MINISTRY OF ~~AVIATION~~ TECHNOLOGY - DLRD/RRE

VALVE ELECTRONIC **CV6113**

Specification ~~MOA~~ MinTech/CV 6113

Issue 1 Dated 28th January 1964

To be read in conjunction with K1001, BS448 and BS1409

SECURITY	
Specification	Valve
UNCLASSIFIED	UNCLASSIFIED

indicates a change

TYPE OF VALVE - Cathode Ray Tube
DEFLECTION - Magnetic
FOCUS - Magnetic
GUN - Tetrode
BULB - Glass. Internal Conductive Coating
SCREEN - 007 (Aluminium backed)
PROTOTYPE - VX1531

MARKING

See K1001/4

BASE

See BS 448. B12A with short metal shell or approved alternative.

RATINGS

(Absolute non-simultaneous and not for Inspectorate)

			NOTES
Heater Voltage	(V)	6.3	
Heater Current	(A)	0.6	A
Max. Anode 1 Voltage	(V)	600	
Min. Anode 1 Voltage	(V)	250	
Max. Anode 2 Voltage	(kV)	15.5	
Min. Anode 2 Voltage	(kV)	9.0	
Max. negative Heater-Cathode Voltage	(V)	150	
Max. Beam Current	(μA)	50	

Typical Operating Conditions

Anode 1 Voltage	(V)	300
Anode 2 Voltage	(kV)	15
Max. Grid voltage for cut-off	(V)	-150
Max. Grid Drive for Ib = 50 μA	(V)	40

CAPACITANCES

Cg - all (max)	(pF)	12
Ck - all (max)	(pF)	12

CONNECTIONS

Pin	Electrode	
1	heater	h
2	grid	g
6	no connection	
7	no connection	
10	anode 1	a1
11	cathode	k
12	heater	h
Side contact	anode 2	a2

SIDE CONTACT

See BS448. CT8

DIMENSIONS

See drawing on Page 6

NOTES

A. The heater may be 0.3A or 0.6A nominal.

B. Screen shall not contain Beryllium.

C. The tube should be operated at its minimum useful brightness in order to prevent damage to the screen material.

D. Joint Services Cat. No. 5960-99-037-3705

(222025)

GENERAL TEST CONDITIONS

Vh(V)	Vg(V)	Va1(V)	Va2(kV)	Vhk(V)	Focus Coil
6.3	adjust	300	15	0	See Note 7

An interlaced 405 line TV raster of convenient size may be used when required.

K1001 Ref.	TEST	TEST CONDITIONS	AQL %	Insp. Level	Symbol	Limits Min.	Limits Max.	Units
5A.3.1	General Inspection Dimensions	No Voltages. See drawing on Page 6		100%				
5A.3.2.2	Loose Particles	No Voltages		100%				
5A.4.1	Insulation			100%				
5A.4.1.2	Grid Insulation Leakage Current	Vh = 7.0V Vg = - 350V Rg = 3 M.ohms		100%	Ig	-	6	µA
5A.4.1.3	Heater-Cathode Leakage Current	Vh = 7.0V Resistor = 3M ohms Vhk = 175V Vhk = -450V		 100% 100%	 Ihk Ihk	 - -	 30 40	 µA µA
	Heater Current	Note 1		100%	Ih	0.27	0.66	A
5A.4.3	Negative Grid Cut-off Voltage Vg1 A1 Characteristic	No deflection See Note 10		100%	Vg	60	150 Record Vg1	V
5A.4.4	Negative Grid Voltage Vg2	Ib = 50µA Defocussed beam, scanned or deflected off usable screen area. Note 2.		100%			Record Vg2	V
	Grid Drive Vg1 - Vg2			100%		20	40	V
5A.4.2.1	Maximum Voltage	Va1 = 450 Vg = -300 Va2 = 18kV Focus field as in Focus Test. Preheat Cathode 2 mins. min.		100%			No Breakdown	
5A.4.2.3	Stray Emission	As above. Vg = twice cut off voltage as in Test 5A.4.3		100%			No visible Stray	
	Dark Current	Va1 = 300V Va2 = 18kV Focus field as in Focus Test. Adjust Vg until spot just not visible.		100%	Ia2	-	5	µA

K1001 Ref.	TEST	TEST CONDITIONS	AQL %	Insp. Level	Symbol	Limits Min.	Limits Max.	Units
	Microphony	Focussed raster. See Note 3		100%				
	Cathode Quality measured as $K = \frac{Ia2}{Vg(cut\ off)\frac{2}{2}}$	Va1 = ~~200V~~ 300✓ Va2 = 2kV Vg = 0 Raster		100%	Ia2	measure		µA
		Negative Grid cut-off voltage as in test 5A.4.3		100%	K	2	-	$\frac{\mu A}{V}$
5A.4.5	Gas Test measured as ratio $\frac{Ia2}{Ik}$	Va1 = 200V Va2 = -25V Adjust Vg to give Ik = 400 µA min. Note 4		100%		-	$2x10^{-4}$	
5A.5.7	Focus							
	Astigmatism of undeflected focussed spot	Pulsed Spot Pulse Width = 0.1µSec p.r.f. = 100pps max. mains synchronised. Amplitude Ib = cut-off to 50µA See Note 5		100%		-	20	%
~~5A.7.2.2~~ 5A.6.2.2.2	Line Width	Pulsed Line 250mm. Pulse width = 100µS Focus as in Astigmatism test. Modulation pulses and deflection waveform synchronised. Note 9		100%		-	0.2	mm
5A.5.7.3	Unfocussed Spot diameter	No deflection or focussing Grid pulsed from cut-off by 100µS of amplitude Vg1 - Vg2. p.r.f. = 25 pps. max.		100%		-	19	mm
5A.6.3	Useful Screen Area Diameter on geometric centre			100%		250	-	mm
5A.6.4.2	Displacement of undeflected unfocussed spot from geometric centre of neck projection to screen	Focus off Raster off		100%		-	5	mm
	Neck Alignment	Note 8		100%		-	5	mm

K1001 Ref.	TEST	TEST CONDITIONS	AQL %	Insp. Level	Sym-bol	Limits Min.	Limits Max.	Units
5A.5.1.1 and 5A.5.1.2	Screen Efficiency	Va2 = 9kV Vg adjusted to give a light intensity of 0.12 candela using a focussed raster of convenient size Viewed through filter. Wratten No.22		100%	Ib	-	8	µA
5A.5.5	Persistence measured as a decay time to (i) 80% (ii) 15%	No focus field Vg adjusted to give screen luminance of 2 foot-lamberts viewed through Kodak Wratten No.22 Filter or equivalent. Linear raster of convenient size, uniform screen excitation. Excitation time = 120 secs. approx.	2.5	I		 100 -	 400 10	 mS secs
5A.3.5	Blemishes and screen defects No. of blemishes within 80mm dia. circle in useful screen area 0.25mm - 0.75mm 0.75mm - 1 mm Blemishes larger than 1 mm See Note 6	Scan over useful area with defocussed raster of convenient size.		100%		 - -	 10 4 0	
5A.4.6	Capacitances		6.5	IC	Cg-all Ck-all	- -	12 12	pF pF
5A.7.2	Resistance to External Pressure			QA				
5A.3.9	Q.A. Purposes only			QA				
5A.3.7	Holding Period - 7 days Repeat							
5A.4.5	Gas test			100%		-	$2x10^{-4}$	

CV6113

NOTES

1. The heater current shall not vary by more than 10% from the manufacturers nominal value.

2. The beam current shall increase continuously over the range of grid voltage Vg1 to Vg2.

3. The tube shall be held with the screen horizontal and uppermost. It shall be viewed for 10 seconds in a dark box whilst its neck is tapped with an approved forked rubber covered wooden mallet at a minimum rate of 4 taps per second. There shall be no dark lines or bars on the faintly illuminated screen.

4. This test shall be made not less than 7 days after completion of exhaust process.

5. Measure maximum and minimum axis at tube centre. No axis to be more than 0.2mm. Limits = $\frac{\text{Difference}}{\text{Max.}} \times 100$

6. Blemishes below 0.25mm shall be ignored, except where the separation between them is less than the maximum dimension of the largest blemish in a group.

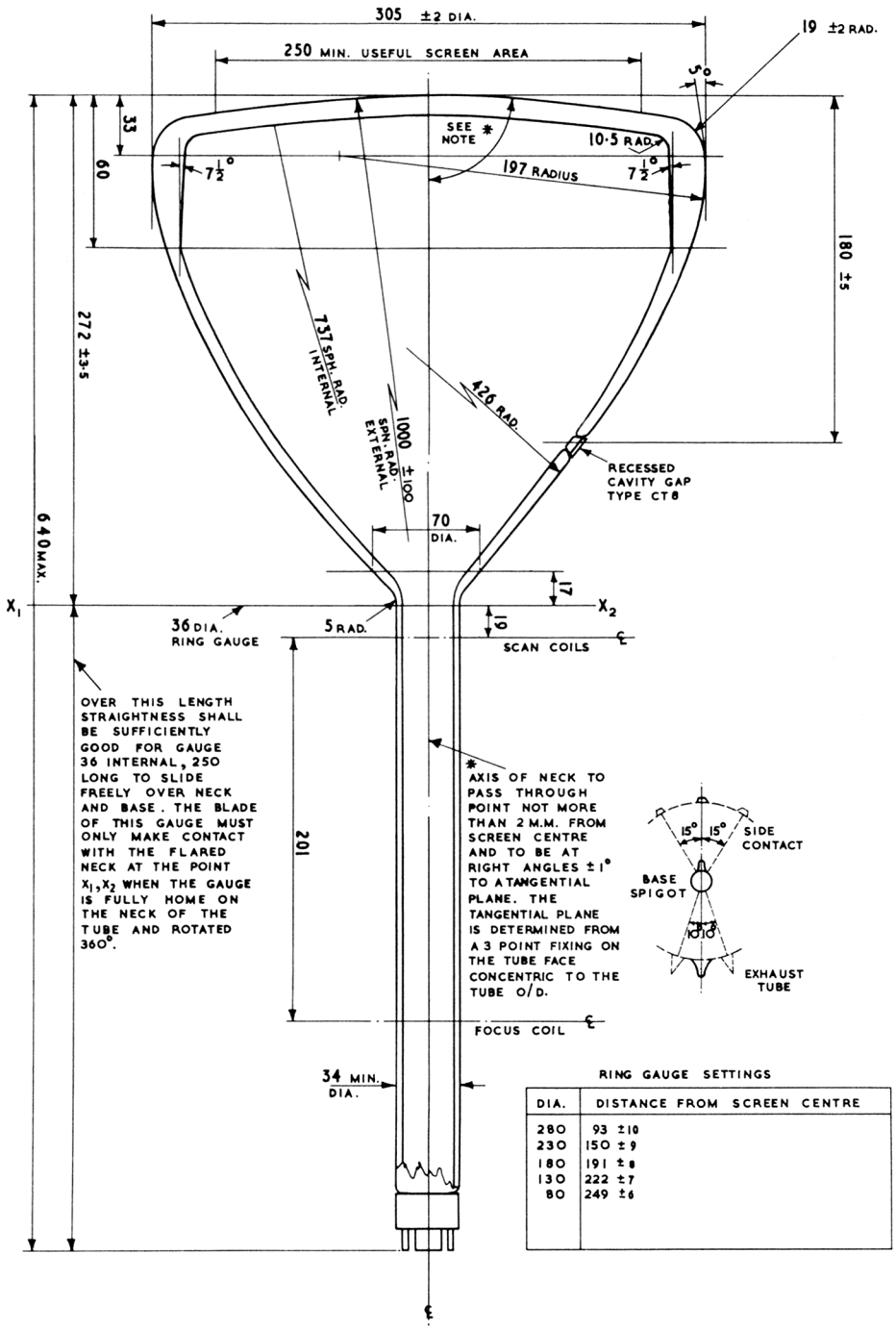
7. A focus coil of good quality is to be positioned as shown in Drawing on Page 6. A Ferranti Type FC4 is suitable.

8. For deviation of centre of neck from geometric centre of tube face, measure by holding the tube neck between three sets of rollers. One set located near the cone, one set located near the base, and the other a spring loaded set located midway between the other two sets of rollers. The tube is rotated and a circle is described on the tube face, the centre of this circle is the neck projected centre.

9. The microscope used for line width measurement should have a 2" objective and an X7 eyepiece giving an overall magnification of approximately 19.

10. Grid cut-off voltage with A1 zero volts shall not exceed 1/7 of Vg1 as in 5A.4.3

11. The tube shall carry a label which reads as follows:-
"Grid drive (for Ib = 50μA) = ... volts"
(The manufacturer to insert the value of drive voltage for each tube).



RING GAUGE SETTINGS

DIA.	DISTANCE FROM SCREEN CENTRE
280	93 ±10
230	150 ±9
180	191 ±8
130	222 ±7
80	249 ±6

ALL DIMENSIONS IN MILLIMETRES

ELECTRONIC VALVE SPECIFICATIONS

SPECIFICATION MOA/CV6113, ISSUE 1, DATED 28th January, 1964.

AMENDMENT No. 1.

(i) Page 3 Cathode Quality Test

In column headed "Test Conditions", amend "Va_1 = 200V" to read "Va_1 = 300V.".

(ii) Page 3 Line Width Test.

In column headed 'K1001 Ref''amend "5A.7.2.2" to read "5A.5.7.2.2".

TVC for RRE

October 1966

(445214)

22/12/66

ELECTRONIC VALVE SPECIFICATIONS.

SPECIFICATION MOA/CV6113, ISSUE 1, DATED 28TH JANUARY 1964

AMENDMENT NO. 2.

Insert the following amendments as instructed:-

1. Page 1

(i) Specification Authority. Amend "MINISTRY OF AVIATION-DLRD/RRE" to read "MINISTRY OF TECHNOLOGY-DLRD/RRE".

(ii) Specification Title. Amend "Specification MOA/CV6113" to read "Specification Mintech./CV6113".

2. Page 2

Negative Grid Voltage Vg2 Test. In test conditions column, against "Note 2" add "11".

3. Page 5.

Insert New Note 11 as follows:-

11.The tube shall carry a label which reads as follows:-

"Grid drive (for Ib = 50uA) = ... volts".

(The manufacturer to insert the value of drive voltage for each tube)

February 1968

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

JAB 28/5/68