

Specification Mintech./CV6201 Issue 1 dated February 1968. To be read in conjunction with K1001, BS2011 except where otherwise stated		SECURITY	
		Spec Unclassified	Valve Unclassified
Type of Valve: Rugged velocity modulated oscillator with external tuning cavity, and waveguide output. Cathode: Indirectly heated Envelope: Metal Ceramic Prototypes: SZ52		MARKING  See K1001/4	
Ratings and Characteristics Absolute non-simultaneous and not to be used for inspection purposes,		BASE Flying leads 18" long	
		Notes	
Heater voltage (v) Heater current (A) Max resonator Voltage (V) Max resonator Dissipation (W) Max resonator Current (mA) Negative Reflector Voltage range (V) Min r.f. Power Output (mW) Frequency Range (MHz) Min Electronic Tuning Range. (MHz) Average Electronic Tuning rate at Mode Peak (MHz/V) Mechanical tuning torque. (oz-ins) Max Reflector Current (uA)	6.3		CONNECTIONS
	0.7 - 1.0		Lead Colour Electrode
	350	A	Code
			Yellow Heater h
	20	B	Yellow Heater h
			Green Cathode k
	50		Grey Reflector ref
			Tan Resonator res
	80-195	A,E,G.	Output waveguide WG16
			DIMENSIONS
	25	F,G.	See outline drawing on page 5.
	Fo $\pm$ 300	C,G.	
		D,G.	MOUNTING POSITION
			Any
	2		CLIMATE
	15-50		Non Tropical
			ALTITUDE
	10	H	100,000 Feet
NOTES			
A. The voltages quoted in this specification are relative to cathode. The valve is normally operated with the resonator at earth potential Preheating of the cathode before application of the resonator voltage is not necessary.			
B. The valve body temperature must not exceed 200°C.			
C. Where fo is the desired frequency of the valve which may be pre-set to any frequency within the range 8350 to 9400 MHz.			
D. Between $\frac{1}{2}$ power points without hysteresis.			
E. The reflector voltage must always remain negative with respect to cathode. If under A.F.C. working there is any possibility of the reflector voltage becoming equal to or more positive than the cathode, a protective diode must be fitted between reflector and cathode.			
F. The valve is capable of being operated into a load with VSWR of 1.2 : 1, or better.			
G. These values under Ratings and Characteristics apply to operation in mode 5.			
H. At operating values of reflector voltage.			
J. NATO Stock Number is 5960-99-037-5428.			

TESTS

To be performed in addition to those tests specified in K1001.

Test Conditions:- Unless otherwise specified				Notes 1 and 2.				
Vh (V)	Vres (V)	Vref (V)	Load					
6.3	300	Adjust for max Po with Neg. Ref. Voltage main- tained within range 80 to 195V.	VSWR better than 1.1 : 1					
K1001 Sect. 5B	Test	Test Conditions	AQL %	Insp. Level	Symbol	Limits		Unit
	<u>GROUP A</u>					Min.	Max.	
3.1.1	Heater Current		-	100%	Ih	<del>0.6</del> 0.7	1.0	A
3.3.1	Reflector Current	Neg. Ref. V = 150V	-	100%	Iref	-	10	uA
	Negative Ref. V.	Within the 600MHz range, measurements shall be made at the two frequency points giving the greatest and least neg. ref. voltage.	-	100%	-Vref	80	195	V
	<u>Oscillation 1</u>	Frequency fo = +300 MHz.	-	100%				
	Resonator Current				Ires	25	45	mA
	Power Output				Po	25	200	mW
	<u>Oscillation 2</u>	Frequency fo - = -300MHz.	-	100%				
	Resonator Current				Ires	25	45	mA
	Power Output				Po	25	200	mW
	<u>Oscillation 3</u>	Within the range fo -300MHz and fo +300MHz, meas- urements shall be made at the two frequencies giving the greatest and least power outputs.	-	100%				
	Resonator Current				Ires	25	45	mA
	Power Output				Po	25	200	mW
	<u>Oscillation 4</u>	Res. V = 250V. With the Neg. Ref. Volt. maintained within the range 40 to 125V, the power output shall be measured over the frequency range fo -300MHz to fo +300MHz.	-	100%				
	Power Output				Po	12	66	mW

K1001 Sect 5B	Test	Test Conditions	AQL %	Insp Level	Sym- Bol	Limits		Unit
						Min.	Max.	
3.4	Emission	Vary $V_h$ from 6.3V to 5.7V. Measured as a change in $I_{res}$ . Non-oscillating	-	100%	$\frac{I_{res}}{I_{res}}$	-	15	%
	Mechanical Tuning Torque	No voltages $T_{amb.} = 15$ to 35 C. Note 3.	-	100%	-	15	50	oz-in.
	<u>Warm-up</u>	Frequency = $f_0 \pm 50$ MHz Notes 4 and 5.	-	100%				
	Output Power Drift				$\Delta P_o$	-	$\pm 0.1$	dB
	Frequency Drift				$\Delta F$	-	$\pm 4$	MHz
	<u>Vibration</u>	Non-oscillating. $V_{ref} = 150V$ . 10g peak for 2 min. at 50Hz. Note 6	-	100%				
	Reflector Current				$I_{ref}$	-	10	$\mu A$
4.2.8	Electronic Tuning Hysteresis		-	100%	-	-	50	%
GROUPS B AND C OMITTED								
4.2.7	<u>GROUP D</u> Electronic tuning as frequency variation from mode peak value.	Adjust $V_{ref}$ . to give half power points	6.5	I	$\Delta F$	$\pm 9$	-	MHz
	Electronic Tuning Rate	Measured at $f_0 = +300$ MHz and $f_0 = -300$ MHz. Note 7	6.5	I	$\frac{\Delta F}{V_{ref}}$	-	4	MHz/V
BS2011 Pt. 2D	<u>GROUP E</u> Accelerated Damp Heat	Pre-conditioning - see Note 11. No. of cycles = 7. Note 12.	-	QA				
	Vibration Endurance	The valve shall be mounted on a vibration table and searched for resonances in each of three planes, as follows:- (1) 5Hz to 20Hz with constant displacement = 0.1in. (2) 20Hz to 500Hz with constant acceleration = 2g. All observed resonances shall be continuously vibrated for a minimum period of 10 minutes. Notes 12 and 13.		QA				

## TESTS CONTINUED

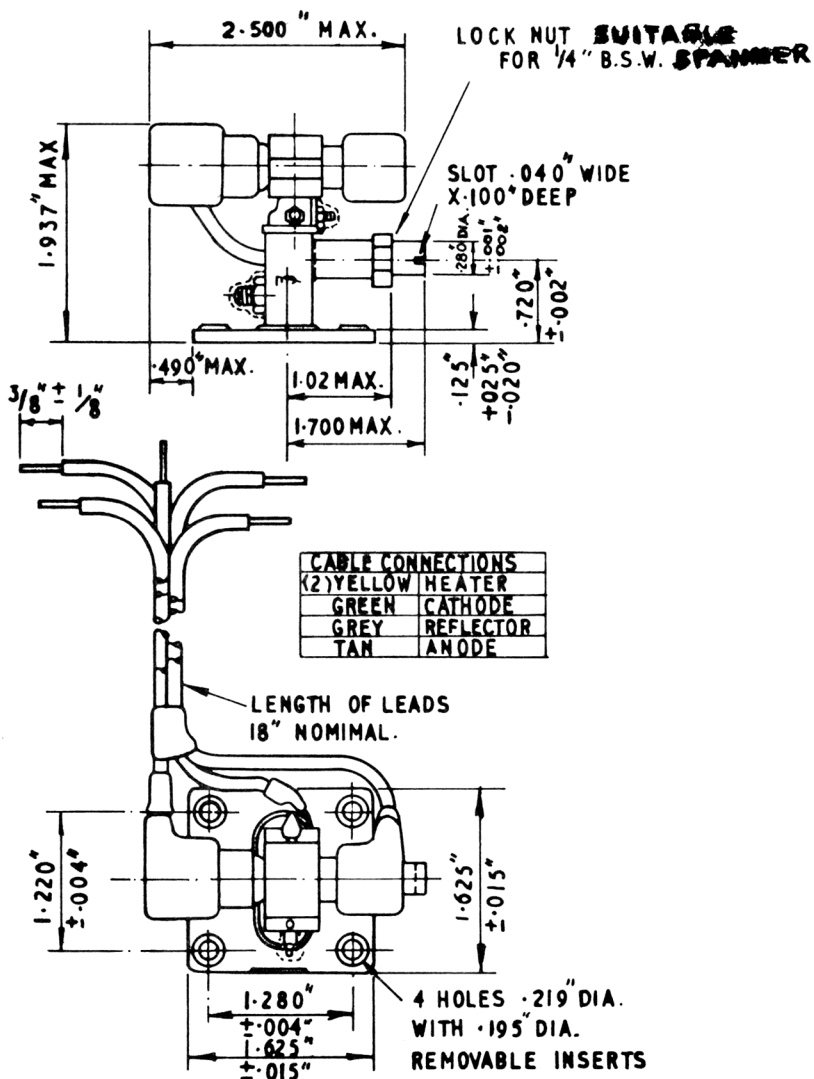
K1001 Ref.	Test	Test Conditions	AQL %	Insp. Level	Sym- bol	Limits		Unit
						Min.	Max.	
11.10.1	GROUP E Continued							
	Shock	Notes 12 and 14.		QA				
	<u>Group F</u> Life <u>Life test end</u> <u>Points</u> 1200 hours output power	Oscillation at any one frequency in range $F_0 \pm 300$ MHz Note 10.		Note 9	$P_o$	20	-	mW
5.14	<u>Group G</u> Electrical Re-test after 14 days storage  Inoperatives Reflector current change	No voltages Neg.Ref.V. =-150V Note (8)		100% 100%	$\Delta I_{ref}$	-	2	$\mu A$

## NOTES

1. The tuning range shall be continuous. During all tests the heater and resonator voltages shall be maintained within  $\pm 2\%$  of quoted values.
2. The same oscillatory mode shall be used for Oscillation tests 1, 2 and 3.
3. Measured over the tuner rotation required to tune the valve from  $f_0 + 300$  MHz to  $f_0 - 300$  MHz.
4. This test shall be performed with the valve mounted in a draught free ventilated box such that the temperature of the air within the box does not exceed  $40^\circ C$ . The voltages  $V_k$  and  $V_{ref}$  shall be monitored and maintained within  $\pm 0.5V$  throughout the tests.
5. The valve shall be operated at mode peak for a minimum period of 2 hours. Readings of power and frequency shall be taken. The supplies to the valve shall then be disconnected and the valve allowed to cool to room temperature. The supplies to the valve shall then be reconnected and within ten minutes the power output from the valve shall be within  $\pm 0.1$  dB of the value before disconnection, and the frequency within  $\pm 1$  MHz of the value before disconnection. The power and frequency shall continue to be within these limits for a further period of ten minutes.
6. The vibration test shall be performed with the valve attached to an approved mount by the waveguide flange. The axis of the electron beam shall be vertical and the reflector downwards. The valve shall be vibrated in the direction of the electron beam. The reflector current shall be continuously monitored during the test and shall not exceed the limit specified.
7. The Electronic Tuning Rate is defined as the overall frequency change caused by a reflector voltage change of  $\pm 0.5V$ .

NOTES CONTINUED

8. Before and after storage the reflector current shall be recorded with all voltages applied but the valve shall not be oscillating.
9. Life test shall be performed on at least one sample out of every batch offered for acceptance. A batch is defined as either 25 valves successfully passing Group A tests or a maximum of three months production. The criterion for acceptance of each batch is that the average life of all samples tested out of that batch shall not be less than 1000 hours. The valves shall run continuously and during life test the relevant valve performance characteristics shall be measured at the following time intervals:-  
 100 hours; 300 hours; 500 hours; 750 hours; 1000 hours; 1200 hours, maintained within  $\pm 12$  hours.  
 Any valve failure occurring up to the 100 hour measuring point shall be disregarded and removed from the test. A further sample shall then be submitted to the life test.  
 A valve known to be satisfactory at one measuring point but unsatisfactory at the next measuring point shall be accorded the number of hours accumulated to the mid-point between the two measuring points.  
 Failure of a valve due to associated test equipment failure shall not be considered a valve failure and under these circumstances a further sample shall be submitted to life test.
10. Providing the valve is in continuous production, i.e. a break in production of not more than six months and the three previous batches have been accepted for life test, the fourth and subsequent batches may be delivered if the life test sample appropriate to that batch is satisfactory at the 300 hours test point. The life test sample shall remain on test for the complete life test period in accordance with the requirements of note 9. In the event of a failure to meet the above criteria, normal life test shall be reinstated until such time as three consecutive batches are again accepted.
11. Pre-conditioning shall be in accordance with the following:-
  - (a) BS2011 Pt. 2B, Dry Heat, Severity  $+85^{\circ}\text{C} \pm 2^{\circ}\text{C}$ , Duration 4 hours.
  - (b) BS2011 Pt. 2A, Dry Cold, Severity  $-40^{\circ}\text{C} \pm 3^{\circ}\text{C}$ , Duration 4 hours. The periodic variation specified in BS2011 Pt. 2D, may be ignored.
12. Following the environmental tests, the valve shall be subjected to visible inspection and in addition, must pass the Group A tests and test limits.
13. The rate of change of vibration frequency shall not exceed one octave per minute from 5Hz to 200Hz and 100Hz per minute from 200Hz to 500Hz.  
 During this test the output from the valve shall be monitored and the following limits shall not be exceeded.
  - (a) Frequency Deviation =  $\pm 1\text{MHz}$ .
  - (b) Power Output = 25 to 200mW.
14. During this test the output from the valve shall be monitored and the following limits shall not be exceeded:-
  - (a) Frequency Deviation =  $\pm 2\text{MHz}$ .
  - (b) Change in Power Output = 1dB.



Where no limiting dimensions are given, those quoted are nominal.

ELECTRONIC VALVE SPECIFICATIONS

SPECIFICATION MINTECH/CV6201, ISSUE 1, DATED FEBRUARY, 1968

AMENDMENT No. 1

1. Page 1 Ratings. Against "Heater Current" amend the limits of "0.7 - 1.0" to read "0.8 - 1.0".
2. Page 2 Heater Current. In the column headed "Limits, Min." delete "0.7" and substitute "0.8".

October 1968

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

*JAS 16/68*