

ADMIRALTY SIGNAL AND RADAR ESTABLISHMENT

CV1916

Specification AD/CV1916 Issue 1 dated 10.10.58  
incorporating MIL-E-1/765 dated 16th July 1954.  
To be read in conjunction with K1006.

SECURITY  
Specification Valve  
Unclassified Unclassified

<u>Type of Valve</u> Magnetron, fixed frequency, pulse type. <u>Cathode</u> Indirectly heated. <u>Envelope</u> Metal - Glass. <u>Prototype</u> 4J33.		<u>MARKING</u> K1001/4  Additional marking 4J33.																									
<u>RATINGS</u> <u>All limiting values are absolute</u>		<u>DIMENSIONS</u> See Drawing 240JAN  See Note E.																									
<table border="1"> <thead> <tr> <th></th> <th></th> <th></th> <th>Note</th> </tr> </thead> <tbody> <tr> <td>Heater Voltage</td> <td>(V)</td> <td>16.0</td> <td>A</td> </tr> <tr> <td>Heater Current</td> <td>(A)</td> <td>3.0</td> <td></td> </tr> <tr> <td>Nominal Frequency</td> <td>(Mc/s)</td> <td>2780 to 2820</td> <td></td> </tr> <tr> <td>Max. Mean Input Power</td> <td>(W)</td> <td>1200</td> <td>B</td> </tr> <tr> <td>Frequency Pulling Factor</td> <td>(Mc/s)</td> <td>15</td> <td></td> </tr> </tbody> </table>					Note	Heater Voltage	(V)	16.0	A	Heater Current	(A)	3.0		Nominal Frequency	(Mc/s)	2780 to 2820		Max. Mean Input Power	(W)	1200	B	Frequency Pulling Factor	(Mc/s)	15			
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<u>Typical Operating Conditions</u>																											
Magnetic Field Strength (Oersteds)		2700	D																								
Peak Anode Voltage (kV)		28																									
Peak Anode Current (A)		40																									
Peak Power Output (kW)		400																									

NOTES

A. The heater shall be switched on at least 3 minutes before HT voltage is applied. See Note 1 on Page 2 of MIL-E-1/765 dated 16th July 1954 for heater voltage conditions during periods of high anode dissipation.

B. Cooling air shall be supplied sufficient to prevent the anode temperature from exceeding 100°C.

C. These conditions refer to pulse operation with pulse duration of 2  $\mu$ S, repetition rate of 500 pps and rate of rise of pulse voltage not exceeding 90 kV/ $\mu$ S.

D. The valve shall be operated with the north pole of the magnet adjacent to the cathode lead.

E. This drawing may be obtained on application to the Specifying Authority.

NOTES

1. The data and tests for Valve type JAN-4J33 shall apply.
2. This specification refers only to the American 4J33 with frequency range 2780 to 2820 Mc/s. No reference should be made to any test, clause, or condition specifically applicable to any of the other magnetrons, (viz., 4J31, 4J32, 4J34 or 4J35) shown on the following pages.

CV1916

MIL-E-1/765  
16 July 1954INDIVIDUAL MILITARY SPECIFICATION SHEET  
ELECTRON TUBE, MAGNETRON, FIXED FREQUENCY, PULSE TYPE

JAN-4J31-35

This specification sheet forms a part of the latest issue of Military Specification MIL-E-1.

Ratings:	Ef	epy	ib	pl	Pi	tk	Du	tp	Anode T	Alt.
Absolute	V	kv	a	kw	W	sec	—	us	°C	ft.
Maximum:	16.0/10%	30	70	2000	1200	—	.001	2.5	100	10,000
Minimum:	—	—	—	—	—	120	—	—	—	—

Pulsing Service Note 1

\*\*Cathode: Oxide Coated Unipotential

For miscellaneous requirements, see Paragraph 3.3 Inspection Instructions for Electron Tubes.

Ref.	Test	Conditions	Min.	Max.
3.1	Qualification Approval:	Required for JAN Marking		
4.5	Holding Period:	t <sub>h</sub> 168 hours		
4.8	Insulation of Electrodes:	Omit		
4.9.8	**Salt Spray Corrosion:	Omit		
4.9.18.1.8	Carton Drop:	(i) Package Group 9 Carton Size E		
4.9.19.1	*Vibration:	No voltage		
4.9.19.2	**Vibration:	No voltage		
4.9.2	Dimensions:	Per drawing 240-JAN		
3.7.1.3	Marking:			
4.16.1	**Cooling:			
4.9.13	Pressurizing:	40 to 45 lbs/sq. in. (absolute)		
4.10.8	Heater Current:	Ef=16.0V	If: 2.8	3.4 A
4.16.3	<u>Oscillation(1):</u>			
—	Coupling:	Per drawing 240-JAN		
4.16.3.1	Magnetic Field:	H <sub>m</sub> 2700 gauss;Coil No. 400; Pole Tip Fig. No. 1		
4.16.3.2	Heater:	tk=120 (max) at Ef=16.0V; Ef=10.0V for test		
4.16.3.3	Pulse Characteristics:	tp=0.9 to 1.1 us;Du=.0005; trv=0.2 us (max)		
4.16.3.4	Average Anode Current: Standing Wave Ratio:	I <sub>b</sub> =35mA <sub>dc</sub> G <sub>s</sub> =1.15/1(max.)		
4.16.3.5	Pulse Voltage:		epy: 26	30 kv
4.16.3.6.2	Power Output:	t <sub>m</sub> 300(max.)	Po: 400	— W

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<u>Ref.</u>	<u>Test</u>	<u>Conditions</u>	<u>Min.</u>	<u>Max.</u>
4.10.7.3	Frequency:	4J31 F: 4J32 F: 4J33 F: 4J34 F: 4J35 F:	2860 2820 2780 2740 2700	2900Mc 2860Mc 2820Mc 2780Mc 2740Mc
4.16.3.7	$\frac{1}{f}$ R.F. Bandwidth:	Bandwidth:	—	2.5Mc
4.16.5	*Pulling Factor:	Ib=20 to 35mA <sub>dc</sub>	$\Delta F$ :	— 15 Mc
4.16.7	Stability:	Note 2		
4.16.3	<u>Oscillation(2):</u>			
—	Coupling:	Per drawing 240-JAN		
4.16.3.1	Magnetic Field:	H=2700 gauss; Coil No. 400; Pole Tip Fig. No. 1		
4.16.3.2	Heater:	tk=120(max.) at Ef=16.0V; Ef=10.0V for test		
4.16.3.3	Pulse Characteristics:	tp=1.8 to 2.2 us; Du=.0006; trv=0.2 us(max.)		
4.16.3.4	Average Anode Current: Standing Wave Ratio:	Ib=45mA <sub>dc</sub> $\rho=1.15/1$ (max.)		
4.9.14	**Temperature Coefficient:		$\Delta F$ :	— .07Mc/°C
4.9.15	**Low Temperature: Operation:	tk=180(max);		
4.11	Life Test:	Group D; Osc. (1)	t:	500 —hrs.
4.11.4	Life Test End Point :	Osc. (1)	Po: Bandwidth :	320 — W — 2.5 Mc

Note 1: During high voltage operation it is essential to operate the heater according to the following schedule:

<u>Pi (watts)</u>	<u>Ef (volts)</u>
1000 - 1200	8
800 - 1000	10.5
600 - 800	13
400 - 600	15
Less than 400	16

The above schedule is valid only for repetition rates of 300 pps or greater

Note 2: The tube is considered to be operating stably when the average current is constant, showing no appreciable kicks which are accompanied by flicker in a neon lamp used as an indicator of RF output, or by wide variations in the oscilloscope trace of input current or voltage. Stable operation shall be demonstrated over the last 30 seconds of a test interval not to exceed 5 minutes.

Note 3: Reference specification shall be of the issue in effect on the date of invitation for bid.