

MINISTRY OF SUPPLY/R.R.E.

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|---|----------|--------------|--|--|
| Specification MOS/CV2158/Issue 6 Dated:- September 16, 1955. To be read in conjunction with K1001 | | | <u>SECURITY</u> <u>Specification</u> <u>Valve</u> Unclassified Unclassified | |
| <u>TYPE OF VALVE:-</u> Gas Modulator Hydrogen Thyatron <u>CATHODE:-</u> Directly heated <u>ENVELOPE:-</u> Glass <u>PROTOTYPE:-</u> VX3166 | | | <u>MARKING</u> See K1001/4 <u>Additional Marking</u> Serial No. | |
| <u>RATING AND TYPICAL OPERATION</u> | | <u>Notes</u> | <u>BASE AND DIMENSIONS</u> See dwg. page 4 | |
| Filament voltage | (V) | 2.5 \pm .1 | A | <u>TOP CAP</u> See dwgs. pages 4 and 5 |
| Filament current | (A) | 38 | B, D B, D C | |
| Max. peak anode voltage | (VK) | 14 | | |
| Peak anode current | (A) | 400 | | |
| Min. trigger pulse voltage | (V) | 500 | | |
| D.C. grid voltage | (V) | -100 | | |
| Max. rate of rise of anode current | (A/usec) | 2000 | B | <u>PACKAGING</u> In accordance with K1005 and to the requirements of R.R.E. |

NOTES

- A. During the first 50 hours of life a warming up time of 10 mins. is required and a further period of up to 5 mins. may be required for the H.T. to be increased to its full value. After 50 hours a 2 min. warming up time is sufficient provided that the valve has been operated during the previous 50 hrs. Otherwise a 10 min. warming up time must be given.
- B. These ratings are for operation with:-
- (1) Repetition frequency of 1000 p.p.s.
 - (2) Pulse length 1.25 usec.
 - (3) Sensibly square pulse shape.
 - (4) Load resistance of 17.5 ohms.
 - (5) The anode shall be cooled by an air stream at $2\frac{1}{2}" \pm \frac{1}{2}"$ water head.
 - (6) D.C. resonant charging.
- C. The trigger pulse should be between 1 and 3 usec. long at the 500 volt (or higher) level. The time of rise should not be greater than 0.1 usec. The source impedance of the trigger pulse generator should be between 250 and 500 ohms. The D.C. resistance of the grid-cathode circuit should not exceed 2000 ohms.
- D. The valve contains a hydrogen replenisher and therefore cannot be used much below the ratings given.
- E. No object should be placed within 1 inch of the glasswork of the valve during operation.
- CV2158/6/1

To be performed in addition to those applicable in K1001

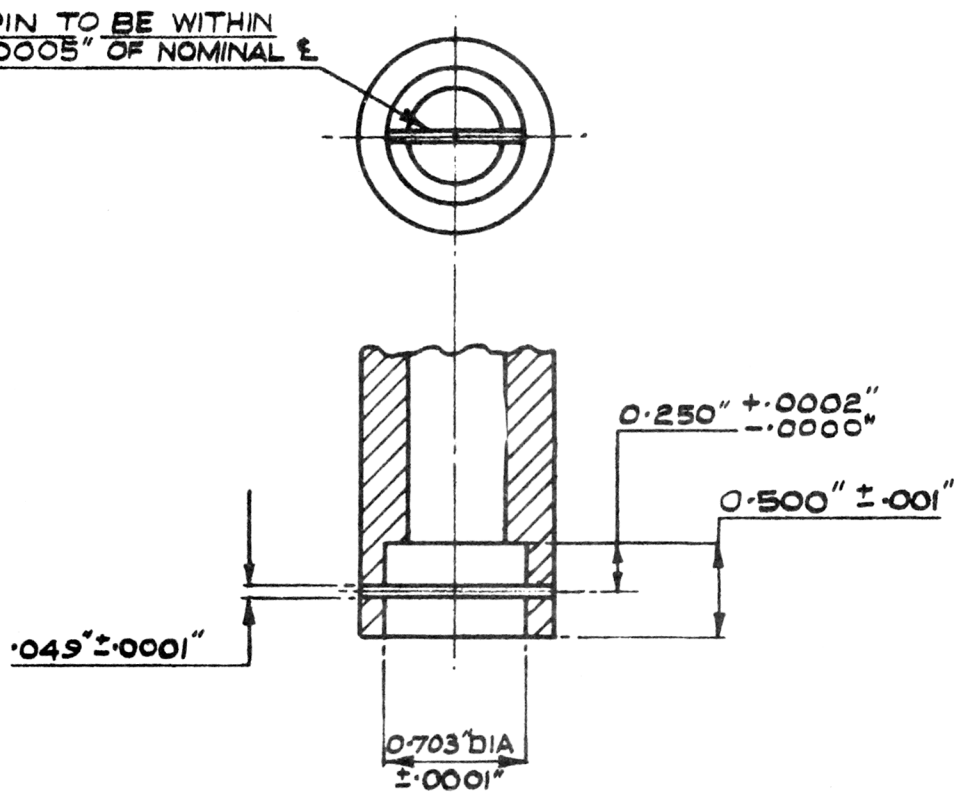
| | Test Conditions | | Test | Limits | | No. Tested | Notes |
|---|-----------------|--------|--|--------|------|------------|------------|
| | Vf(V) | Va(KV) | | Min. | Max. | | |
| a | 2.5 | | If (A) | 34 | 42 | 100% | 1 |
| b | 2.5 | 14 | Running up time (mins.) $t_{HK} = 10$ mins. | | 5 | 100% | 2,3. |
| c | 2.5 | 14 | Stabilising time (mins.) | | 15 | 100% | 2,3,4,5,6. |
| d | 2.5 | 14 | Running up time (mins.) $t_{HK} = 2$ mins. | | 2 | T.A. | 2,8. |
| e | 2.5 | 14 | Stabilising time (mins.) | | 7 | T.A. | 2,4,5,7,8. |
| f | 2.5 | 14 | Jitter (μ S) | | .05 | T.A. | 2,8,9. |

NOTES

- The filament voltage to be measured at the tag end of the cathode leads at the end of a 10 min. warming period.
- These tests shall be carried out in an approved line-discharge modulator, giving I_a (peak) = $400A \pm 5\%$ at $V_a = 14$ kV and $\frac{dI_a}{dt} = 2000$ A/usec. $\pm 10\%$. The pulse length shall be 1.25 usec. $\pm 10\%$ at 1000 p.p.s.
A suitable circuit is shown on page 6.
The open circuit trigger pulse shall be of amplitude not exceeding 500 volts and of impedance not less than 500 ohms. The grid bias shall be $-100V \pm 5V$ and the D.C. resistance of the grid circuit shall be not less than 2500 ohms.
- These tests to be performed following a holding period of at least 72 hours.
- There should be no internal arcs causing tripping of the H.T. overload relays after the end of the permitted running up period. However, one trip is allowed provided that the H.T. is immediately re-applied and test (c) or (e) repeated without further trips occurring.
- Stability shall be judged to have been achieved when there is no perceptible moving step on the leading edge of the thyatron current pulse or jitter greater than 0.1 usec. relative to the triggering pulse and no internal flashes or arcs. Stable operation shall be demonstrated over at least the last two mins. of the permitted stabilising period.

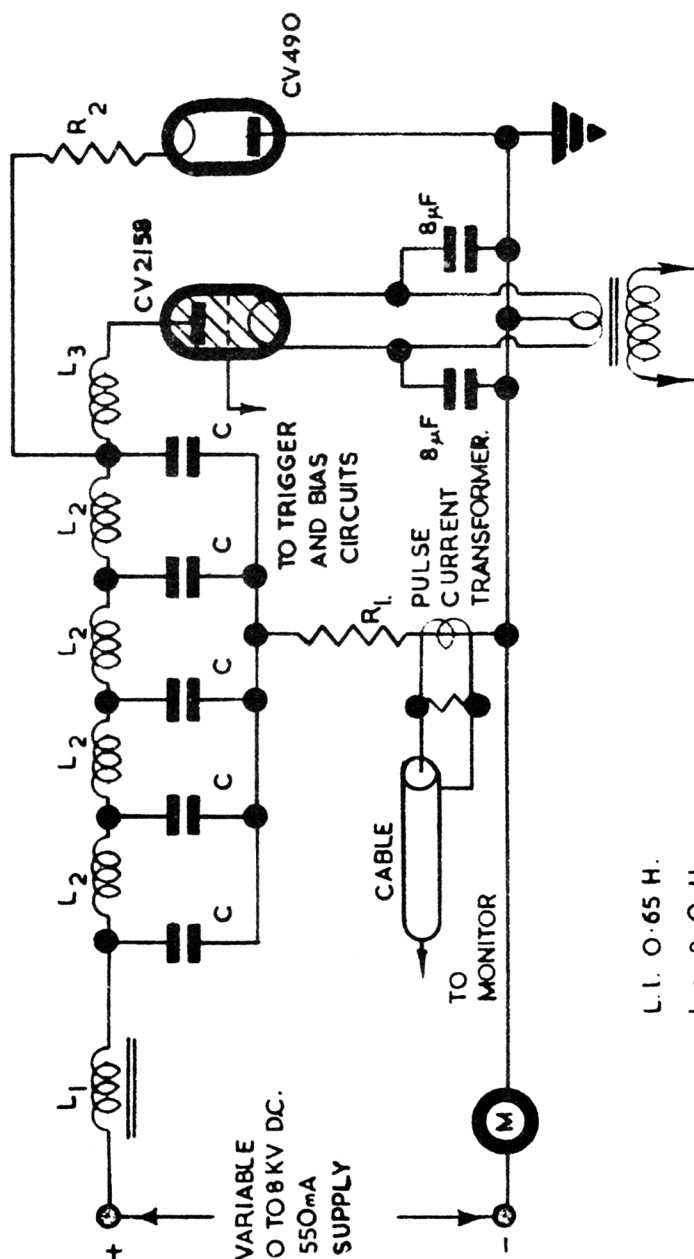
6. Test (c) shall be carried out concurrently with test (b), the time being measured from when H.T. is first applied. The test shall be continued for a total period of 15 mins. after H.T. is applied.
7. Test (e) shall be carried out concurrently with Test (d), the time being measured from when H.T. is first applied. The test shall be continued for a total period of 7 mins. after H.T. is applied.
8. These tests to be performed after 50 hours operation in a modulator as defined in Note 2 followed by a holding period of 24 hours.
9. For this test the grid triggering pulse shall have a rise-time of not less than 0.1 usec. The test to be performed with $t_{HK} = 10$ mins. and after a stabilising period of operation for 10 mins.

PIN TO BE WITHIN
0.0005" OF NOMINAL \pm



GAUGE FOR COOLER TUBE
AND SLOTS

RECOMMENDED MODULATOR CIRCUIT.



L.I. 0.65 H.

L.2 2.0 H.

C .0077 μ F.

R1 16.3 4KW.

 $R_2 \quad 150 \Omega$

L.3. TO BE ADJUSTED TO GIVE $\frac{dI_a}{dt}$ 2000 A/U SEC. PEAK.