

MINISTRY OF SUPPLY D.L.R.D./R.R.E.

VALVE ELECTRONIC

CV 2455

Specification MOS(A)/CV2455 Issue 1 Dated 9th June, 1958 To be read in conjunction with K1001 and B.S.1409	<u>SECURITY</u>	
	<u>Specification</u> UNCLASSIFIED	<u>Valve</u> UNCLASSIFIED

TYPE OF VALVE - Grid-controlled Mercury Pool Modulator CATHODE - Mercury Pool ENVELOPE - Steel PROTOTYPE - VX9138	<u>MARKING</u> See K1001/4
	<u>DIMENSIONS and CONNECTIONS</u> See Drawing on Page 4

<u>RATING</u>		Note
Ignition Solenoid Voltage	(V) 230 \pm 35 (A) 5 (c/s) 45-65	A
Min. Ignition and Excitation Anode Supply Voltage	(V) 80	B
Min. Excitation Anode Current	(A) 8	
Min. Ignition Anode Current	(A) 5	
<u>GRID SUPPLY</u>		
Negative Bias Voltage	(V) 425 \pm 25	C
Drive Pulse; (5-10 μ sec duration)	(V) 1000 \pm 200	
Normal Grid Stopper Resistance	(ohms) 2000	
<u>LOW VOLTAGE ANODES</u>		
Max. Hold-off Voltage	(V) 1700	D
Max. Inverse Voltage	(V) 650	
Max. Peak Current - each anode - (for 5 μ sec pulse in HV anode)	(A) 250	
Max. Current Pulse Duration	(μ sec) 500	
Max. Mean Input Power	(KW) 15	
Max. Pulse Recurrent Frequency at max. mean input power	(c/s) 300	
<u>HIGH VOLTAGE ANODE</u>		
Max. Hold-off voltage	(kV) 26	E
Max. Inverse Voltage	(kV) 4	
Max. Peak Current	(A) 600	
Max. Rate of Rise of Current	(A/ μ sec) 4000	
<u>OPERATING TEMPERATURES</u>		
Mercury Pool	($^{\circ}$ C) 18 to 50	F
Base of Steel Tank - max. when operating	($^{\circ}$ C) 50	
- min. when HT first applied	($^{\circ}$ C) 18	
<u>MOUNTING</u>		
Max. Angle of Tilt from vertical in operation	(degrees) 15	G
Resistance from tank to cathode	(ohms) 1000	

NOTES

(See Page 2)

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Z.17613.R.

NOTES

- A. The solenoid supply voltage shall be applied to leads 1 and 3 for 0.6 secs and then, with 100 ohms in series, to leads 1 and 2 for 0.05 secs.
- B. Maximum ripple for excitation current, 10% peak/peak. Excitation series choke not less than 0.05H.
- C. Source impedance for drive pulse shall not exceed 1000 ohms.
- D. The primary pulse current is to be equally shared between the two LV anodes.
- E. HV grid pulse must be applied when LV anode current is falling and has a value between 60% and 33% of its maximum value.
- F. Temperature of base of steel tank to be measured at point X shown on drawing on page 4. When operating, the valve to be cooled by an air stream, directed vertically on to its base, of 350-400 cu-ft./min. with velocity 3500-4000 ft/min. at temperature 15-25°C.
- G. Tank to be insulated from earth for 5 KV working voltage.

TESTS

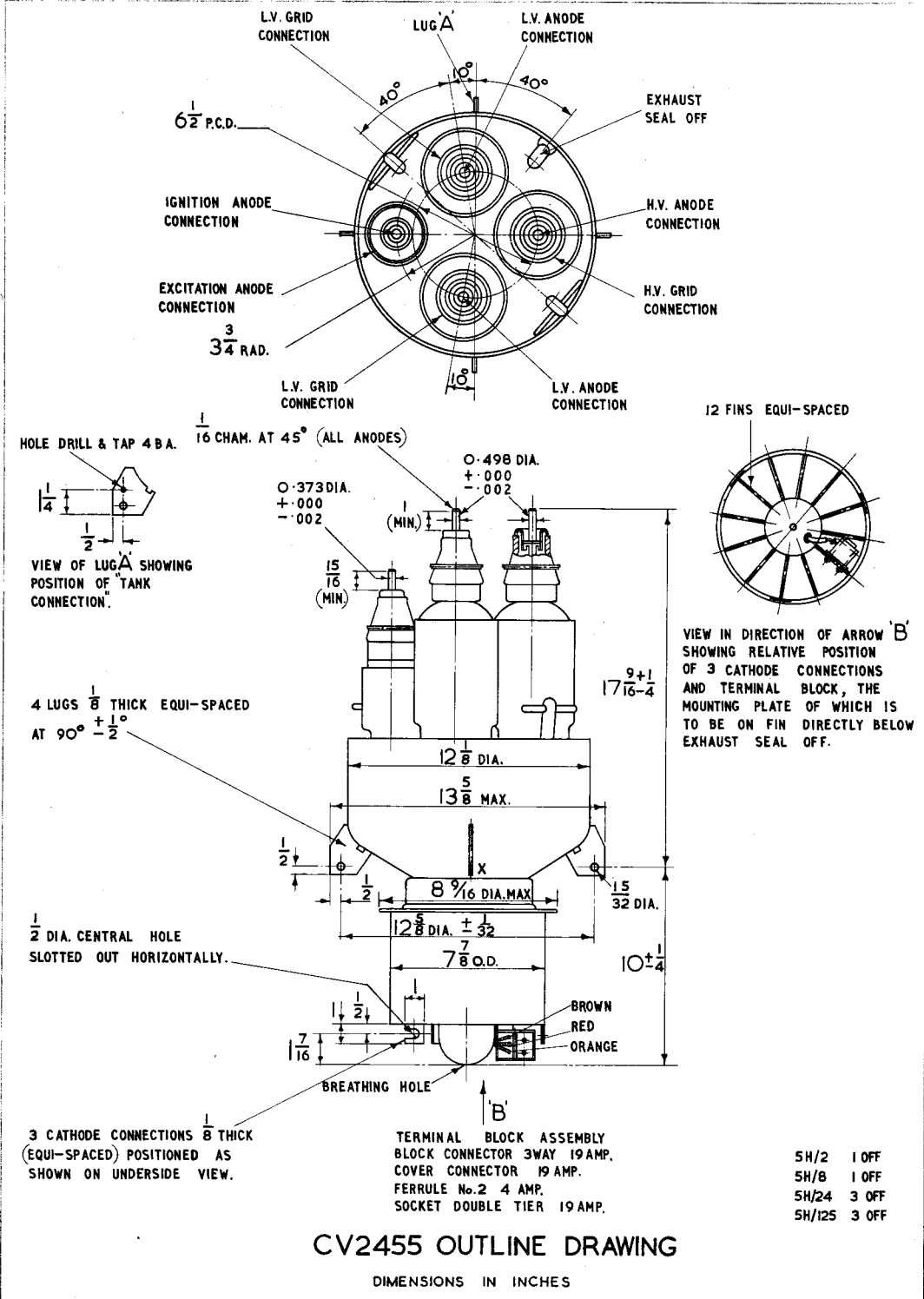
All tests to be performed with ambient temperature between 15 and 25°C. At least one month's shelf life shall elapse before any tests are carried out.

	Test	Test Conditions	Limits		No. Tested
			Min.	Max.	
a	<u>Excitation</u> When Ignition solenoid supply voltage is applied to the coil, the excitation shall start. This test shall be repeated 20 times at approximately 1 minute intervals. Number of failures to start in 20 operations.	For ignition and excitation circuits see drawing on page 5. Ignition and excitation anode supplies to be 80 volts on open circuit (ripple less than 10% peak/peak). Adjust circuit resistance to give excitation current of 8 amps. Ignition solenoid supply voltage, 195V RMS 50 c/s AC. Note 1		1	
b	<u>Excitation anode voltage (V)</u>	Excitation anode current to be 8 amps	16	26	100%
c	<u>Pick-up of LV and HV anodes</u> Number of applications of ignition supply to start excitation, LV & HV anode currents	50V RMS, 50 c/s AC supply on LV and HV anodes. Current limited to 7-10 amps in each anode by resistors. Grids connected to respective anodes through 100 ohm resistors. Normal excitation supply. See drawing on Page 5.		1	100%

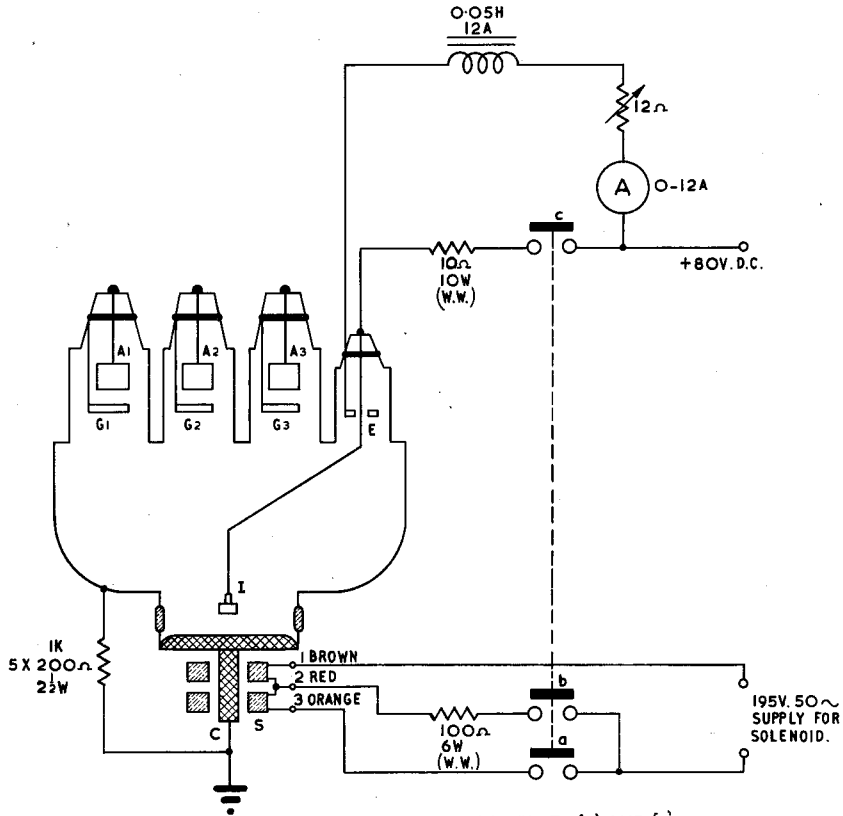
	Test	Test Conditions	Limits		No. Tested
			Min.	Max.	
d	When excitation arc is started, LV and HV anodes shall not start. (5 tests at intervals of 1 minute).	As c above, but with grids biased to -100 volts with respect to cathode.			100%
e	<u>Insulation</u> (megohms)	Between each electrode, except ignition anode, and tank at 1KV.	20		100%
f	<u>Flash-over</u> No failures to occur	Apply 2KV RMS 50 c/s AC between tank and each electrode (except ignition anode) in turn. Electrodes not under test to be left unconnected.			100%
g	<u>Vacuum</u> After 10 minutes initial cleaning up period, no breakdown to occur in a 2 minute period.	Apply 20 kv RMS 50 c/s AC between HV anode and all other electrodes including tank connected together.			100%
h	<u>Life Test</u> Life test end point-repeated failures at a rate exceeding 5 per 24 hours.	Valve to be tested in an approved circuit Mean input power 15KW. Valve to be off at least 1 hour in each 24 hours.	1000		TA

NOTES

- Solenoid supply voltage shall be applied to leads 1 and 3 for 0.6 secs. and then, with 100 ohms in series, to leads 1 and 2 for 0.05 secs.



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- A1 } LOW VOLTAGE ANODES.
- A3 }
- G1 } LOW VOLTAGE GRIDS.
- G3 }
- A2 HIGH VOLTAGE ANODE.
- G2 HIGH VOLTAGE GRID.
- E EXCITATION ANODE
- I IGNITION ANODE
- S IGNITION SOLENOID COIL
- C CATHODE.

CONTACTS 'a' AND 'c'
CLOSED 0.6 SECONDS.
WHEN 'a' AND 'c' OPEN
CONTACT 'b' CLOSES
FOR 0.05 SECONDS.

N. B.:-
TANK MUST BE INSULATED FROM EARTH
AND CONNECTED TO CATHODE THROUGH
1K (5KV. SURGE INSULATION.)

CV.2455
IGNITION AND EXCITATION TEST CONDITION CIRCUITS.