MINISTRY OF TECHNOLOGY - DLRD/RRE VALVE ELECTRONIC **CV6199**

Specification Mintech/CV6199 Issue 1, Dated October 1968. To be read in conjunction with K1001	SECURITY Specification Unclassified Valve Unclassified

TYPE OF VALVE: Packaged Magnetron, X-Band, Fixed Frequency, Flying Leads.
PROTOTYPE: YJ 1050

RATINGS

Absolute, Non-simultaneous. Not for Inspection Purposes.

	Unit	Min	Max	Notes
Peak Anode Voltage	Kv	-	7.9	
Pulse Anode Current	A	6.0	9.0	
Duty Factor	-	-	0.001	
Mean Input Power	W	-	71	
Rate of Rise of Voltage Pulse	kV/µS	60	100	
Pulse Duration	µS	-	1	
Load Mismatch (vswr)	-	-	1.5 :1	
Temperature of Anode Block	°C	-	120	A
Cathode Heating Time	S	120	-	
Altitude	ft	-	20,000	B

TYPICAL OPERATING CONDITIONS

Heater Voltage	V(rms)	6.0	6.3	6.6
Heater Current	A(rms)	-	0.55	-
Heater Supply Frequency	Hz	-	400	-
RF Pulse Power Output	kW	-	22	-
Duty Factor	-	-	0.0004	-
Pulse Duration	µS	-	0.5	-
Pulse Repetition Frequency	pps	-	800	-
Pulse Voltage	kV	7.0	7.5	7.7
Pulse Current	A	-	7.5	-
Rate of Rise Voltage Pulse	kV/µS	-	60	-
Pulse Input Power	kW	-	56.25	-
Mean Input Current	mA	-	3	-
Mean Input Power	W	-	22.5	-
Mean R.F. Output Power	W	-	8.8	-
Frequency	GHz	9.21	9.24	9.27
Frequency Pulling (VSWR = 1.21:1)	MHz	-	12	15

CATHODE
Indirectly Heated

COOLING
See Note A

CONNECTIONS
See Outline Drawing on page 6.

MOUNTING POSITION
Any

DIMENSIONS
See Outline Drawing on pages 6 and 7

WEIGHT
Magnetron 1.2kg
In carton 2.3kg

MARKING
K1001/4 and serial number.

PACKAGING
K1005

NATO STOCK NUMBER
5960-99-037-5413

NOTES

A. In normal circumstances, natural cooling is adequate but where the ambient temperature is abnormally high or convection cooling is restricted, artificial cooling may be necessary to keep the block temperature below the specified maximum.

B. Operation up to 20,000 ft is permitted provided a choke coupling is used but the output window must not be pressurised. A protective cover for the window is supplied.

TEST CONDITIONS FOR OSCILLATION TESTS, UNLESS OTHERWISE STATED

K1001 Ref.	Feature	Symbol	OSC (1)			Unit	Note
			Min.	Nom.	Max.		
5F 2.2.1	Heater voltage	Vf	6.1	6.3	6.5	V	
5F 2.5.5	Rate of Rise of Pulse Voltage	rrv		100	105	kV/uS	1
5F 1.1.4	Pulse Duration *	tp	0.45	0.5	0.55	/uS	
5F 2.6	Pulse Repetition Frequency *	prf		1000		pps	
5F 2.7	Mean Anode Current	Ia		3.75		mA	
5F 1.4	Duty Factor *	DF		0.0005			

* Where the pulse duration differs from the nominal value the prf shall be adjusted to maintain the correct duty factor.

TESTS

To be performed in addition to those applicable in K1001

K1001 Ref	Test No.	Test	Test Conditions Notes 2,3			Limits		Unit	Note
			Osc.	Load v swr	Ia mean mA	Min.	Max.		
		Group A 100%							
	1	Dimensions							4
16.3.7	2	Holding Period		No Voltages Applied		14	-	days	
5.F.1.12	3	Stability (1)	1	1.2:1 min	3	-	0.5	%MP	5,6,7
5.F.1.12	4	Stability (2)	1	1.2:1 min	4.5	-	0.5	%MP	6,7
5.F.1.11	5	R.F.Bandwidth	1	1.2:1 min		-	5	MHz	7
	6	Sidelobe Ratio	1	1.2:1 min		6	-	dB	8
	7	Mean Power Output	1	1.1:1 max		9.0	-	W	
5.F.1.1.2	8	Pulse Voltage	1	1.1:1 max		7.0	7.7	kV	
5.F.2.8	9	Frequency	1	1.1:1 max		9.21	9.27	GHz	
5.F.1.9	10	Frequency Pulling	1	1.5:1 min		-	25	MHz	9
5.F.2.2.2	11	Heater Current				0.50	0.60	A	

GROUPS B, C, D and E No Tests.

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K1001 Ref.	Test No.	Test	Test Conditions Notes 2&3 Osc.			Limits Min.	Max.	Unit	Note
		Group F							
	12	Life (1) 3000 Cycles.	1						19, 20
		Life Test End Points (3000 cycles)							
		Repeat Group A tests 3 and 4 with following limits applied							
		Stability (1)				-	1	%	
		Stability (2)				-	1	%	
		Cold Start				-	-	-	18
		GROUP G No tests.							
		Group H Qualification Approval Tests.							
	13	Heater Resonance and Fatigue							10
5.F.8.1	14	Low Pressure							11
	15	Frequency Modulation with Vibration				-	1	MHz	12
5.F.1.10	16	Frequency Pushing				-	1.5	MHz/A	13
10	17	Climatic							14
	18	Life (2) 2000 hours							15
		Life Test End Points							
		Repeat Group A tests 3,4,5, 7&8 with following limits applied							
		Stability(1) (as in Group A)				-	1	%MP	16
		Stability(2) (as in Group A)				-	1	%MP	16
		RF Bandwidth (as in Group A)				-	6	MHz	16
		Mean Power Output (as in Group A)				7	-	W	16
		Pulse Voltage (as in Group A)				7.0	7.9	kV	16
		Cold Start							17, 18

NOTES

1. The rate of rise of the voltage pulse specified shall be obtained when the valve is operating at a peak current of 7.5A.

2. For all tests the temperature of the anode block shall not exceed 120°C.

3. The valve shall be coupled by means of a bolted flange choke, Joint Services Catalogue No.5985-99-083-0051 satisfying specification DEF-5382, to a waveguide of internal dimensions 0.4 x 0.9 ins., which shall be terminated in a resistive load giving a voltage standing wave ratio better than 1.1 :1.

4. See outline drawing fig. 1. Dimensions are to be inspected as stated on fig. 1.

5. The valve shall be operated with the heater only for 120 seconds before the application of H.T.

6. The average number of missing pulses shall not exceed the specified limit. A pulse is considered to be missing if the R.F. energy is less than 70% of its normal energy level within the spectrum envelope.

7. For this test the load mismatch shall be adjusted to give the maximum spectrum degradation.

8. The ratio of the height of the minor lobes to that of the main lobe shall not be less than the specified value.

9. The load mismatch shall be varied through all phases during this test.

10. The heater shall be supplied with a constant 6.3Vrms, no other voltage being applied to the valve, and the supply frequency shall be swept 3 times from 340 to 440 Hz and back, the time for the sweep being not less than 90 seconds in each direction. If any resonances are found the test shall be continued at the resonant frequency for 30 hours, after which the heater current shall be within 3% of the initial value.

11. The valve shall be operated for the specified time in a chamber where the absolute pressure is 350 ± 25mm Hg. During the test there shall be no evidence of corona, voltage breakdown or overheating and the requirements of all the electrical tests in Group A shall be met.

12. The valve shall be operated and subjected to sinusoidal vibration in each of three mutually perpendicular directions, one of which shall be parallel to the axis of the cathode. The frequency shall be swept once up and down in each of the following bands, the amplitude being kept constant in each band.

    (a) 5 - 10 Hz at 0.05 ins. amplitude.
    (b) 10 - 25 Hz at 0.03 ins. amplitude.
    (c) 25 - 50 Hz at 0.01 ins. amplitude.
    (d) 50 -100 Hz at 0.005ins. amplitude.

    The rate of sweep of frequency shall be one octave per minute.
    The total frequency deviation of oscillation during vibration shall not exceed the specified limit.

NOTES - continued

13. The anode current shall be varied from 3 to 4.5 mA mean by varying the pulse voltage, care being taken to avoid thermal effects. The change in frequency per unit change in current shall not exceed the specified limit.

14. After the climatic test the valve shall satisfy clause 10.3.1 and 10.3.2 of K1001 and tests 7 and 9 of this specification.

15. The valve shall be operated continuously under Oscillation(1) conditions into a matched load for the specified number of hours.

16. These end point tests are to be performed every 100 hours.

17. This test is to be performed only after 2000 hours.

18. The body temperature shall be stabilised at -40°C. The heater voltage shall be applied for 2 minutes, after which, on application of H.T., the valve shall start and operate satisfactorily.

19. One valve shall be run on life test every three months during production. This test is for information only, not acceptance, and test results are to be made available to the Inspection Authority.

20. The valve shall be operated for the specified number of cycles, each of which shall consist of

(a) 2 minutes warm-up with Vf only (Vf = 6.3V)
(b) 23 minutes running. Osc (1) conditions
(c) 5 minutes off

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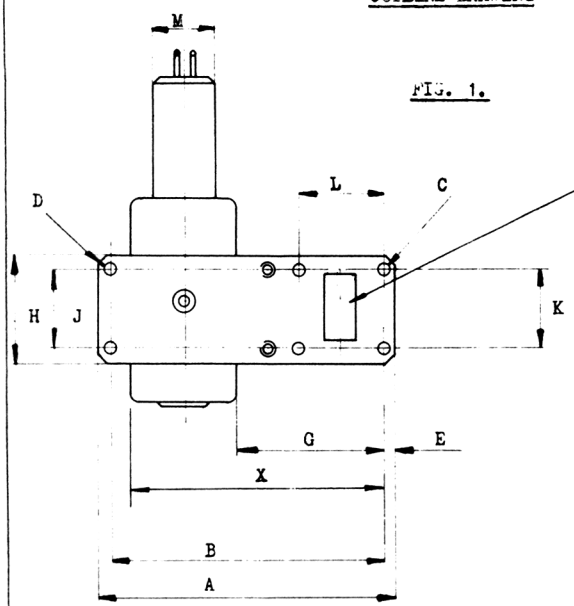
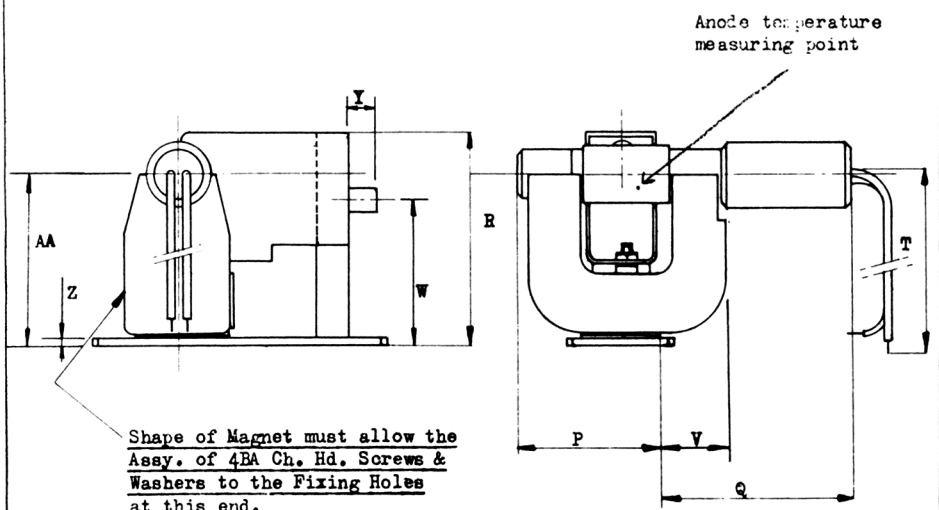
OUTLINE DRAWING

FIG. 1.



Outlet Via Waveguide. WG.16 to take Bolted Flange Choke Coupling to DEF SPEC.5352 J.S.CAT.No.5985-99-083-0051.

CATHODE - YELLOW LEAD
HEATER - GREEN LEAD



Shape of Magnet must allow the Assy. of 4BA Ch. Hd. Screws & Washers to the Fixing Holes at this end.

FOR DIMENSIONS SEE PAGE 7

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DIMENSIONS

REF	MIN.	NOM.	MAX.	AQL	INSPECTION LEVEL
A	-	-	113.5	6.5	I
B	104.1	-	104.3	6.5	I
C	4.24	-	4.40	6.5	I
D	4.37	-	4.52	6.5	I
E	-	4.8	-		Q.A.
G	54.2	-	-		Q.A.
H	-	-	41.7	6.5	I
J	30.91	-	31.07		Q.A.
K	30.91	-	31.07		Q.A.
L	32.41	-	32.61	6.5	I
M	-	25.4	-		Q.A.
P	-	-	55		Q.A.
Q	-	-	78		Q.A.
R	-	-	84		Q.A.
T	-	152	-		Q.A.
V	-	-	30.22		Q.A.
W	55.4	-	56.8		Q.A.
X	-	9.8	-		Q.A.
Y	-	-	11.5		Q.A.
Z	3.05	-	3.30		Q.A.
AA	63.5	-	68.0		Q.A.

All dimensions in mm.