# CV1495 / CV1500

MINISTRY OF SUPPLY (R.R.E/L.S)

VALVE ELECTRONIC

Specification MOS/CV1495, MOS/CV1496, MOS/CV1497, MOS/CV1498, MOS/CV1499 and MOS/CV1500.
Issue 3 Dated:- 24th October 1956.
To be read in conjunction with K1001 ignoring clauses:- 5.2, 5.3, 5.8

| SECURITY | |
|---|---|
| Specification | Valve |
| Unclassified | Unclassified |

Type of Valve:- Magnetron
Cathode:- Indirectly heated
Envelope:- Metal, glass
Prototype:- CV160

**MARKING**

See K1001/4, also
Serial No .....

**BASE**

None

| RATING | | Note |
|---|---|---|
| Heater voltage (V) | 6.0 | A |
| Heater current (A) | 1.25 | |
| Frequency (Mc/s) | | |
| CV1495 | 3010 | |
| CV1496 | 3030 | |
| CV1497 | 3050 | |
| CV1498 | 3070 | |
| CV1499 | 3090 | |
| CV1500 | 3110 | |
| Max. mean input power (W) | 500 | B |
| Max. frequency pulling for $\|K\| = 0.2$ (Mc/s) | 7 | |

**CONNECTIONS AND DIMENSIONS**

See pages 5 and 7

**PACKAGING**

To the requirements of R.R.E. and in accordance with K1005.

**TYPICAL OPERATING CONDITIONS**

| | | | |
|---|---|---|---|
| (1) | Peak anode voltage (kV) | 21.5 | C,D |
| | Peak anode current (A) | 22.5 | |
| | Field strength (gauss) | 2050 | |
| | Peak power output (kW) | 200 | |
| (2) | Peak anode voltage (kV) | 17.0 | D,E |
| | Peak anode current (A) | 17.5 | |
| | Field strength (gauss) | 1750 | |
| | Peak power output (kW) | 100 | |

For Notes A, B, C, D, & E - See pages 2 and 3

## TESTS.



To be performed in addition to those applicable in K1001

| | Test Conditions | | | Test | Limits | | No. Tested | Notes See Pages 3 & 4 |
|---|---|---|---|---|---|---|---|---|
| | Field (gauss) | Vh (V) | Pk.Ia (A) | | Min. | Max. | | |
| a | - | 6.0 | - | Ih (A) | 1.0 | 1.5 | 100% | 1,2 |
| b | 2050 ± 25 | Note3 | 22.5 | Va (kV) | 20.0 | 23.0 | " | 2,3,4,5. |
| c | " | " | " | Frequency (Mc/s) | | | " | 2,3,4,5. |
| | | | | CV1495 | 3000 | 3020 | | |
| | | | | CV1496 | 3020 | 3040 | | |
| | | | | CV1497 | 3040 | 3060 | | |
| | | | | CV1498 | 3060 | 3080 | | |
| | | | | CV1499 | 3080 | 3100 | | |
| | | | | CV1500 | 3100 | 3120 | | |
| d | " | " | " | Efficiency (%) | 35 | - | " | 2,3,4,5,6 |
| e | " | " | " | Frequency Pulling (Mc/s) | - | 7 | " | 2,3,4,7 |
| f | " | " | " | Stability (mins) | - | 5 | " | 8 |
| g | | | | Cold impedance test T.R. distance (cm) | 10.0 | 11.0 | T.A. | 2,3,4,9 |

### NOTES (see page 1)

A. The heater voltage should be applied for at least 2 mins. before the H.T. voltage is applied.
When in operation the heater voltage should be reduced from its value for starting in accordance with the following formula:-

$$Vh = 6\sqrt{1 - \frac{Wi}{500}} \text{ volts}$$

where Wi = mean input power in watts.

B. When in operation the valve must be air cooled to maintain the temperature of the anode block below 140°. The air shall be blown from a duct of overall dimensions approx. $3\frac{1}{4}$" x $1\frac{1}{4}$" mounted 1.625" ± 0.015" from the line of centres of the mounting recess in the coupler and arranged to approximately close the blowing aperture on one side of the valve, exhaust being from the remote side.

NOTES (See Page 1) Contd.

C. These conditions apply for a pulse length of 0.5 $\mu$ sec. max. with a duty cycle of 0.001 max.

D. Load V.S.W.R. not worse than 0.67.

E. These conditions apply for a pulse length of 1 $\mu$ sec. max.

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NOTES (See Page 2)

1. The heater voltage shall be applied for at least two minutes before the heater current is measured.

2. During these tests the valve shall be air cooled so that the anode temperature does not exceed 100°C.

3. The modulator used for these tests shall have a pulse length not less than 0.5 $\mu$ sec. and a rate of rise of voltage not less than 150 kV/$\mu$ sec. The duty ratio shall be not less than 0.0007.
The heater voltage shall be reduced, when the H.T. voltage is applied, in accordance with Note A on Page 2.
The magnetic field specified is to be measured at the centre of the magnet gap. The magnet shall have pole pieces of $1\frac{1}{2}$" dia. with a gap of $1\frac{1}{2}$".
The North pole of the magnet shall be adjacent to the cathode lead of the valve.

4. The tests shall be carried out with the valve feeding through the coupling section shown on page 6 into a coaxial line of inner conductor 0.740" $\pm$ 0.002" dia. and outer conductor 1.375" $\pm$ 0.005" dia. terminated to give a V.S.W.R. not worse than 0.9.

5. These tests may be carried out in the presence of a mismatch of $|K| = 0.2$ adjusted in phase to give maximum anode voltage (or minimum anode current) provided the following modified limits apply:-

Test:- (b) Va (kV) 20.5 min., 23.5 max.
(c) Frequency - no change
(d) Efficiency (%) 40 min.

NOTES (See Page 2) Contd.

6. Efficiency shall be calculated from the following formula:-

$$\text{Efficiency} = \frac{Wo}{Va \times ia} \times 100\%$$

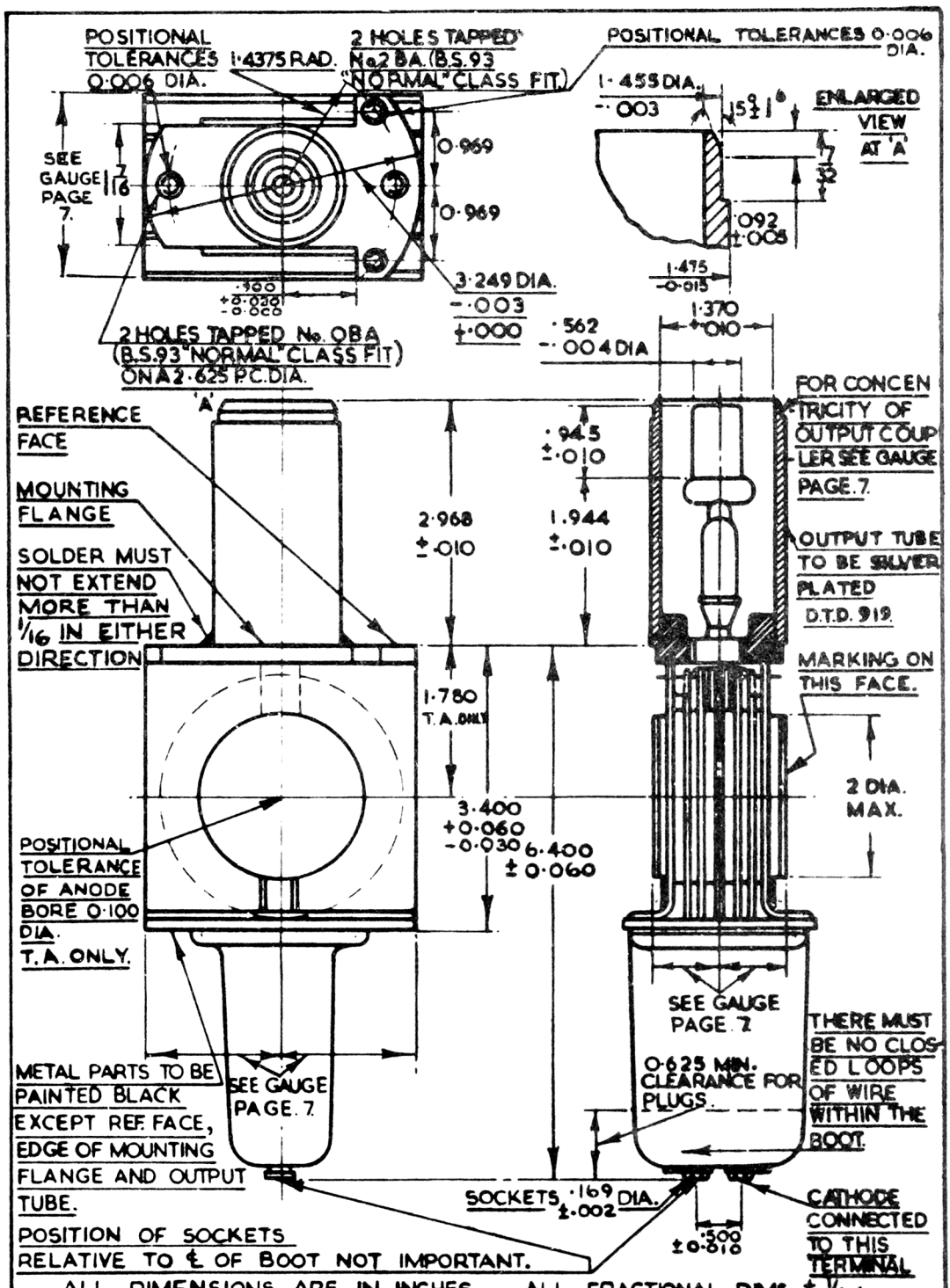
where Wo = mean power output (watts)
Va = anode voltage (kV)
ia = mean anode current (mA)

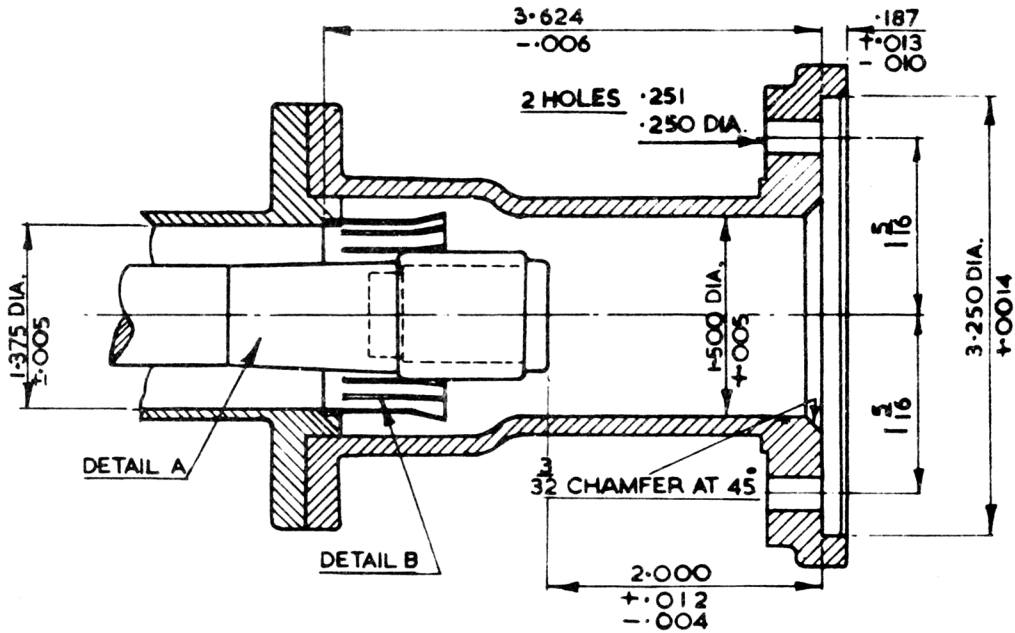
7. A mismatch of voltage reflection coefficient $|K| = 0.2$ shall be introduced into the waveguide and varied in phase through at least half a guide wavelength. The total variation in frequency shall be measured by means of a spectrometer.

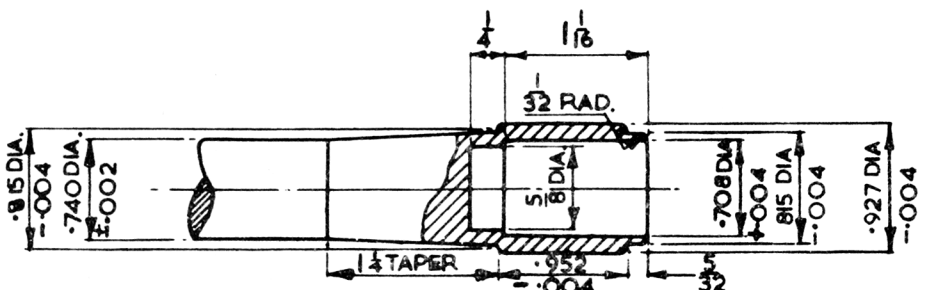
8. This test shll be carried out immediately following a holding period of 168 hours during which the valve shall not have been operated. A mismatch of reflection coefficient $|K| = 0.2$ shall be introduced into the waveguide and adjusted in phase to give minimum anode voltage (or maximum anode current). Stable operation shall be judged to have been achieved when there are no missing lines in the spectrum and the mean current is steady within $\pm$ 10% when measured by an instrument having a time constant not exceeding 2 seconds. Stable operation shall be demonstrated over a period of 1 min. within a test period of 5 min. measured from the commencement of application of the H.T. voltage.

9. A source of C.W. oscillation of frequency equal to that of the magnetron is injected into the coaxial line. The position of the standing wave voltage minimum in this line must be within 10.0 and 11.0 cms. of the reference surface of the mounting plate of the magnetron. The magnetron frequency for this test is to be determined in an approved manner. It is that which would obtain if the valve were working into a purely resistive load with the block temperature at the value in fact occurring during the cold impedance test.

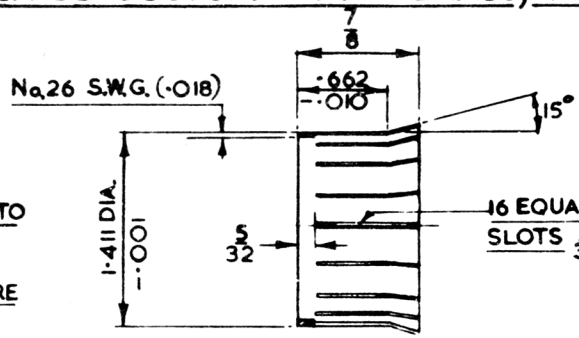
# CV1495/CV1500






DETAIL 'A' INNER CONDUCTOR. MAT$^{L}$ :-BRASS, HARD, G.D.A.




## NOTE

ALL FRACT$^{L}$ DIM$^{NS}$ TO BE WITHIN ±·010

ALL DIMENSIONS ARE IN INCHES

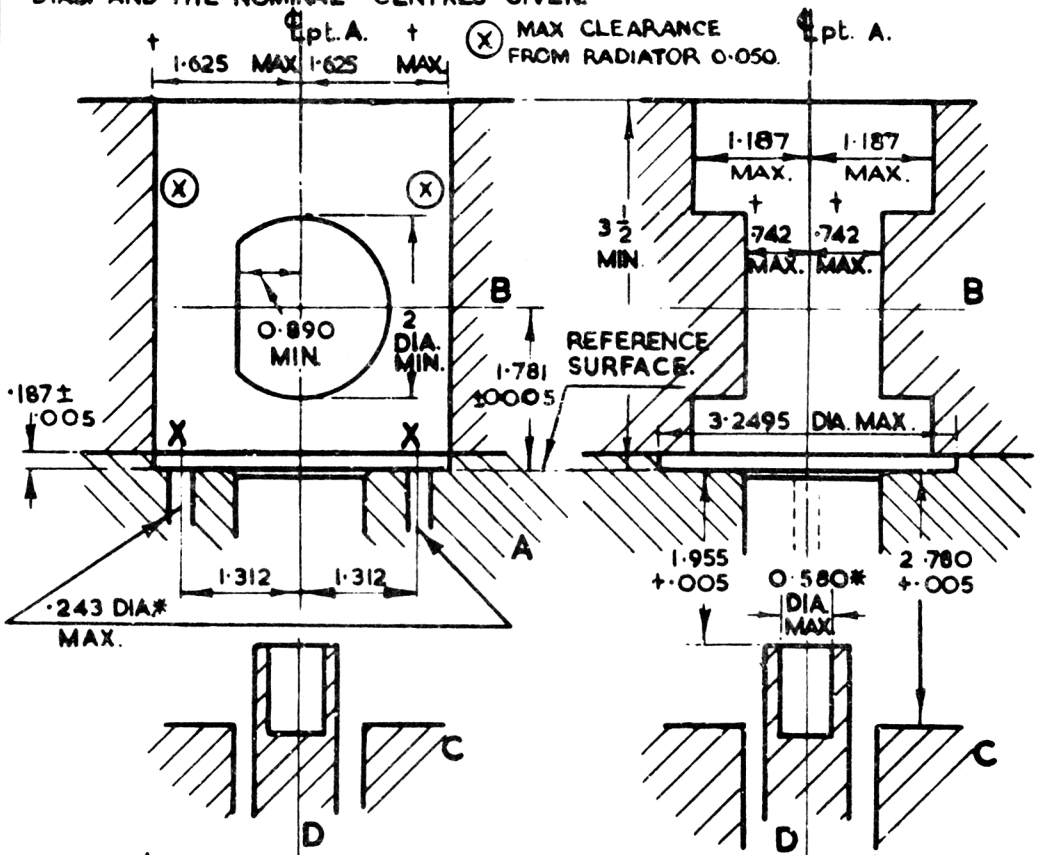
DETAIL 'B' CONTACT MAT$^{L}$:-BERYLLIUM COPPER

# TEST COUPLER.

# CV.1495-CV.1500.

THE HOLES MARKED * MUST LIE ENTIRELY WITHIN THE CIRCLES DEFINED BY THE MAX. DIAS. AND THE NOMINAL CENTRES GIVEN.

† THESE DIMENSIONS APPLY TO ALL PARTS OF THE SURFACES.




NOTE. ALL ℄ AND REFERENCE PLANES ARE BASED ON THE "REFERENCE SURFACE", THE CENTRE OF THE LOCATING RECESS (3·2495 DIA. MAX.) AND THE DIA. OF THE LATTER THROUGH THE CENTRES OF THE HOLES. X X.

NOTE. VALVE TO BE SECURED TO PT. 'A' WITH TWO 0 BA. SCREWS (BS 93 CLOSE FIT CLASS) IT MUST THEN CLEAR PARTS B.C. & D.

## GAUGE. (DETAILS.)

THIS GAUGE IS APPLIED IN ADDITION TO CHECKS ON THE OUTLINE DIMENSIONS GIVEN ON PAGE 5.

ALL DIMENSIONS ARE IN INCHES