MINISTRY OF AVIATION - RRE

VALVE ELECTRONIC **CV4121**

Specification MOA/CV4121	SECURITY	
Issue 1 dated 7th August, 1962	Specification	Valve
To be read in conjunction with K1001	Unclassified	Unclassified

TYPE OF VALVE: High Voltage Half Wave Rectifier and Inverse Diode.

CATHODE: Indirectly heated.

ENVELOPE: Ceramic

PROTOTYPE: UR40/F

MARKING

K1001/4

BASE

Flying Leads

CONNECTIONS

See drawing page 5.

DIMENSIONS

See drawing page 5.

MOUNTING POSITION

Any

See Note C.

RATINGS AND CHARACTERISTICS

All limiting values are absolute
(Not for inspection purposes)

All Applications			Notes
Heater Voltage	(V)	6.3	A
Heater Current	(A)	1.35	
Min. H.T. Switching Delay	(secs)	45	
Max. Operating Anode Seal Temp.	(°C)	225	B
Max. Anode Dissipation	(W)	20	
Max. Shock (short duration)	(g)	500	
Max. Acceleration (continuous op.)	(g)	2	C
Max. D. C. Anode Current	(mA)	75	D
Max. Peak Anode Current	(mA)	450	D
Max. Peak Inverse Voltage	(kV)	14	
Max. RMS Anode Current	(mA)	160	
Rectifier Application			
Max. Peak Inverse Voltage, on load	(kV)	17	D
Min. Limiting Resistance	(ohms)	4000	D
Inverse Diode Application			
Max. Pulse Anode Current (normal operation)	(A)	4	E
Max. Pulse Anode Current (fault condition)	(A)	8	E,F

NOTES

A. Maximum deviation not to exceed ± 5%.

B. Conduction and /or Forced Air Cooling may be required depending on application. This will be the case when the valve is operated at max. anode dissipation in an ambient temperature higher than 30°C.

C. When subject to vibration, vertical mounting with anode upwards, is preferable.

D. Ratings apply to 50 c.p.s. operation with .25 μF capacitor

E. Under these conditions max. pulse time constant 5.0 μs. and max. duty ratio 1:200.

F. Max. duration of fault = two seconds.

G. JOINT SERVICES CATALOGUE NUMBER: 5960-99-037-3672

TESTS

To be performed in addition to those applicable in K1001

Vh = 6.3 V. RMS unless otherwise stated

K1001 Ref.	Test	Conditions	AQL %	Insp. Level	LIMITS Min.	LIMITS Max.	Units
	GROUP A	Tests in this group apply to all valves		100%			
	Holding period	No. voltages			28		Days
	Heater Current				1.22	1.48	Amps
	Anode Voltage, DC	Ia = 200 mA DC			120	150	Volts
	Anode Voltage, Pulse	Ia peak = 14 Amps Tp = 2.5 µsecs. PRF = 50 - 200 c/s			-	3.3	kV
	Rectification	Input voltage = 6 kV RMS Supply frequency = 50 c/s Reservoir Cap. = 0.25 µF Source Resistance = 4 k Load current = 75 mA DC Notes 1 and 2					
	Vibration	No voltages. 5g at 50 c/s normal to axis for one minute. Change in Ih after vibration			- -	 5	 %
	GROUPS B, C, D	Omitted					
	GROUP E	Environmental Tests	Record	IA			
11.2	Resonance search	Vibration 10-2000 c/s at 2g peak acceleration Ia = 75 mA, R load = 1000 ohms. Modulation of anode current Note 6				0.75	mA pk to pk
11.3	Fatigue	Vibration 5g at 170 c/s Vh = 6.6 V switched, one minute on, three minutes off. Note 7					
	Post Fatigue test	Rectification test as in Group A	Record	IA			

K1001 Ref.	Test	Conditions	AQL %	Insp. Level	Limits Min.	Limits Max.	Units
	GROUP E Cont'd						
11.4	Shock	No Voltages Hammer Angle = 30° Note 8		QA			
	Functional Vibration (1)	Notes 9 and 10					
	Functional Vibration (2)	Notes 9 and 11					
	Life, inverse diode intermittent fault (1)	Notes 3 and 4	Record	QA	500	-	Hrs.
	Life, inverse diode intermittent fault (2)	Notes 3 and 4	Record	QA	1000	-	Hrs
	Life, standby	Heater only	Record	QA	2000	-	Hrs
	GROUP F						
	Life, rectification (1)	Input voltage 6kV r.m.s. Supply Freq = 50 c/s Reservoir Capacity = 0.25 µF Source Resistance = 4 kohms. Load current = 75mA d.c. min. Note 1	Record	IA	500	-	Hrs.
	Life, rectification (2)	As Life, rectification (1) Note 1	Record		1000	-	Hrs.
	Life, Shelf	No Voltages Note 5			3	-	Yrs.
	Life, end points	Valves shall repeat Anode Voltage, d.c. and rectification tests as in Group A, same limits.					
	GROUP G	Omitted					

NOTES

1. The valve shall be tested in the circuit as in Figure 2, which includes a sensitive trip circuit RL, C, MR, R. Resistance R shall be adjusted so that RL is energised when the reverse current flow exceeds 150 mA. Suitable values are:-
   RL = type 3000 relay 6500 ohms; C = 8 μF; MR = type 5D72.

   A flashover is defined as a reverse current exceeding 150 mA.

2. The valve shall run for one minute, then the EHT supply shall be switched three times, five seconds off and five seconds on. The valve shall not flashover more than once. A flashover is defined as a reverse current exceeding 150 mA.

3. To be carried out in test rig with circuit as in Figure 3, with the following component values: PFN 1 μsec., 80 ohms., "Normal" load = 62 ohms ± 5%, "Fault" load 35 ohms ± 5%, Diode load = 620 ohms ± 5%, PRF = 1000 c/s. P.I.V. = 14 kV. Fault condition switched in for two seconds every thirty minutes.

4. At the discretion of the Approving Authority these tests may be carried out in the alternative "Simulated inverse diode operation" test rig in Figure 2, with P.I.V. = 14kV. "Normal" diode current = 4 Amps peak, "Fault" diode current = 8 Amps peak. PRF = 1000 c/s, with "Fault" condition switched in for two seconds every thirty minutes.

5. Five percent of the production shall be set aside for this test. The schedule to be agreed with the Approving Authority.

6. Valve to be supplied from DC source of dynamic impedance at 75 mA = 1000 ohms Max. Valve to be vibrated along axis and in one direction normal to axis.

7. Valve to be vibrated for 50 hrs. along the axis and for 50 hrs. in one direction perpendicular to the axis.

8. Shock to be applied in two directions along axis and in two opposite directions perpendicular to valve axis.

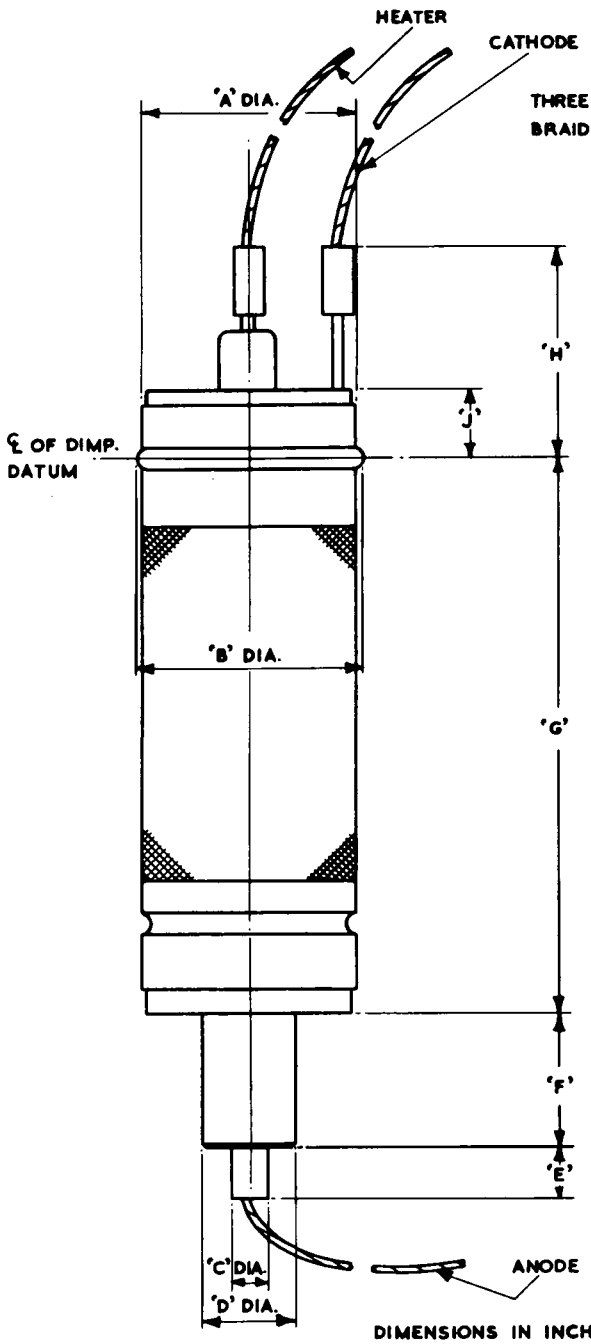
9. Valve to be operated as for Rectification test Group A.

10. Valve to be vibrated along axis, over 15 - 500 c/s at a rate not exceeding 1 octave per minute. 15 - 30 c/s with peak velocity of ten inches per second, 30 - 500 c/s with peak acceleration of 5g.

11. Valve to be vibrated normal to axis over 15 - 500 c/s at a rate not exceeding 1 octave per minute. 15 - 30 c/s with peak velocity of four inches per second, 30 - 500 c/s with peak acceleration of 2 g

CV4121

OUTLINE DRAWING



REF.	MAX.	MIN.
A	0·730	0·715
	18·54	18·16
B	0·780	0·760
	19·81	19·31
C	0·125	NOM.
	3·17	NOM.
D	0·320	—
	8·13	—
E	0·250	—
	6·35	—
F	0·450	—
	11·43	—
G	2·020	1·920
	51·31	—
H	0·900	—
	22·86	—
J	0·280	—
	7·110	—

CERAMIC SECTION

DIMENSIONS IN INCHES AND MILLIMETRES.

FIG 2

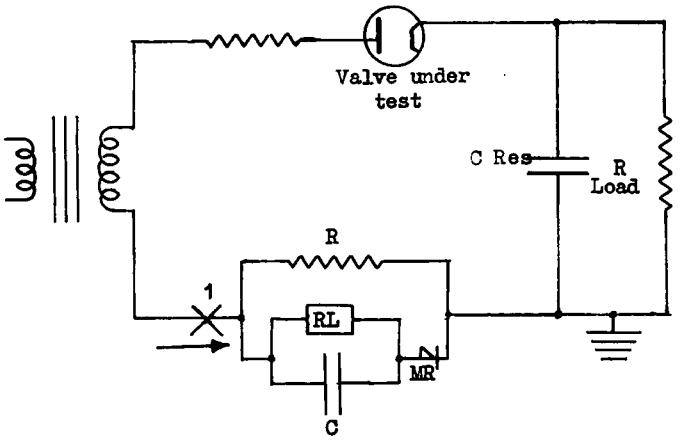
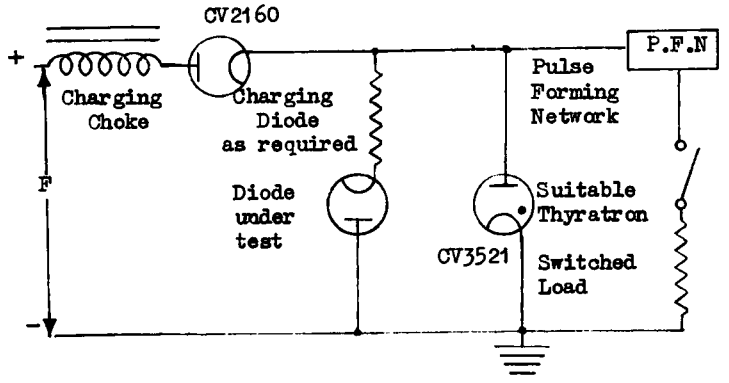

Valve under test
C Res
R Load
R
1
RL
MR
C

FIG 3


CV2160
+
Charging Choke
Charging Diode as required
P.F.N
Pulse Forming Network
F
Diode under test
Suitable Thyratron
CV3521
Switched Load
-