MINISTRY OF AVIATION D.L.R.D/R.A.E. VALVE ELECTRONIC **C.V.5314**

SPECIFICATION MOA/CV5314	SECURITY	
	SPECIFICATION	VALVE
ISSUE 2 DATED 1-4-63	Unclassified	Unclassified
To be read in conjunction with K1001 and BS1409		

→ Indicates change

TYPE OF VALVE:-	KLYSTRON AMPLIFIER for use with three external cavities
ENVELOPE:-	GLASS and METAL
CATHODE:-	Indirectly Heated
FOCUSSING:-	Electromagnetic
COOLANT:-	Forced Air
CONNECTIONS:-	Flying Leads
PROTOTYPE:-	VX7154 (VX7136)

MARKING

See K1001/4

BASE

See drawing on page 6

RATINGS
(All limiting values are absolute)

			Notes
Heater Voltage	(V)	12.6	
→ Heater Current (max)	(A)	2.0	
Max. Collector Voltage	(kV)	18	
Max. Collector Dissipation	(kW)	1.0	
Max. Cavity Resonator Voltage	(kV)	18	
Max. Resonator Dissipation (any one disc seal)	(W)	3.0	
Max. Peak Modulator Voltage	(kV)	5.5	
Min. Negative Modulator Voltage (Hold Off)	(V)	150	
Max. Modulator Dissipation	(W)	12.0	
Max. Modulator Resistor	(kΩ)	250	
→ Max. Average Cathode Current	(mA)	70	
Nom. Duty Cycle	(%)	3.0	
Min. Gain	(dB)	33	
Min. Cooling Supply	(cu.ft/min)	35	A
Min. Cathode Heating Time	(mins)	2	
Normal Operating Frequency Range	(Mc/s)	960-1215	
→ Min. Peak Power Output (Final Cavity) Under Test Specification Conditions	(kW)	6.5	
Focussing Coil Requirements		-	B

CONNECTIONS

See drawing on page 6

Lead	Electrode
1	Modulator
2	Heater plus Cathode
3	Heater
Block	Collector

DIMENSIONS

See drawing on page 6

MOUNTING POSITION

Vertical

NOTES

A. Minimum requirements for a Collector Dissipation of 1 kW.

B. See Curve on page 7.

C. The Joint Services Catalogue Number is 5960-99-037-2267

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TESTS

To be performed in addition to those applicable in K1001

TEST CONDITIONS:- Unless otherwise stated.

Vh (V)	Vmod.d.c (V)	Vcoll + Vcav (V)	Vmod Peak (kV)	I.fd.(Note 11) (A)
12.6 (Heater Volts)	-150 (D.C.Modulator Volts)	15 kV (Collector and Resonator Cavity Volts)	5 (Peak Modulator Pulse Volts)	2.2 (Field Current Magnetic Focussing)

NOTES 1, 2, 3, 7

	Test Conditions	Test	Units	Limits Min.	Limits Max.	Insp. Level	Notes	
a	Vmod = 7kV d.c. All other electrodes earthed	Electrode Leakage Modulator to all:- (including cathode)	µA	-	100	100%	3	←
b	Vh = 12.6V No other voltages	Heater Current	A	1.55	2.0	100%	3	←
c	Ifd = 0, Vcoll + Vcav = -50V Vmodpk = 0, Vk = 0 Adjust Vmod.d.c. for Imod. = 20 mA.	Gas Current	µA	-	0.9	100%	3, 4	
d	Ifd = 0.9A, Vcoll + Vcav = 2.5kV Vmod.d.c. = 800 V. Vmod.Peak = 0	1) Collector Current 2) Modulator Current 3) Cavity Current	mA mA mA	130 0 0	215 0.25 2.0	100% 100% 100%	1,3	←
e	Vmod Peak = 0	Collector Current	mA	0	2.5	100%	1,3	
f	Frequency = 962 Mc/s Max.Drive Power = 3.25W	1) Peak Power Output 2) Average Collector Current 3) Peak Collector Current	kW mA Record I1	6.5 0	- 70	100% 100%	1,2,3, 7 12 & 13	← ← ←
g	Max. Drive power= 3.25W 1) Frequency=1024Mc/s 2) Frequency=1151Mc/s 3) Frequency=1213Mc/s	1)Peak Power Output 2) Peak Collector Current	 kW kW kW Record I_1	 6.5 6.5 6.5	 - - -	100%	1,2,3, 7 12 & 13	← ←

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	Test Conditions	Test	Units	Limits Min.	Limits Max.	Insp. Level	Notes
h	Vh = 11.3V No R.F. Drive	1) Peak collector Current 2) Calculate Reading of Clause "h1" x 100 / Reading of Clause "f3 or g2"	%o	Record I_2 90	- -		1,2, 3,7 12
j	1)Repeat Test Clause 'c' 2)Repeat Test Clause 'd' (d1, d2, d3)	Electrical Retest after 28 days holding Period Gas Current	µA	Note 5 Limits as specified in test clause 'd'		100%	4,5
k	The valves in the sample shall initially be tested to the tests specified in clauses "a" to "h" inclusive and the results recorded. The valves shall then be run under the specified conditions, with forced air cooling for a minimum period of 500 hours(RF input=0) On completion of the 500 hours running time, the sample shall be retested.	Life Test		Note 6		10% or two valves per month (whichever is greater)	1,2,3 6, 8, 10

NOTES

1. The valve shall be tested with Vcoll + Vcav at earth potential and the specified P.D's maintained.

2. Where cooling is specified a max. air flow of 35 cu.ft. per min. is permitted. Amdt-1

3. To enable "Post Holding Period" and "Post Life" tests to be performed, the individual readings obtained on each of the tests (a) to (h) inclusive are to be recorded.

4. Gas current to be measured after a minimum period of 10 mins. operation when the current should neither be rising nor outside the specified limit.

5. After the 28 days "Holding Period" a valve with a gas current less than 0.3μA shall be acceptable. Above 0.3μA a valve within the specified limit but having an increase in value less than 2:1 shall be acceptable. If the increase is greater than 2:1 the valve shall be held for a further period of 28 days when no further increase is allowable.

6. After completion of the 500 hours "Life Test" the valves in the sample shall be retested (clauses "a" to "h" inclusive) and the following limits shall apply:-

Amdt-1 ~~Clause "a 1" The specified limits to apply.~~

Amdt-1 Clause "a 2" The specified limits to apply and in addition the change in value from the original reading must not exceed 30μA.

Clause "b" The specified limits to apply and in addition the change in value from the original reading must not exceed ± 0.15A.

Clause "c" A valve with a gas current of either less than 0.3μA or an increase in value of less than 2:1 shall be acceptable. If the increase is greater than 2:1 then the valve shall be rejected.

Clause "d 1" The specified limits to apply and in addition the change in value from the original reading must not exceed ± 10 mA.

Clause "d 2" and "d 3" The specified limits to apply and in addition the change in value from the original reading must not exceed + 50%.

Clause "e" A valve with a collector current of less than 1mA or a change in value from the original reading of less than ± 10% shall be acceptable.

Clause "f 1" The maximum decrease from the original reading must not exceed 10%

Clause "f 2" The specified limits to apply and in addition the change in value from the original reading must not exceed ± 20%

Clause "g" The maximum decrease from the original reading must not exceed 10% in each case.

Clause "h" The specified limits to apply

7. The modulator pulse shall be of gaussian waveform with a p.r.f. = 7.5 kc/s ± 0.5 kc/s. The pulse width at 50% level shall be 3.75μSecs ± 0.25μSecs.

8. The sample shall be life tested under D.C. conditions in an approved test rig.

9. The R.F. tests clauses "f" to "h" inclusive are to be performed in an approved test rig. (for example STC (Paignton) Test Set 61028). ←

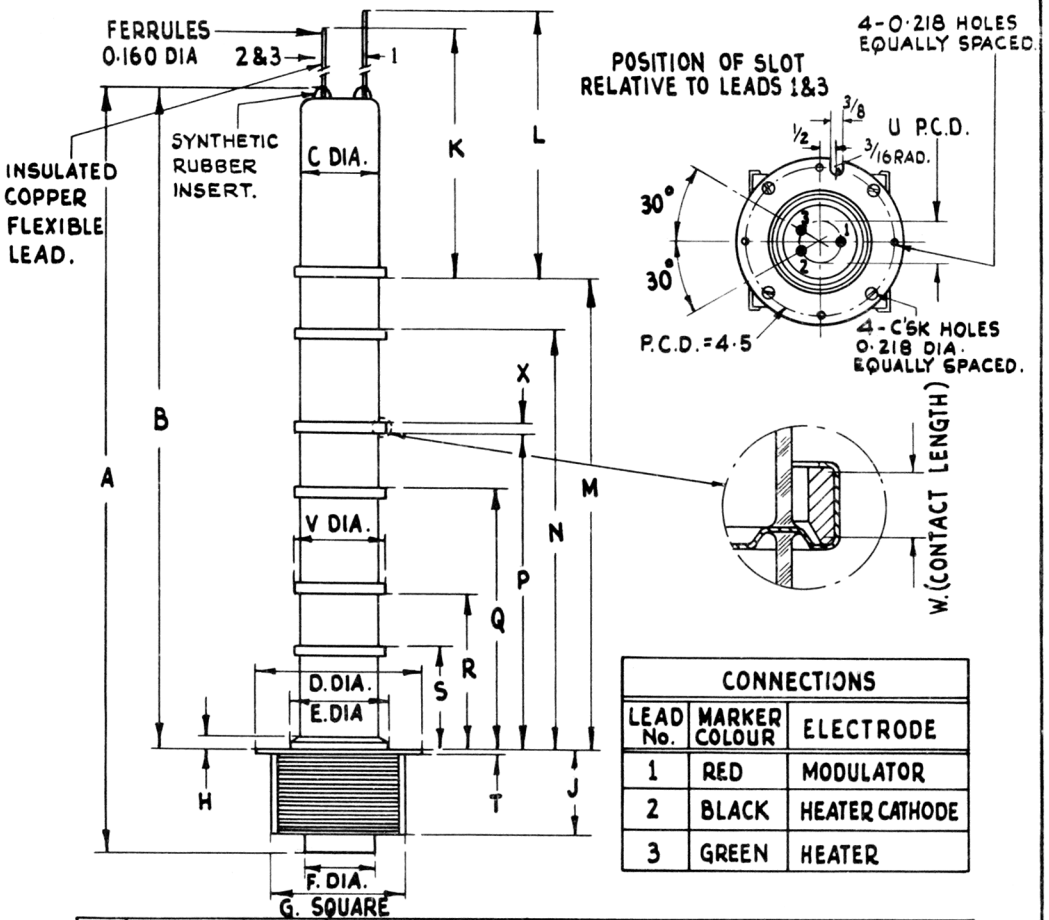
10. Should a valve from the Life Test sample fail during, either, the "Life" period or the "Post Life" testing, another valve may be subjected to the "Life Test" when no further failures shall be allowed.

11. A typical Magnetic Field Strength curve is shown on Page 7.

12. It may be recorded at either 962 m/cs or 1213 m/cs. ←

13. The Characteristic Impedance of the R.F. Load used for power measurement shall be referred to (50 + j0) ohms. ←
The V.S.W.R. shall be better than 0.9.

VALVE OUTLINE DRAWING.



CONNECTIONS		
LEAD No.	MARKER COLOUR	ELECTRODE
1	RED	MODULATOR
2	BLACK	HEATER CATHODE
3	GREEN	HEATER

DIM.	MILLIMETRES	INCHES
A	584·2 MAX.	23 MAX.
B	504·8 MAX.	19 7/8 MAX.
C	61·46 MAX.	2·420 MAX.
D	127·0 ± 0·8	5 ± 1/32
E	76·20 +0·10 −0·00	3·000 +0·004 −0·000
F	54·0 MAX.	2 1/8 MAX.
G	104·0 MAX.	4 3/32 MAX.
H	9·5 APP.	3/8 APP
J	63·5 ± 1·6	2 1/2 ± 1/16
K	450·9 ± 3·2	17 3/4 ± 1/8
L	469·9 ± 3·2	18 1/2 ± 1/8

DIM.	MILLIMETRES	INCHES
M	359·70 ± 2·03	14·161 ± 0·080
N	320·30 ± 2·03	12·611 ± 0·080
P	239·29 ± 2·29	9·421 ± 0·090
Q	199·92 ± 2·29	7·871 ± 0·090
R	118·90 ± 2·29	4·681 ± 0·090
S	79·53 ± 2·03	3·131 ± 0·080
T	3·2 ± 0·4	1/8 ± 1/64
U	31·8 APP	1 1/4 APP.
V	71·12 ± 0·10	2·800 ± 0·004
W	7·37 MIN.	0·290 MIN.
X	9·5 ± 0·4	3/8 ± 1/64

NOTES.

1. THE EXTERNAL SURFACES OF THE CAVITY CONNECTIONS SHALL BE GOLD PLATED.
2. THE A.M. REFERENCE No. OF THE FERRULES IS 5H/25
3. ALL DIMENSIONS SHOWN ON DRAWING ARE IN INCHES.

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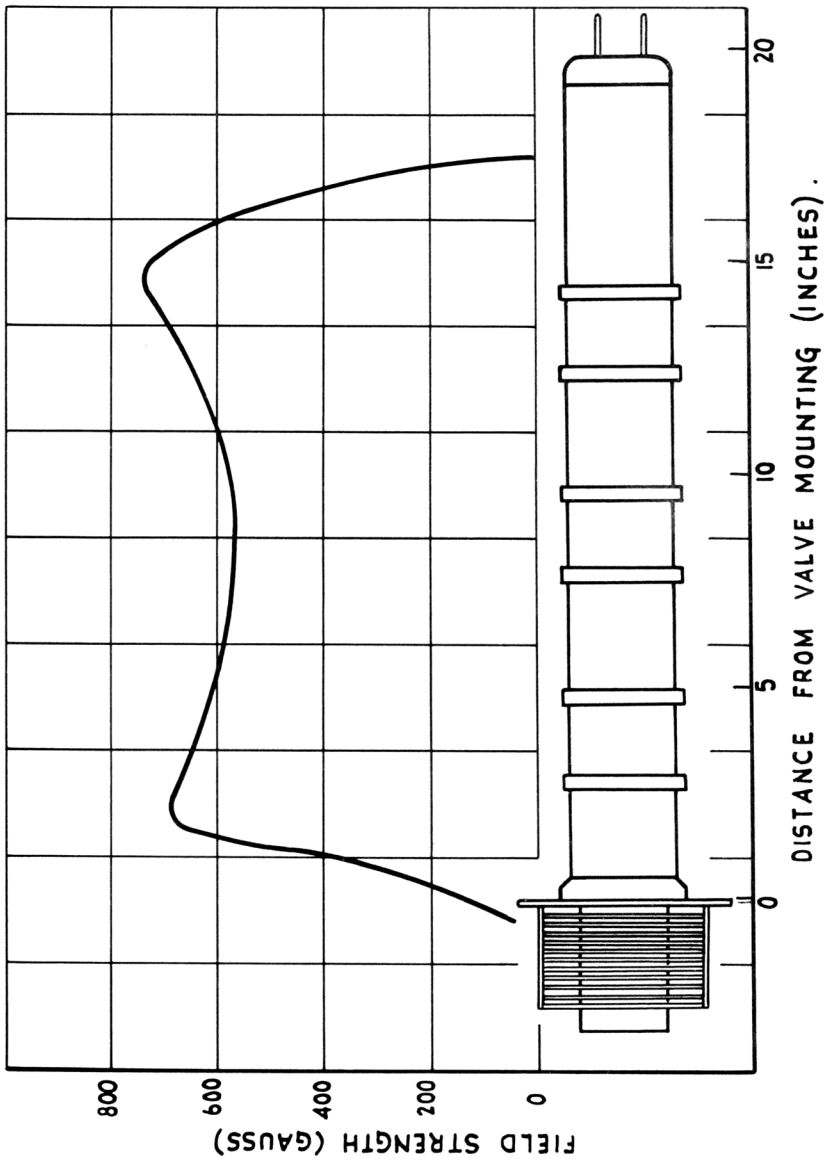
TYPICAL MAGNETIC FOCUSING FIELD.



ELECTRONIC VALVE SPECIFICATIONS

SPECIFICATION MOA/CV 5314 ISSUE 2 DATED 1.4.63.

AMENDMENT No. 1.

Page 4 NOTES

(a) Note 2. Amend "3 cu. ft. per min." to read "35 cu. ft. per min."

(b) Note 6 Clause a1. Delete all reference to this clause.

(c) Note 6 Clause a2. Delete the "2" in "Clause a2"

August, 1963

T.V.C. for
R.A.E.

17/7/63

N.190323