (x) (x) (x) (x	raised from 500 mW to 100W peak. Auxil- iary: 50 µA to modition of Short he position of the ffective RF short ehind the front lange of the cell hall be measured. (x) (x) (x) (x) (x) (x) (x) Arc Loss 100 µA tiary: 50 µA tiary: 10%. Other conditions as for Test (f). The conditions as for Test (f). Note 1 The conditions as for Test (f). Note 1 Line shall be energised with not more than 4 kW peak RF power measured immediately after the cell. The conditions as for Test (f). Note 1 Line shall be energised with not more than 4 kW peak RF power measured immediately after the cell. The conditions as for Test (f).	raised from 500 mW to 100W peak. The applied conditions as for test (f). The position of Short hall be measured. The position of the ffective RF short ehind the front lange of the cell hall be measured. (x) Main:- 100 µA ± 3% Main:- 10%. Other conditions as for test (f). The position of the foot lary: 50 µA ± 3%. Main:- 10%. Other conditions as for Test (f). Note 1 The standard from 500 mW to 100W peak. The standard from 500 The standard from 500 mW to 100W peak. The standard from 500 The standard from 500 mW to 100W peak. The standard from 500 The standard from 500 mW to 100W peak. The standard from 500 The standard from 500 mW to 100W peak. The standard from 500 The standard from 500 The standard from 500 mW to 100W peak. The standard from 500 The	raised from 500 he total leakage hrough the cell hall be measured s the applied ower is raised rom 500 mW to 100W eak. (1) osition of Short he position of the ffective RF short lange of the cell hall be measured. (1) Arc Loss 100 µA ± 3% 100 µA ± 3% To = 0.5 µsec ± 10%. Other conditions as for Test (f). To = 0.5 µsec ± 10%. Other conditions as for Test (f). Note 1 Line shall be energised with not more than 4 kW peak RF power iary: 50 µA ± 3% Line shall be energised with not more than 4 kW peak RF power measured 100 µA ± 3% Auxil- iary: 50 µA ± 3% OA - CA -	raised from 500 ## total leakage hrough the cell hall be measured s the applied ower is raised rom 500 mW to 100W eak. (1) Obsition of Short he position of the ffective RF short lange of the cell hall be measured. (1) (1) Obsition of Short he position of the ffective RF short lange of the cell hall be measured. (2) (3) (4) (5) (5) (6) Main:- 100 µA ± 3% Main:- 100 µA ± 3% (1) (1) Main:- 100 µA 10% 10% 10% 10% 10% 10% 10% 10

NOTES

- 1. The primer supply voltage shall be D.C. having a peak-to-peak ripple voltage not greater than 1%, and shall be negative with respect to the body of the cell. The minimum open-circuit voltage shall be 900 volts, and the regulation shall be negligible at load currents up to 0.3 mA.

 The currents in the primers shall be limited to the stated values by series resistances, of which at least one megohm shall be placed adjacent to each primer.
- 2. High power leakage tests must be made using a Magnetron Type CV192, which has been calibrated against a suitable sub-standard.
- 3. High power leakage may be measured by the three-pulse method or by other suitable methods using approved equipment. If the three-pulse method is used, the pulse lengths shall be approximately 0.1 (t₁), 0.5 (t₂) and 1.0 (t₃) microseconds. If the measured leakage powers are respectively p₁, p₂ and p₃ microwatts:-
 - (a) Spike Energy

With pulse length t4,

Spike Energy = $\frac{10p_1}{PRF}$ ergs/pulse.

(b) Flat Power

With pulse lengths t2 and t3.

Flat power =
$$\frac{p_3-p_2}{t_3-t_2} \times \frac{10^3}{PRF}$$
 mW peak.

- 4. The limits for recovery time are manufacturing limits applying to new cells only. The recovery time will change with life, and a cell is considered to have reached its end-of-life if the recovery time to 6db exceeds 10 microseconds.
- 5. These results shall be recorded.

