MINISTRY OF ~~AVIATION~~ Technology DLRD(T) R.R.E. VALVE ELECTRONIC **CV6168**

Specification: ~~MOA~~ Marked/CV6168
Issue 1 dated 19th August 1965
To be read in conjunction with K1001, DEF131, DEF5011, etc.

SECURITY	
Specification	Valve
Unclassified	Unclassified

Type of Valve: Reliable Broad-Band TR Cell
Prototype: WF 461

MARKING
K1001/4

RATINGS AND CHARACTERISTICS
(Not for Inspection purposes)

			Note
Operating Frequency Range	Mc/s	8500-9500	
Max. Peak Power	kW	200	
Min. Peak Power	kW	4	
Min. Primer Supply Voltage	V	-850	B
Primer Current	µA	130	B

Base: None

DIMENSIONS
See outline drawing

TOP CAP
None

Primer connection is by wrapped joint, single strand wire 20-25 swg.

NOTES

A. The cell is for use in balanced duplexers, mounted between 3 dB couplers, 0.75 centres (W.G.16).

B. The primer encapsulation contains 5.5 Mohms of external resistance. With a primer supply voltage of between -850 and -1000V, the primer current will be limited to between 100 and 160 µA. With a primer supply voltage of not less than -950V, the supply to the primer must be connected at least 5 seconds before the application of high power RF pulses. With a primer supply of between -850 and -950V, the supply must be connected at least 30 seconds before the application of high power RF pulses.

C. Arc loss becomes disproportionately high at line powers of less than 4 kW.

D. There is a 3.3 Megohm resistor between the primer connection and the monitor allowing a measurement to be made of the primer current without disconnecting the primer supply.

E. NATO Stock Number: 5960-99-037-4455

To be performed in addition to those tests applicable in K1001

Conditions: Unless otherwise stated, Primer supply voltage is -1000V and the cell is mounted between 3 dB couplers, 0.75" centres, to an approved design.

K1001 5H	Test	Test Conditions	AQL %	Insp. Level	Sym-bol	Limits Min.	Limits Max.	Units
	GROUP A							
2.5	Primer Breakdown	Applied voltage -950V Note 1		100%	t	-	5	secs
2.5	Primer Current	Applied voltage -850V Note 1		100%		100	-	µA
4.1.3.1	V.S.W.R.	Reflectometer Check 8500 to 9500 Mc/s Note 2		100%		-	1.30	Ratio
4.1.1.1	Total Insertion Loss	Reflectometer Check at 8500 Mc/s 8600 to 9500 Mc/s Note 3		100%		- -	1.0 0.8	dB dB
	Leakage	f = 8900 ± 100 Mc/s P.R.F. = 1,000 pps ± 10% Linepower = 200 kW ± 15%						
	(1) Spike	tp = 0.15 µS ± 15%		100%		-	0.02	e/p
	(2) Total	tp = 1.0 µS ± 15% Note 4		100%		-	10	mW
	GROUP B - Omitted							
	GROUP C							
4.2.4.4	Low level leakage	f = 8900 Mc/s ± 100 Mc/s P.R.F. = 1000 pps ± 10% tp = 1.0 µS ± 10% Incident power varied from 100 mW peak to 100 W peak	2.5	II		-	500	mW
4.2.5.1	Recovery Time							
	(1)	at 200 kW peak Note 5	2.5	II		-	1.5	µS
	(2)	at 70 kW peak Note 6				-	0.8	µS

TESTS (Cont'd)

CV 6168

K1001	Test	Test Conditions	AQL %	Insp. Level	Symbol	Limits Min.	Limits Max.	Units
Group C (Cont'd)								
4.1.10	Electrical Length		10	II				
	(1)	at 8500 Mc/s				147	187	deg.
	(2)	at 8900 Mc/s				234	274	deg.
	(3)	at 9500 Mc/s				350	390	deg.
		Note 7						
	GROUP D							
4.2.2	Arc Loss	4 kW min. power		QA		-	1.2	dB
		Note 8						
4.2.7	Position of Short Circuit	Note 9		QA		.058	.072	inches
	GROUP E							
	Damp Heat	DEF 5011 Section 5 Category H.5		QA				
	Shock	DEF 5011 Section 13 Category S.2		QA				
	Dry Cold	DEF 5011 Section 15 Category -25°C		QA				
	Dry Heat	DEF 5011 Section 16 Category +85°C		QA				
	Vibration	DEF 5011 Section 18 Category V.2		QA				
	GROUP F							
	Life							
	Life Test End Point			4.0%		Record		
5.3	(1) 500 Hours	at 200 kW peak						
		Note 10						
	Post 500 Hours Life Tests							
	Inoperatives		2.5					
	Electrical Tests	Combined AQL	6.5					
	(1) Recovery Time	To -6db				-	3.0	uS
	(2) v.s.w.r.	8500 to 9500 Mc/s				-	1.4	Ratio
	(3) Insertion Loss	8500 to 9500 Mc/s				-	1.2	dB
	(4) Crystal Protection	Crystal N.F. deterioration				Record		dB

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K1001	Test	Test Conditions	AQL %	Insp. Level	Sym bol	Limits Min	Limits Max	Units
	Life Test End Point							
5.3	(2) 1000 Hours	At 70 kW peak Note 11						
	Post 1000 Hours Life Tests							
	Inoperatives		2.5					
	Electrical Tests	Combined AQL	6.5					
	Recovery Time	To -6dB						
	V.S.W.R.	8500 Mc/s to 9500 Mc/s				-	1.4	Ratio
	Insertion Loss	At 8500 Mc/s				-	1.20	dB
		At 8600 to 9500 Mc/s				-	1.00	dB

N O T E S

(1) D.C. Primer Supply as specified in K1001 5H.2.5. Cell un-mounted.

(2) V.S.W.R. measurements shall be made with the line energised at not greater than 10 mW. The termination shall be matched better than 1.02 over the frequency band.

(3) Measurement of insertion loss shall be made with the valve mounted between impedances matched better than 1.10 V.S.W.R. over the frequency band and the line energised at not greater than 10 mW.

(4) For high power measurements, the magnetron shall be a CV2284 or equivalent. The rate of rise of magnetron voltage shall be 100 kV/µsec. ± 10%. Pulse lengths shall be measured at 10% of peak amplitude. A thermistor with the following characteristics shall be used:-

$$\text{Efficiency (E)} = \frac{\text{Measured Power}}{\text{Incident Power}} \text{ shall be greater than } 0.9$$

V.S.W.R. better than 1.10 over 8900 Mc/s ± 100 Mc/s

" " 1.33 over 8900 Mc/s ± 250 Mc/s

If the measured leakage powers are P_1 and P_2 microwatts at pulse lengths of 0.15 µsec. and 1.0 µsec. respectively then:-

4.1. Spike energy = $\frac{10P_1}{E \times p.r.f.}$ ergs/pulse

4.2 Total leakage = $\frac{1000P_2}{E \times p.r.f.}$ mW peak

NOTES (Cont'd)

(5) Test conditions are:- Peak power 200 kW ± 10% PRF 1000 p.p.s. ± 10% tp = 1.0 μsec ± 10%.

The frequency of the simulated echo pulse shall be within the range 8500 to 9500 Mc/s and shall be not greater than 10 mW peak incident on the cell. 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 6 db.

(6) Test conditions are:- Peak power 70 kW ± 10% PRF = 3000 p.p.s. ± 10% tp = 0.33 μsec ± 10%

Otherwise as Note (5).

(7) The length of RCSC No.16 waveguide having the same effective electrical length as the cell shall be determined, with the line energised at a convenient low power level. The measurement shall be made on each half of the cell.

(8) Arc loss shall be measured with the line energised at not greater than 4 kW RF peak measured immediately after the cell. PRF = 1000 p.p.s. ± 10% tp = 1.0 μsec ± 10%.

(9) The position of short circuit shall be measured as the distance of the effective RF short behind the input flange of the cell. Peak power = 200 kW ± 10% tp = 1.0 μsec. ± 10% PRF = 1000 p.p.s. ± 10%. The measurement shall be made on each half of the cell.

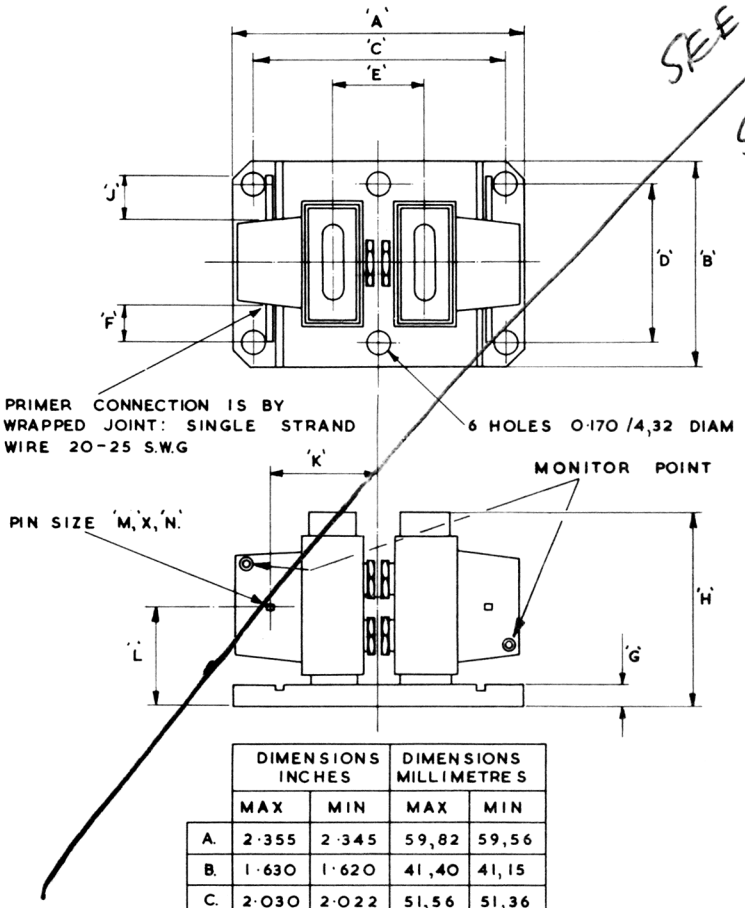
(10) Life tests shall be carried out with the cells mounted between 3 dB couplers. Crystals type CV2154 shall be mounted in approved holders behind each cell. The main run shall be terminated in a matched load. Input power to each cell shall be 200 kW ± 10% PRF = 1000 p.p.s. ± 10% tp = 1.0 μsec. ± 10% f = 9375 ± 100 Mc/s.

(11) Conditions as in Note (10) except that Peak power = 70 kW ± 10% PRF = 3000 p.p.s. ± 10% tp = 0.33 μsec. ± 10%.

OUTLINE DRAWING

(THIRD ANGLE PROJECTION)

SEE REVISED SHEET C

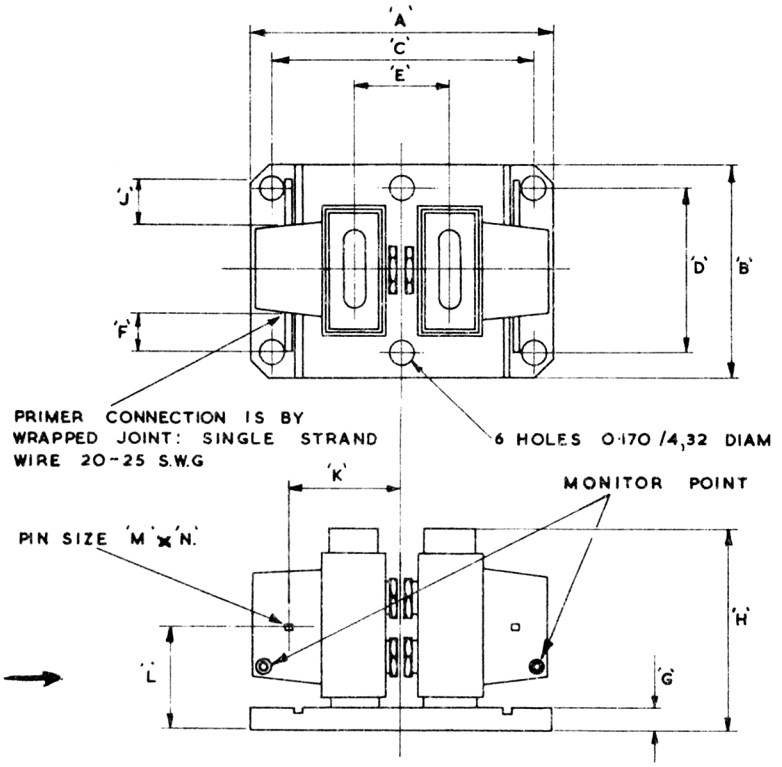


	DIMENSIONS INCHES		DIMENSIONS MILLIMETRES	
	MAX	MIN	MAX	MIN
A.	2·355	2·345	59,82	59,56
B.	1·630	1·620	41,40	41,15
C.	2·030	2·022	51,56	51,36
D.	1·223	1·217	31,06	30,91
E.	0·755	0·745	19,18	18,92
F.	0·250	NOM.	6,35	
G.	0·175	0·165	4,44	4,19
H.	1·557	1·553	39,55	39,45
J.	0·425	NOM.	10,80	
K.	0·875	NOM.	22,22	
L.	0·778	NOM.	19,76	
M	0·036	NOM.	0,91	
N.	0·048	NOM	1,21	

ALL DIMENSIONS IN INCHES

OUTLINE DRAWING

(THIRD ANGLE PROJECTION)



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ALL DIMENSIONS IN INCHES

ELECTRONIC VALVE SPECIFICATIONS

SPECIFICATION MOA/CV6168, ISSUE 1, DATED 19TH AUGUST 1965

AMENDMENT No. 1

1. Page 1

(i) Specification Authority. Delete "MINISTRY OF AVIATION DLRD(T) RRE" and substitute "MINISTRY OF TECHNOLOGY - DLRD/RRE".

(ii) Specification Title. Delete "Specification MOA/CV6168" and substitute "Specification Mintech/CV6168".

2. Page 6 Cross out (but do not remove) existing page 6 and substitute new page 6 dated March 1969, attached hereto.

March 1969

T.V.C. for RRE