MINISTRY OF AVIATION - DLRD/RRE

VALVE ELECTRONIC **CV6107**

Specification MOA/CV6107
Issue 2 dated 9.10.63
To be read in conjunction with K1001 excluding clauses:- 5.2, 5.3, 5.5, 5.8, 5.9, 5.12 and 11.42

SECURITY

Specification	Valve
Unclassified	Unclassified

→ Indicates change

TYPE OF VALVE - Monitor diode, note B
CATHODE - Indirectly heated
PROTOTYPE - VX 9237C

MARKING

As in K1001/4, with serial number

RATING

Non-simultaneous
All limiting values are absolute
Not for inspection purposes

			Notes
Initial heater voltage, volts	r.m.s.	6.3 ± 7½%	A
Heater current for Vh = 6.3, Amps	r.m.s.	1.2	
→ Frequency range,	KMc/s	2.7 - 3.2	D
Max. peak power input	kW	20	
Max. mean input power	W	18	
Max. ambient temperature	°C	70	C
Max. pulse length	µS	15	E

CONNECTIONS

See drawing on page 6
Locating collar:- Heater and cathode
End Cap:- Heater
Centre contact:- Collector

END CAP

K1001/A1/D5.1

DIMENSIONS

See page 6

Superseded by Issue 2A

NOTES and DATA

A. For maximum life the heater voltage shall be adjusted, when the valve is running with an RF input, to a value between 10% and 20% above that required to maintain the diode output. See note F.

B. The valve, as detailed on page 6 is normally used in a waveguide holder as on page 5, the arrangement being a waveguide-coaxial transistion into the distributed diode, and a coaxial load termination after the distributed diode.

C. The amount shall be positioned to allow free convection of air about the load.

D. By using alternative mounts, which are not herein specified, the diode will operate over the range 2.5 - 6.5 kMc/s.

→ E. In certain circumstances this maximum pulse length may be exceeded. Also under certain conditions CW may be applied to the diode. These useages are not covered by this specification.

→ F. A threshold heater voltage will be found which will just maintain the pulse output at the level obtained with 6.3 volts heater. Heater voltages below this will cause the pulse amplitude to sink to lower than the initial level.

G. The Joint Services Catalogue Number is:- 5960-99-037-2964.

CV6107

TESTS

To be performed in addition to those applicable in K1001

TEST CONDITIONS: Vh = 6.3 ± 0.1 Volts RMS unless otherwise stated. The heater shall have been on for at least three minutes before each test unless otherwise stated.

Test	Test Conditions	Units	Limits	
			Min.	Max.
GROUP A	Each test in this group to be carried out on all valves			
(a) Heater current		Amps r.m.s.	1.1	1.3
(b) V.S.W.R.	No heater, note 1	ratio	-	1.5
(c) Holding period	Note 6, no voltages	hrs	168	
(d) Collector current	Note 2	μA	35	-
(e) Emission	Note 3	Amps	1.5	-
(f) Power input (1) for 9 volts out across 68 ± 1% ohms load	Note 4, 18			
	(a) with mount APHL.1 at f=2800 ± 25Mc/s	Pk watts	174	194
	(b) with mount APHU.1 at f=3100 ± 25Mc/s	Pk watts	191	211
(g) Diode output for heater run.	Power input as measured in test (f) Notes 4, 5, 17.	Volts peak	8.8	9.2
GROUPS B, C, D, E	No tests			
GROUP F	Life tests, note 7			
(h) Heater cycle life (Information only)	One cycle to consist of three minutes with Vh = 7 ± 0.1 Volts RMS, three minutes off. Note 8, 15	hrs total	~~1000~~ 500	
(j) Cathode life (Information only)	Ia = 40 mA do, Note 8, 15	hrs	1000	
(k) Shelf life	No voltages Note 13		To be agreed	
GROUP G	No tests			
GROUP H	Qualification Approval Tests			
(1) Operational life	As in note 4, pulse output across 68 ± 1% ohms to be 10 volts peak. Note 8, 16.	hrs	1000	

Superseded by Issue 2A

Amdt 1

TESTS (Contd.)

Test	Test Conditions	Units	Limits	
			Min.	Max.
(m) Shock	No voltages. Hammer angle 25° Notes 8, 9.			
(n) Power input (2)	Note 10			
(p) Power input (3)	Note 11			
(q) Standard mounts	Note 12			

Superseded by Issue 2A

NOTES

1. The RF match shall be measured with the valve cold in approved holder APHL1 at frequencies of 2700, 2800 and 2900 mc/s each within ± 25 mc/s and in approved holder APHU1 at frequencies of 3000, 3100 and 3200 mc/s, each within ± 25 mc/s.

2. The current which flows through a total load resistance of 3000 ± 2% ohms connected between cathode and collector shall be measured. The current shall flow into the collector.

3. A pulse voltage of 15 microseconds (min.), and of PRF 250 (min.) pps, shall be applied between the collector and the cathode. The voltage amplitude of the pulse, which shall not exceed 700 vplts, shall be adjusted for emission which shall be equal to, or greater than 1.5 amps over the whole of the pulse.

4. The valve shall be tested in the approved test rig defined in Note 14 under the following conditions: (a) In Approved mount APHL1 at f = 2800 Mc/s ± 25 Mc/s, (b) In approved mount APHU1 at f = 3100 Mc/s ± 25 mc/s. The R.F. pulse length shall be 10 µs ± 1 µs at a minimum p.r.f. of 250 pps.

5. The heater shall be reduced in steps by 0.5 volts per step and the valve run at each step for ten seconds. When the step is reached at which the amplitude falls, the heater voltage shall immediately be raised by two steps. The diode output shall be measured across the same load as in test (f).

6. Tests (d), (e), (f) and (g) shall be carried out after the holding period.

7. Up to 5% of the production shall be allocated to each test in this group.

8. The valve shall satisfy tests (b), (d), (e) (f), (g) at the conclusion of this test. 20% of the production shall be tested Amdt 1

9. The valve shall be mounted in wax in a box of square cross section. Three blows shall be applied to the locating collar end along the cathode axis and three blows shall be applied in one direction perpendicular to this.

10. The valve in its approved mount shall withstand a peak power input of 20 kW (min.), with a pulse length of 1.9 ± 0.2 µsecs at 500 ± 25 pps. at any one frequency within the range 2700-3700 mc/s, at the discretion of the manufacturer. Valve shall be running during test.

11. With the test rig as defined in note 4, but with a pulse length of 15 microseconds, test (f) shall be repeated to the same limits.

12. Four standard mounts shall be provided by the manufacturer. Standard mounts APHL1 and APHU1 shall be used for testing the valves to the specification, and standard mounts APHL2 and APHU2 shall be held at RRE as reference standards.

12. (Contd.

Standard mounts APHL1 and APHL2 shall have a VSWR less than 1.5/1 over the band 2700 - 2900 mc/s, and an average sensitivity of 184 watts peak for 9 volts peak output across 68 ohms ± 1% load at 2800 ± 25 mc/s when tested with six approved valves. These mounts will be selected from production mounts 5935-99-913-2972 as on Elliott-Litton drawing PC3772, issue 3.

Standard mounts APHU1 and APHU2 shall have a VSWR less than 1.5/1 over the band 3000 - 3200 mc/s, and an average sensitivity of 202 watts peak for 9 volts peak output across 68 ohms ± 1% load at 3100 ± 25 mc/s when tested with six approved valves. These mounts will be selected from production mounts 5935-99-914-9704 as on Elliott-Litton drawing PC3772, issue 3.

Amdt 1

13. The target shelf life is three years. ~~Five~~ One per cent of the production shall be set aside for test, the procedure to be agreed with the specification authority.

14. The Approved test rig shall measure the mean power received by the diode by means of a thermister and a calibrated directional coupler as on page 8. The RF envelope observed as the pulse output of the monitor diode shall be trapezoidal, and the time of rise and fall shall be an insignificant fraction of the pulse length. The prf shall be measured or otherwise deduced and the pulse width between the half power points shall be measured, and the peak power calculated from the relation:-

$$\text{peak power} = \frac{\text{mean power}}{\text{pulse length} \times \text{prf.}}$$

15. If any failures occur the Approving Authority shall be informed.

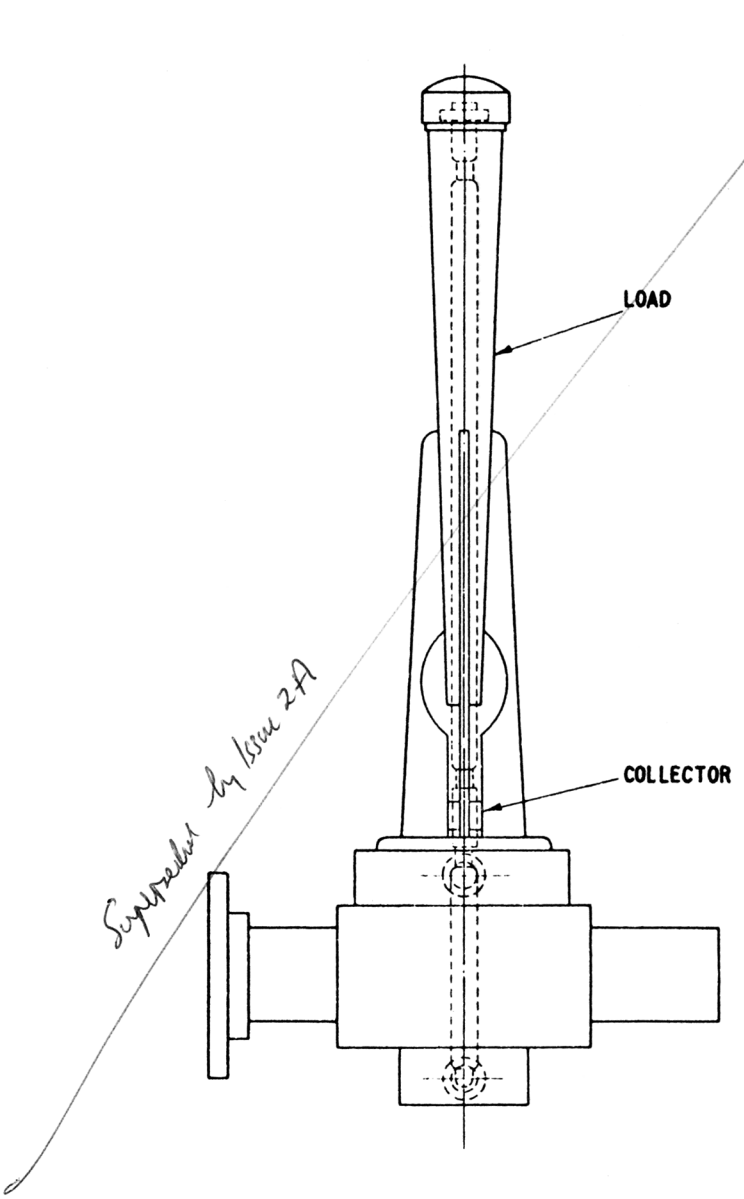
16. In mount similar to $APHL_1$ or $APHU_1$ at the discretion of the Approving Authority.

17. Either (a) or (b) at the discretion of the manufacturer.

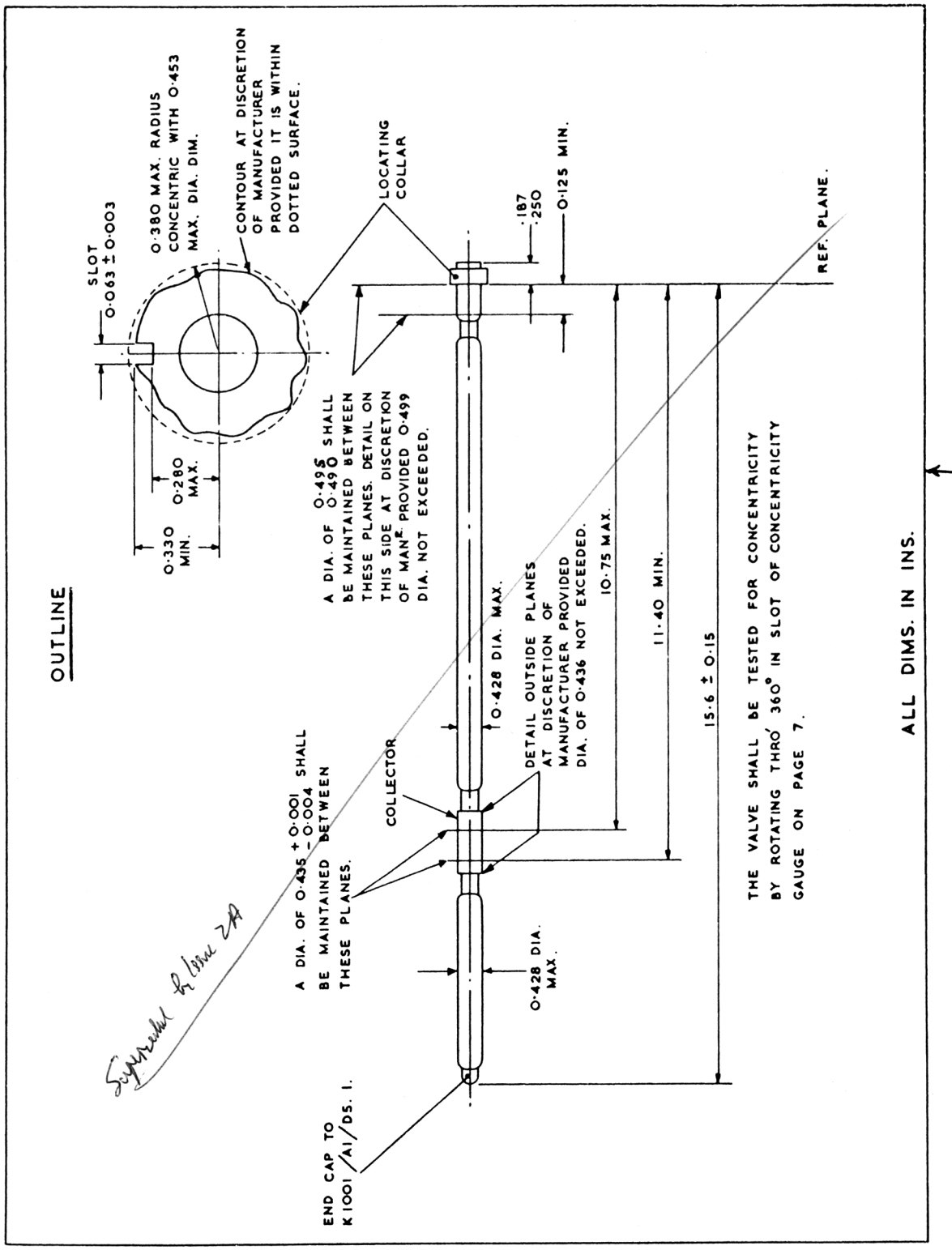
18. The manufacturer may carry out this test as many times as he wishes. All results must be recorded, and the average must lie between the limits stated. If the manufacturer is required to retest valves then the procedure outlined above applies, without reference to previous sets of results.

Superseded by Issue 2A

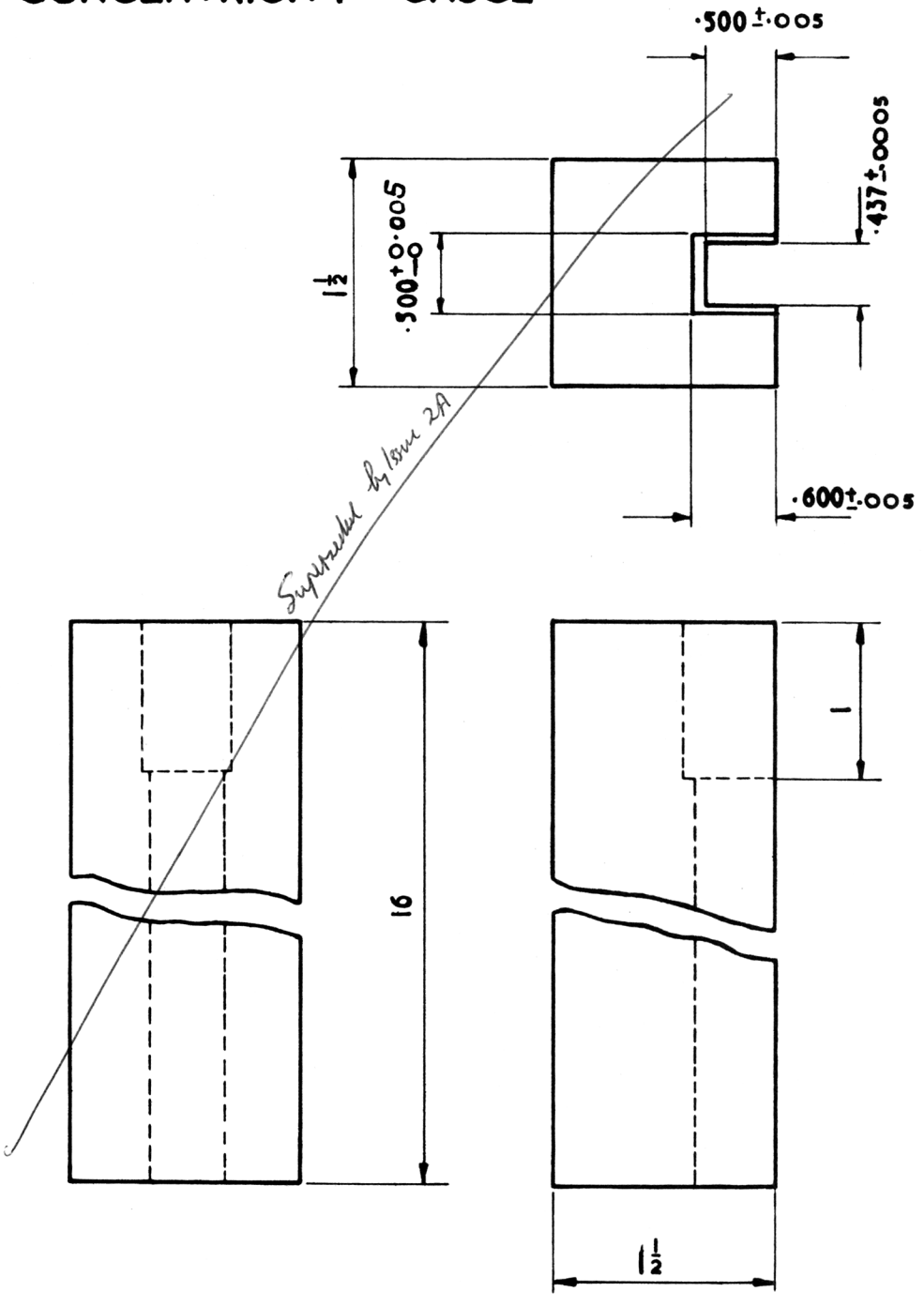
DIODE IN HOLDER



Superseded by Issue 2A


OUTLINE
SLOT 0·063 ± 0·003
0·380 MAX. RADIUS CONCENTRIC WITH 0·453 MAX. DIA. DIM.
CONTOUR AT DISCRETION OF MANUFACTURER PROVIDED IT IS WITHIN DOTTED SURFACE.
LOCATING COLLAR
·187 ·250
0·125 MIN.
REF. PLANE.
0·330 MIN.
0·280 MAX.
A DIA. OF 0·495 0·490 SHALL BE MAINTAINED BETWEEN THESE PLANES. DETAIL ON THIS SIDE AT DISCRETION OF MANF. PROVIDED 0·499 DIA. NOT EXCEEDED.
0·428 DIA. MAX.
DETAIL OUTSIDE PLANES AT DISCRETION OF MANUFACTURER PROVIDED DIA. OF 0·436 NOT EXCEEDED.
10·75 MAX.
11·40 MIN.
15·6 ± 0·15
A DIA. OF 0·435 + 0·001 − 0·004 SHALL BE MAINTAINED BETWEEN THESE PLANES.
COLLECTOR
0·428 DIA. MAX.
END CAP TO K1001/A1/DS. 1.
THE VALVE SHALL BE TESTED FOR CONCENTRICITY BY ROTATING THRO' 360° IN SLOT OF CONCENTRICITY GAUGE ON PAGE 7.
ALL DIMS. IN INS.

CONCENTRICITY GAUGE



ALL DIMS IN INCHES

SCHEMATIC OF APPROVED TEST RIG. FOR MONITOR DIODE