MINISTRY OF TECHNOLOGY - DLRD/RHE

Valve Electronic **CV6107**

Specification Mintech/CV6107
Issue 2A dated December 1968
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 A
CATHODE - Indirectly heated
PROTOTYPE - VX 9237C BS510

MARKING
As in K1001/4.

RATING
Non-simultaneous
All limiting values are absolute
Not for imspection purposes

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

CONNECTIONS
See drawing on page 5
Locating collar:-
Heater and cathode

End Cap:- Heater
Centre contact:- Collector

END CAP
K1001/A1/D5.1

DIMENSIONS
See page 5

NOTES and DATA

A. The valve, as detailed on page 3 is normally used in a waveguide holder the arrangement being a waveguide-coaxial transistion into the distributed diode, and a coaxial load termination after the distributed diode.

B. 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. 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.

C. By using suitable mounts, the diode will operate over the range 2.5 to 6.55 GHz.

D. The mount shall be positioned to allow free convection of air about the load.

E. In certain circumstances this maximum pulse length may be exceeded.

F. The NATO Stock Number is 5960-99-037-2964.

TESTS

To be performed in addition to those applicable in K1001.

Tests shall be performed after a minimum holding period of 168 hours.

Test Conditions: Unless otherwise stated:-

Vh = 6.3 V r.m.s.

The heater shall have been on for at least one minute before each measurement is made.

Test No.	Test	Test Conditions	Insp Level	AQL %	Limits Min.	Limits Max	Unit
	GROUP A		100%				
1	Heater Current				1.1	1.3	A rms
2	V.S.W.R.	No heater. Note 1.			-	1.3	ratio
3	Sensitivity	Notes 2 and 3. (a) f = 2800 ±25MHz (b) f = 3100 ±25MHz in appropriate approved mount.			235 250	290 305	Wpk Wpk
4	Mechanical Dimensions	In accordance with the outline drawing on page 5.			-	-	-
	GROUP B omitted						
	GROUP C		II	6.5			
5	Collector Current	Note 4.		4	35	-	mA
6	Emission	Note 5.		4	1.5	-	A
7	Diode Output for Heater Run	Notes 2, 6 and 7.		4	8.8	9.2	Vpk
	GROUPS D and E omitted						
	GROUP F						
8	Heater Cycle Life, 500 hours	One cycle to consist of 3 minutes at Vh = 7 ±0.1Vrms and 3 minutes off. Note 9.	Note 8				
	Post Test End Point						
	Heater Current	As in test (1)			1.0	1.4	Arms
9	Cathode Life 1000 hours	Ia = 40mA d.c. Note 9.	Note 8				
	Post Test End Point				Note 16		
	Collector Current	As in test (5)			-	10	% Δ
	Emission	As in test (6)			-	10	% Δ
	Sensitivity	As in test (3)			-	10	% Δ
10	Shelf Life 3 years	No voltages. Notes 9 and 10.	Note 11				
	Post Test End Point				Note 16		
	Sensitivity	As in test (3)			-	10	% Δ
	GROUP G omitted						

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TESTS (cont'd.)

Test No.	Test	Test Conditions	Insp. Level	AQL %	Limits Min.	Limits Max	Unit
	GROUP H		Q.A.				
11	Operational Life 1000 hours	Notes 2 and 7.					
	Post Test End Point				Note 16		
	V.S.W.R.	As in test (2)			-	10	%Δ
	Sensitivity	As in test (3)			-	10	%Δ
	Collector Current	As in test (5)			-	10	%Δ
	Emission	As in test (6)			-	10	%Δ
	Diode Output for Heater Run	As in test (7)			-	10	%Δ
12	Shock	No voltages. Acceleration = 6g Duration 10 mS. Note 12.					
	Post Shock				Note 15		
	V.S.W.R.	As in test (2)			-	-	
	Sensitivity	As in test (3)			-	-	
	Collector Current	As in test (5)			-	-	
	Emission	As in test (6)			-	-	
	Diode Output for Heater Run	As in test (7)			-	-	
13	Power Input (1)	Note 13.					
14	Power Input (2)	Note 14.			Note 14		

Notes

1. The r.f. match shall be measured with the valve cold over the frequency bands 2.7 to 2.95GHz and 2.95 to 3.2GHz in the two appropriate approved holders.

2. The valve shall be tested in an approved test rig as shown on page 7. at a minimum p.r.f. of 250 pps and pulse duration 10µS ±1µS. Sensitivity shall be measured by setting the pulse output of the monitor diode to 9V ±1% across a 68 ohm ±1% load. The observed output pulse shall be trapezoidal and the time of rise and fall shall be an insignificant fraction of the pulse duration. The p.r.f. shall be measured or otherwise deduced and the pulse duration between the half power points shall be measured and the peak power calculated from the following:-

$$\text{peak power} = \frac{\text{mean power}}{\text{pulse duration x p.r.f.}}$$

3. 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 specified limits. If the manufacturer is required to retest valves the procedure given in Note 2 shall apply, without reference to previous results.

4. The current which flows through a total resistance of 3kΩ ±2% connected between cathode and collector shall be measured. The current shall flow into the collector.

5. A pulse voltage 15µS minimum and minimum p.r.f. 250pps shall be applied between collector and cathode. The voltage amplitude of the pulse, which shall not exceed 700V shall be adjusted for emission which shall be equal to, or greater than, 1.5A over the whole of the pulse.

6. The heater shall be reduced in steps by 0.55V ±0.05 volts per step and the valve run at each step for 10 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 (3).

7. At the discretion of the manufacturer, tests shall be performed at either frequency range.

8. Two percent of production shall be tested.

9. Test is for information only. Any failures to be reported to the Qualification Authority.

10. The post test end point measurement shall be made at the following intervals:- 6 months, 12 months and 3 years.

11. One tube shall be submitted to shelf life test every three months during a production run.

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

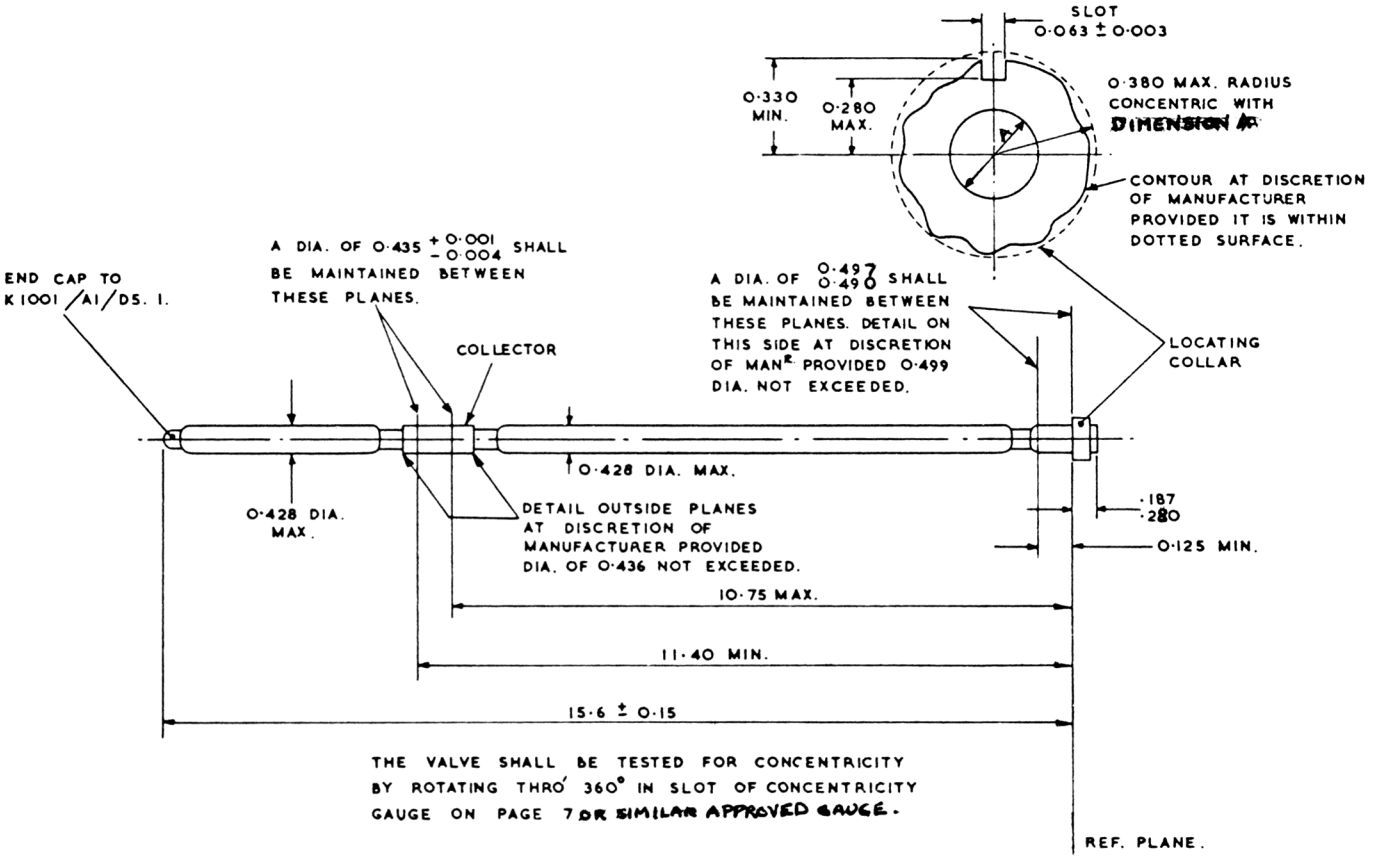
13. The valve in an approved mount shall withstand a peak power input of 20kW minimum, with a pulse duration of 1.9 ±0.2µS at 500pps at any frequency within the range 2.7 to 3.7GHz, at the discretion of the manufacturer. The valve shall be running during the test.

14. With the test rig defined in Note 2 but with a pulse duration of 15µS, a sensitivity test, either test 3a or 3b, at the manufacturers discretion, shall be repeated to the same limits.

15. The initial test limits in Group A or Group C shall apply as appropriate.

16. The limits apply to the allowable change in the measured parameters from the initial pre-test measurement.

OUTLINE DRAWING



THE VALVE SHALL BE TESTED FOR CONCENTRICITY BY ROTATING THRO' 360° IN SLOT OF CONCENTRICITY GAUGE ON PAGE 7 OR SIMILAR APPROVED GAUGE.

ALL DIMENSIONS IN INCHES

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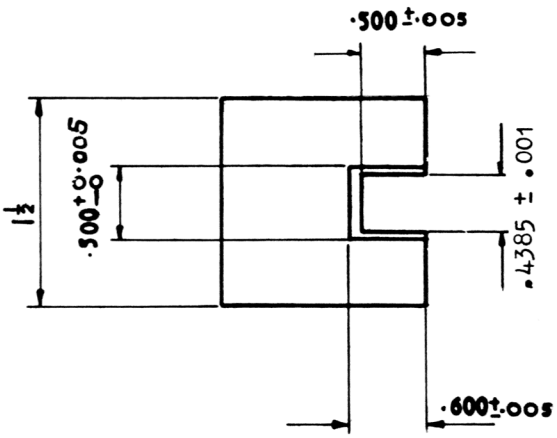
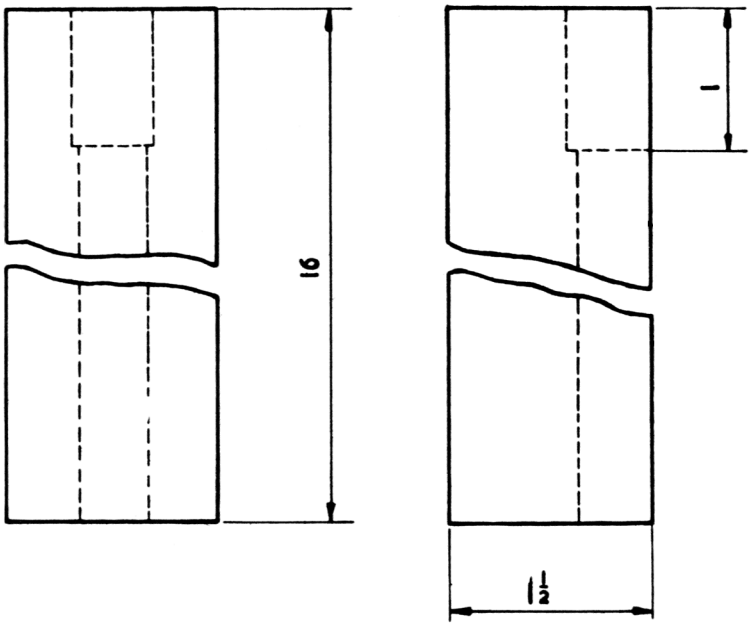
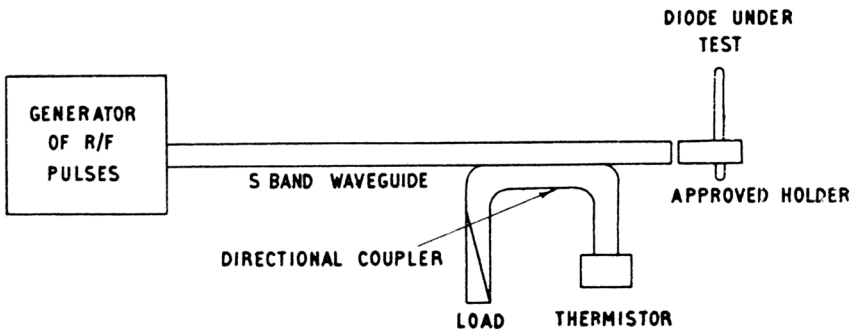
CONCENTRICITY GAUGE





ALL DIMS IN INCHES

SCHEMATIC OF APPROVED TEST RIG. FOR MONITOR DIODE



ELECTRONIC VALVE SPECIFICATIONS

SPECIFICATION M.O.A./CV.6107 ISSUE 2. DATED 9th OCTOBER 1963

AMENDMENT NO.1

Superseded by Issue 2A

Page 2. Group F.

Against "(h) Heater cycle life". In the Min. Limits column amend "1,000 hrs" to read "500 hrs.".

Page 3. Note 8. Add the following sentence "2% of the production shall be tested.

Page 4. Note 13. Amend this note to read "The target shelf life is three years. One per cent of the production shall be set aside for test, the procedure to be agreed with the specification authority."

March, 1965.

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

RAP 29/6/65