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

VALVE ELECTRONIC **CV6108**

Specification ~~MOA~~ Mintech/CV6108	SECURITY
Issue 1A dated 22nd December 1964	Specification: Unclassified / Valve: Unclassified
To be read in conjunction with K1001	

→ Indicates a change

TYPE OF VALVE - Package magnetron with flying leads, fixed frequency

CATHODE - Indirectly heated

PROTOTYPE - CV2281, M537A

RATING

Non simultaneous
All limiting values are absolute
(Not for inspection purposes)

			Note
Initial heater voltage, Volts	r.m.s.	6.3 ± 10%	A
Heater current at Vh = 6.3, Amps	r.m.s.	0.5	
Max. heater surge current, Amps	r.m.s.	3.0	
Max. mean input power	Watts	82.5	
Max. peak input power	kW	33	
Max. duty cycle	ratio	0.0025	C
Max. pulse length,	μsec.	2.5	C
Max. rate of rise of voltage pulse	kV/μsec.	75	D
Max. anode temperature	°C	140	B
Max. VSWR	ratio	1.5/1	
Max. altitude	ft.	10,000	
Max. Waveguide pressure	psi A	45	

DATA - 1

Frequency limits	kmc/s	8.77-8.83	
Peak pulse anode voltage	kV	5 - 6	
Tube heating time	secs.	120	A

DATA - 2, "Burst Operation"

Note E

Burst duration,	milliseconds	40
Burst frequency	c/s	2
PRF during burst	kc/s	50
Pulse length	μsec.	0.45
Peak anode current	Amps	4 - 5.5
Max. rate of rise of voltage pulse	kv/μs	80

MARKING

K1001/4 with serial number

DIMENSIONS

See page 8
See also gauge on page 10

CONNECTIONS

Cathode: GREEN lead, or neutral coloured lead With GREEN sleeve.
Heater: YELLOW lead, or neutral coloured lead with YELLOW sleeve.

MOUNTING POSITION

Any

SUPPORT

Face plate

WEIGHT

3lbs. approximately

JOINT SERVICE CATALOGUE NO.

5960-99-037-2968

COUPLING FLANGE

5985-99-083-0051 ←
W.G. 16

RATING AND DATA NOTES

A. HT should not be applied until 120 seconds after application of heater voltage for ambient temperatures above 0°C, and not until 180 seconds for ambient temperatures between 0°C and -55°C.

The heater voltage should be reduced within three seconds of applying the HT for mean power inputs greater than 25 watts, according to the formula:-

$$Vh = 6.3 \left(1 - \frac{\text{mean power input}}{180}\right) \pm 0.6 \text{ Volts r.m.s.}$$

The heater current surge should never exceed 3.0 Amps r.m.s.

B. The anode may be cooled as necessary by a flow of air over the anode body and guide attachment brackets which serve as cooling fins. The preferred direction of the air blast, and the point at which the anode temperature should be measured are shown on page 8.

C. These ratings apply for equally spaced pulses.

D. The rate of rise of voltage is, for rating purposes only, $\frac{dv}{dt}$ MAX measured above the 80% level of the magnetron peak pulse anode voltage.

E. This is a set of simultaneous operating conditions.

F. The CV6108 replaces the CV2281 and is used in ARI 5851, ARI 5885 and ARI 5951. The relative positions of the magnetron and the aperature for the cathode support in the bulkhead screens are shown on page 9.

TESTS

To be carried out in addition to those applicable in K1001

TEST CONDITIONS: unless otherwise specified, notes 1, 10

Parameter	Units	Osc. 1		Osc. 2		Osc. 3 BURST		Note
		Min.	Max.	Min.	Max.	Min.	Max.	
Initial heater voltage	Volts RMS	6.3		6.3		6.3		3
Tube heating time	secs	-	120	-	120	-	-	
Run heater voltage	Volts r.m.s.	4.5		6.3		4.5		3
Pulse length	μsecs	0.9	1.1	1.8	2.2	0.4	-	
Duty cycle	ratio	0.002		0.001		0.0016	-	
Pulse repetition rate	kc/s	-	-	-	-	47.5	52.5	
Duration of BURST	milliseconds	-	-	-	-	38	42	
Rate of rise	kv/μs	75	-	75	-	80	-	2
Mean anode current	mA	9	-	4.5	-	-	-	
Peak anode current	A	-	-	-	-	4.75	5.5	
VSWR at output flange	ratio	-	1.05	-	1.05	-	1.05	

Test	Test Conditions	Limits		Units
		Min.	Max.	
GROUP A	Tests in this group to be carried out on all valves , Note 17.			
(a) Holding period	14 days min. No voltages,note16			
(b) Stability (1)	Osc. 1, VSWR = 1.5/1 min. Max. current condition, note 4	-	0.25	%
(c) Stability (2)	Osc. 1, VSWR = 1.5/1 min. Min. current condition, note 5	-	0.25	%
(d) Frequency pulling	Osc. 1, VSWR = 1.5/1 min.	-	15	Mc/s
(e) Spectrum (1)	Osc. 1 Ia = 7.5 and 9.0 mA VSWR = 1.5/1 min. all phases	-	2.5/tp	Mc/s
(f) Side Lobes (1)	Osc. 1 Ia = 7.5 and 9.0 mA VSWR = 1.5/1 min. all phases	6	-	db
(g) Mean power	Osc. 1	16		Watts
(h) Frequency	Osc. 1, anode temp. = 40 ± 10 °C Note 7	8770	8830	Mc/s
(j) Pulse voltage (1)	Osc. 1	5.3	5.7	kV
(k) Heater current	Vh = 6.3 volts RMS, no pulse voltages	0.43	0.60	Amps
(l) Pressurising	Waveguide pressurised to 45 PSIA. No voltages		0.005	lbs (weight) per hr.
(m) Pulse voltage (2)	Osc. 3	5.3	5.7	kV
(n) Frequency (2)	Osc. 3	8770	8830	Mc/s
(p) Mode change (1)	Osc. 3, Ia = 4.0 -5.5 Amps range. Note 11			
(q) Mode change (2)	Osc. 3, Ia = 5.5 Amps min. VSWR = 1.5/1 phase adjusted for max. current. Note 11			
(r) Mode change (3)	Osc. 3, Ia = 5.5 Amps min. VSWR = 1.5/1, phase adjusted for min. current. Note 11			
(s) Cold VSWR	No voltages	8		VSWR

TESTS (Contd.)

Test	Test Conditions	Limits		Units
		Min.	Max.	
GROUPS B, C, D	No tests			
GROUP E	Mechanical and environmental tests at the inspection levels indicated			
Vibration	No voltages. AQL = 6.5% Inspection level I. Note 14			
GROUP F	Life and survival tests at the inspection level indicated			
Life	Oscillation 2. Note 8	250		hrs.
Life test end points	Tests:-			
	(b) Stability (1)		0.5	%
	(c) Stability (2)		0.5	%
	(e) Spectrum (1)		3/tp	Mc/s
	(f) Side lobes (1)	6		db
	(g) Mean power	12.5		Watts
	(h) Frequency	8770	8830	Mc/s
Life, burst condition	Oscillation 3, Note 9	12		hrs.
Life, burst condition test end point	Tests (b) - (j) inclusive same limits			
Shelf life in pack.	No voltages, Note 12	To be agreed		
GROUP G	No tests in this group			
GROUP H	Qualification Approval tests			
Life	Oscillation 2.	1000		hrs.
Life test end points	Tests:-			
	(b) Stability (1)		1.0	%
	(c) Stability (2)		1.0	%
	(e) Spectrum (1)		3/tp	Mc/s
	(f) Side lobes (1)	6		db
	(g) Mean power	12.5		Watts
	(h) Frequency (1)	8770	8830	Mc/s
Low temperature operation	Anode temperature -55°C initially, Osc 1, Note 13			
Low pressure operation	Osc. 1, Ambient pressure = 500 m.m. hg. Note 16			

NOTES

1. The test conditions are at the discretion of the manufacturer providing that the limits, which are in absolute units, are complied with.

2. This is $\frac{dv}{dt}$ measured at the onset of RF oscillations.

3. Measured with meters calibrated to B.S.I. grade 1 industrial standards.

4. This shall be the first test after the holding period. EHT to be applied 120 seconds maximum after switch on of heater. The phase of the VSWR shall be adjusted to obtain maximum current. This test shall terminate eight minutes after switching on the heater.

5. This shall follow stability 1 test and shall terminate seventeen minutes after switching on the heater. The phase of the VSWR shall be adjusted for minimum current for this test.

6. Pulses are defined as missing if their energy is less than 70% of the normal level in the frequency range 8755 - 8845 mc/s. The number of missing pulses shall not exceed the number specified, expressed as a percentage during any consecutive five minute period within the duration of the test.

7. Measured at point specified on outline drawing.

8. The number of tubes to be life tested shall not be less than one per month. At the option and at the expense of the manufacturer, additional tubes may be life tested to the same conditions, and the failure data shall be based on the total for test.

   In calculating the average life of a life test group of tubes, the life of each tube shall be determined by adding to the hours at the last life test end point passing test, either 10% of the hours specified as the minimum life, or one half of the hours between the last life test end point passing test and the life test end point failure test whichever value is smaller. At the conclusion of the time specified for life test, the average life of the life test group of tubes placed on test shall be not less than 80% of the number of hours specified.

9. 10% of the tubes shall be run for 12 hrs., and 30% of the tubes shall be run for one hour, and if no failures occur the batch shall be accepted. If a failure occurs, a second sample of 40% of the tubes shall be run for 12 hours and if no failures occur in this sample, the batch shall be accepted. If a failure occurs in the second sample, the whole batch shall be run for 12 hours.

10. The oscillation 3 conditions may be obtained by using one of the modulators as in ARI 5851 and ARI 5885. Adjust mains input to 115 volts, and then, provided that the pulse voltage is within the specified limits, and the valve is not moding, the peak current should be set within the limits by altering the input voltage for the EHT supply to the modulator valve.

11. Two alternative methods of test are acceptable.

    (a) There shall be no double current or pulse voltage traces as seen on an oscilloscope.

    (b) The number of missing pulses, as defined in note 6 shall not exceed 1%, ignoring the first 10% of the burst.

12. 5% of the production shall be set aside for shelf life tests. The target is one year initially, leading to three years.

NOTES (Contd.)

13. The anode shall be at -55°C. EHT shall be applied three minutes max. after the heater, and the valve shall then operate satisfactorily.

14. Vibration at right angles to the cathode support, 25 ± 2 c/s with amplitude ± 0.040" min. for 60 seconds. Tube must repass all tests (b) - (j) inclusive.

A lot shall consist of 111 valves or one month's production whichever is greater. A valve having one or more defects shall count as one defective. Reduced inspection may be allowed after five 'successive' lots have been accepted. Normal inspection shall be used and continued until reduced or tightened inspection is required.

15. The pressure in the waveguide is at the discretion of the manufacturer. There shall be no signs of voltage breakdown.

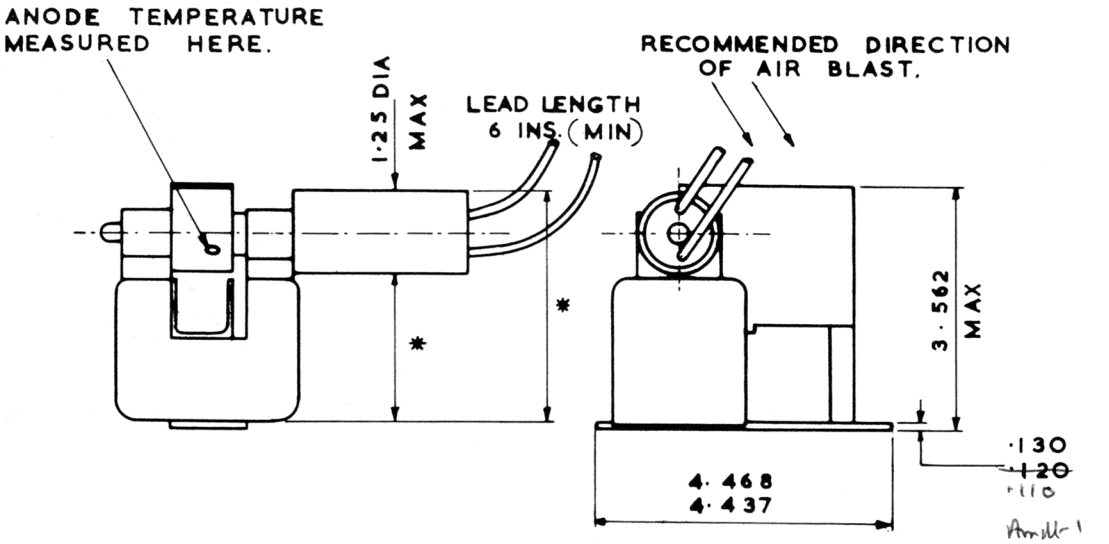
16. Tests (b) Stability (1), (c) Stability (2) (g) Mean Power (j) Pulse Voltage (1) may be carried out before and shall be carried out at the conclusion of the holding period. All other tests may be carried out before or after the holding period.

17. All valves to be inspected against Outline Drawing on page 8., and must pass gauge on page 10.

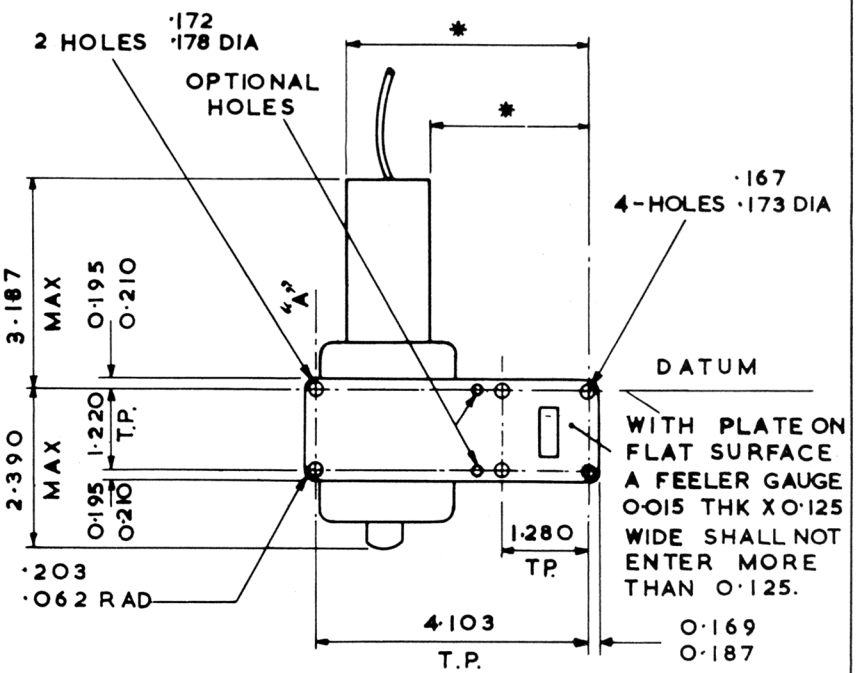
With reference to the Gauge on page 10, yokes A and B are to be placed in positions shown so the the valve is gauged with both yokes simultaneously.

OUTLINE

THIRD ANGLE PROJECTION



*VALVE MUST PASS GAUGE PAGE 10.

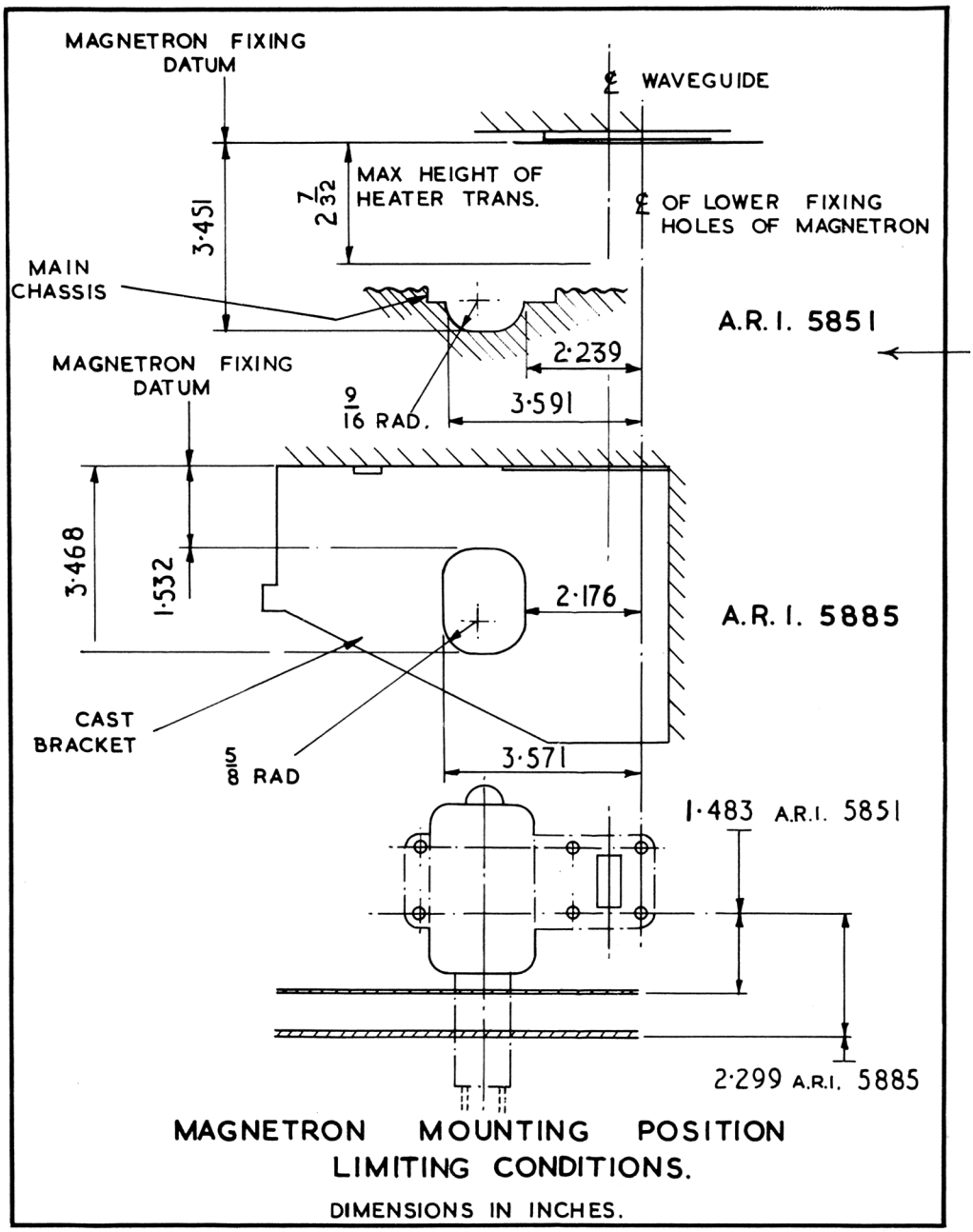


NOTE :- NO POINT ON THE PLAN PROFILE OF THE MAGNET SHALL BE NEARER TO THE CENTRE LINE OF THE HOLES ON "A-A" THAN 0·172.

HOLES POS TOL 0·0025 DIA.

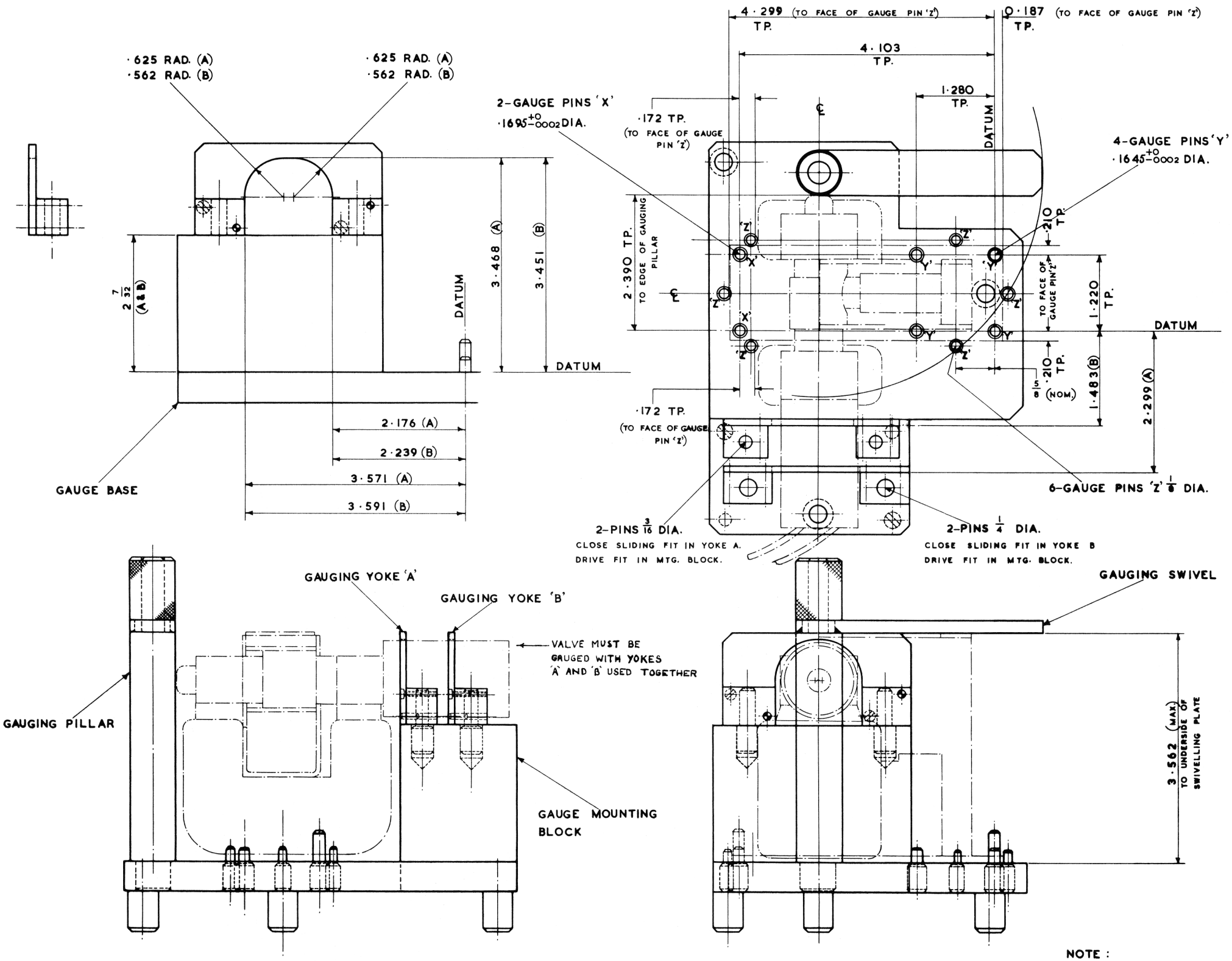
THIS DRAWING TO BE READ IN CONJUNCTION WITH GAUGE PAGE 10

DIMENSIONS IN INCHES



MAGNETRON MOUNTING POSITION LIMITING CONDITIONS.

DIMENSIONS IN INCHES.



NOTE :

ALL GAUGE PINS POS. TOL. ·0005 DIA.

ALL DIMENSIONS IN INCHES

ELECTRONIC VALVE SPECIFICATIONS

SPECIFICATION MOA/CV6108, ISSUE 1A. DATED 22ND DECEMBER 1964.

AMENDMENT NO. 1

Insert the following amendments as instructed:-

1. Page 1.

(i) Specification Authority.
Delete "MINISTRY OF AVIATION - RRE" and substitute "MINISTRY OF TECHNOLOGY - DLRD/RRE".

(ii) Specification Title.
Delete "Specification MOA/CV6108" and substitute "Specification Mintech/CV6108".

2. Page 8.

Locate in the top right hand drawing, the dimension ".130" / .120 (referring to the base plate thickness), and amend the ".120" to read ".110".

March 1968

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

N5338o9T

28/8/68

ELECTRONIC VALVE SPECIFICATIONS
SPECIFICATION MOA/CV 6108 ISSUE 1. DATED 5th JULY, 1962

AMENDMENT NO.1

Superseded by issue 1A

Page 1. CONNECTIONS

Delete the existing connections in their entirety and substitute the following:-

CATHODE: Green lead or neutral coloured lead with green sleeve.

HEATER: Yellow lead or neutral coloured lead with yellow sleeve.

Page 4. Test clause "(t)"

Position of Minimum. Delete this test completely. No page 4

November, 1962
(152440)

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

AAS 5 2/63

ELECTRONIC VALVE SPECIFICATIONS

SPECIFICATION MOA/CV6108 ISSUE 1. DATED 5th JULY 1962

AMENDMENT NO. 2

Page 4(a) Holding period

In the column headed Test Conditions Amend "168 hrs. min. No Voltages" to read "14 days min, no Voltages, note 17".

Page 7 Insert new note 17

17. Tests, (b) Stability (i), (c) Stability (2), (g) Mean Power, (j) Pulse Voltage (1), may be carried out before and shall be carried out at the conclusion of the holding period. All other tests may be carried out either prior to or after the holding period.

February, 1963.
NJ.175329.

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