

Specification D.At.En./CV 6103 Issue 1	<u>SECURITY</u>
Dated 13th February, 1962.	<u>Specification</u> <u>Tube</u>
To be read in conjunction with KLC01	Unclassified Unclassified

TYPE OF VALVE - Radial Beam Switching Tube, Permanent Magnet, High Vacuum, Ten Outputs. CATHODE - Indirectly heated. ENVELOPE - Glass, unmetallised. PROTOTYPE - VX.9210.			<u>MARKING</u> SEE K1001/4. <u>BASE</u> B26A									
<u>RATING</u>		Notes	<u>CONNECTIONS</u>									
			Pin	Electrode	Pin	Electrode						
Heater Voltage	(V)	6.3	1	Spade 0	14	Spade 2						
Heater Current	(A)	0.50	2	Target 9	15	Target 1						
			3	Target 8	16	Even						
Max.spade to cathode voltage (V_s max.)	(V)	145	4	Odd Switching Grid		Switching Grid						
Min.spade to cathode voltage (V_s min.)	(V)	80	5	Target 7	17	Target 0						
Max.target to cathode voltage (V_T max.)	(V)	300	6	Spade 7	19	Spade 9						
Min.target to cathode voltage (V_T min.)	(V)	50	7	Target 6	20	Spade 8						
Min.switching grid to cathode voltage (V_{SG} min.)			8	Target 5	21	Heater						
			9	Spade 5	22	Spade 6						
			10	Target 4	23	Spade 4						
			11	Do not connect	24	Spade 3						
					25	Heater						
			12	Target 3	26	Spade 1						
			13	Target 2	27	Cathode						
V_s 140V	(V)	80	<u>DIMENSIONS</u>									
V_s 125V	(V)	65	See Fig.1									
V_s 100V	(V)	50										
V_s 80V	(V)	40										
Min.spade resistance (R_s min.)			1	<table><tr><th>DIMENSION</th><th>Max. (mm.)</th></tr><tr><td>A. Seated Height</td><td>81.5</td></tr><tr><td>B. Overall Dia.</td><td>44</td></tr></table>			DIMENSION	Max. (mm.)	A. Seated Height	81.5	B. Overall Dia.	44
DIMENSION	Max. (mm.)											
A. Seated Height	81.5											
B. Overall Dia.	44											
V_s 100V	(k Ω)	75										
Max.spade resistance (R_s max.)												
V_s 100V	(k Ω)	220										
Min.input pulse duration	(μ S)	0.25	2									
<u>RECOMMENDED OPERATION</u>			3									
Spade to cathode voltage	(V)	100		<u>MOUNTING POSITION</u> Any: providing that the tube is kept at least 2" from any magnetic material or 4" from a similar tube, a strong magnet, or a mu-metal screen.								
Spade resistance	(k Ω)	100	4									
Target to cathode voltage	(V)	100										
Target Resistor	(k Ω)	4.7	5									
Switching grid to cathode voltage	(V)	50										
Switching grid to cathode voltage pulse amplitude	(V)	-55										
Pulse duration	(μ S)	0.25										
<u>NOTES</u>												
(1). The spade resistance is the total resistance, including resistors for beam formation, etc.												
(2). Pulse amplitude should be sufficient to bring the switching grid potential to 5V below the cathode voltage. Pulse shape as in Fig.2.												
(3). The recommended operating circuit is shown in Fig.3.												
(4). Stray capacities must be kept to a minimum and for operation at high speed, each spade must be connected to a separate load resistor with not more than $\frac{1}{2}$ " of connecting lead.												
(5). Any number of target connections may be taken to a common target resistor.												

TESTSTo be performed in addition to those applicable in K1001

Test	Test Conditions	A.Q.L. %	Insp. Level	Symbol	Limits		Units	Notes
					Min.	Max.		
<u>Group A</u> <u>Acceptance Tests</u>								
(a) Insulation	To be measured between heater and cathode. $V_h = 150V$. $V_k = 0V$	100%			5		MΩ	1
(b) Insulation	To be measured between cathode and heater. $V_k = 150V$. $V_h = 0V$	100%			5		MΩ	1
(C) Insulation	To be measured between any one electrode and parallel combination of all the others (Heater ex- cluded) at 300V.	100%			50		MΩ	
(d) Heater Current	$V_h = 6.3V$	100%		I_h	.45	.55	Amp.	1
(e) Cut-off	$V_b = 150V$ To be applied between all electrodes (heater excluded) and the cathode.	100%				75	μA	1
(f) Target Current	To be measured as shown in circuit in Fig.4a. $V_T = V_{SG} = 80V$ $V_S = 140V$ Pulse frequency = 10kc/S	100%		I_T	15.0	18.0	mA	1
(g) Target Current	To be measured as shown in circuit in Fig.4a. $V_T = V_{SG} = 50V$ $V_S = 100V$ Pulse frequency = 10kc/S	100%		I_T	6.5	9.0	mA	1
(h) Cathode Current	To be measured as shown in circuit in Fig.4a. $V_T = V_{SG} = 80V$ $V_S = 140V$ Pulse frequency = 10kc/S	100%		I_K	16.0	20.0	mA	

Test	Test Conditions	A.Q.L. %	Insp. Level	Symbol	Limits		Units	Notes
					Min.	Max.		
<u>Group A</u> <u>Acceptance Tests</u> - continued -								
(j) Cathode Current	To be measured as shown in circuit in Fig.4a. $V_T = V_{SG} = 50V$ $V_S = 100V$ Pulse frequency = 10kc/S	100%		I_K	7.0	10.0	mA	
(k) Noise	To be measured using the circuit shown in Fig.4a. $V_T = V_S = 100V$ $V_{SG} = 50V$	100%				0.75	V(pk- pk)	1,2 3.
(l) Speed	The tube shall count without error when tested in the circuit shown in Fig.4a. Frequency = 10kc/S $V_T = V_{SG} = 50V$ $V_S = 100V$	100%						1
(m) Speed	The tube shall count without error when tested in the circuit shown in Fig.4a. Frequency = 1Mc/S $V_T = V_{SG} = 50V$ $V_S = 100V$	100%						1
(n) Speed	The tube shall count without error when tested in the circuit shown in Fig.4a. Frequency = 2Mc/S $V_T = V_{SG} = 50V$ $V_S = 100V$	100%						1
(p) $\frac{1}{4} \mu/s$ pulse slow speed	The tube shall count without error when tested as described in Fig.5. $V_T = V_S = 125V$ $V_{SG} = 65V$	100%						1

Test	Test Conditions	A.Q.L. %	Insp. Level	Symbol	Limits		Units	Notes
					Min.	Max.		
<u>Group B</u> <u>Life Test</u>								
(a) Regular running life test I.	Heater only	} Combined A.Q.L. 10% 1/4 μ/s slow speed)		IC				4
Regular Running life test II	$V_T = V_s = 140V$ $V_{SG} = 70V$							
Regular running life test III	$V_T = V_s = 100V$ $V_{SG} = 50V$							
Tests to be performed								
End Point = 1,000 hours.								5
(b) Insulation	To be measured between heater and cathode $V_h = 150V$ $V_k = 0V$		100%		4		MΩ	1
(c) Insulation	To be measured between cathode and heater $V_k = 150V$ $V_h = 0V$		100%		4		MΩ	1
(d) Insulation	To be measured between one electrode and para- llel combination of all the others (heater excluded) at 300V		100%		40		MΩ	
(e) Leakage Test	The tube shall count without error when tested in the circuit shown in Fig. 4b. $V_T = V_s = 100V$ $V_{SG} = 50V$ Pulse Freq. = 10 Kc/S.		100%					
(f) Heater Current	$V_h = 6.3V$		100%	I_h	.475	.525	Amp.	1
(g) Cut-off	$V_b = 150V$ To be applied between all electrodes (heater excluded) and the cathode.		100%			100	μA	1
(h) Target Current	To be measured as shown in circuit in Fig. 4a. $V_T = V_{SG} = 70V$ $V_s = 140V$ Pulse frequency = 10 kc/S		100%	I_T	14.0	19.0	mA	1

Test	Test Conditions	A.Q.L. %	Insp. Level	Symbol	Limits		Units	Notes
					Min.	Max.		
<u>Group B</u> <u>Life Test</u> (Cont'd)								
(j) Target Current	To be measured shown in circuit in Fig. 4a. $V_T = V_{SG} = 50V$ $V_s = 100V$		100%	I_T	6.0	9.0	mA	1
(k) Cathode Current	To be measured using the circuit shown in Fig. 4a. $V_T = V_{SG} = 70V$ $V_s = 140V$ Frequency = 10 kc/s		100%	I_K	14.0	18.0	mA	1
(l) Cathode Current	To be measured using the circuit shown in Fig. 4a. $V_T = V_{SG} = 50V$ $V_s = 100V$ Frequency = 10 Kc/s.		100%	I_K	6.0	10.0	mA	1
(m) Noise	To be measured using the circuit shown in Fig. 4a. $V_T = V_s = 100V$ $V_{SG} = 50V$		100%			0.75	V(pk-pk)	1,2 3.
(n) Speed	The tube shall count without error when tested in the circuit shown in Fig. 4a. $V_T = V_{SG} = 50V$ $V_s = 100V$ Frequency = 10 kc/s		100%					1
(p) Speed	The tube shall count without error when tested in the circuit shown in Fig. 4a. $V_T = V_{SG} = 50V$ $V_s = 100V$ Frequency = 1 Mc/S		100%					1
(q) Speed	The tube shall count without error when tested in the circuit shown in Fig. 4a. $V_T = V_{SG} = 50V$ $V_s = 100V$ Frequency = 2 Mc/S		100%					1

Test	Test Conditions	A.Q.L. %	Insp. Level	Symbol	Limits		Units	Notes
					Min.	Max.		
<u>Group B</u>								
<u>Life Test (Cont'd)</u>								
(r) $\frac{1}{4}$ μ /S pulse slow speed.	The tube shall count without error when tested as described in Fig. 5. $V_T = V_s = 125V$ $V_{SG} = 65V$		100%					1
(s) Leakage Test	The tube shall count without error when tested in circuit shown in Fig. 4b.		100%					
<u>Group C</u>								
Tests to be performed after 28 days								
(a) Cut-off	$V_B = 150V$ To be applied between all electrodes (heater excluded) and the cathode.		100%			75	μA	1
(b) Target Current	To be measured as shown in circuit in Fig. 4a. $V_T = V_{SG} = 80V$ $V_s = 140V$ Pulse frequency = 10 kc/s		100%	I_T	16.0	19.0	mA	1
(c) Target Current	To be measured as shown in circuit in Fig. 4a. $V_T = V_{SG} = 50V$ $V_s = 100V$ Pulse frequency = 10 Kc/s		100%	I_T	7.0	9.5	mA	1
(d) Noise	To be measured using the circuit shown in Fig. 4a. $V_T = V_s = 100V$ $V_{SG} = 50V$		100%			0.75	V(pk-pk)	1,2,3.
(e) Speed	The tube shall count without error when tested in the circuit shown in Fig. 4a. $V_T = V_{SG} = 50V$ $V_s = 100V$ Frequency = 10 kc/s		100%					

Test	Test Conditions	A.Q.L. %	Insp. Level	Symbol	Limits		Units	Notes
					Min.	Max.		
<u>Group C</u> (cont'd)								
(f) Speed	The tube shall count without error when tested in the circuit shown in Fig. 4a. $V_T = V_{SG} = 50V$ $V_s = 100V$ Frequency = 1 Mc/s		100%					1
(g) Speed	The tube shall count without error when tested in the circuit shown in Fig. 4a. $V_T = V_{SG} = 50V$ $V_s = 100V$		100%					1
(h) $\frac{1}{4} \mu/s$ pulse slow speed	The tube shall count without error when tested as described in Fig. 5. $V_T = V_s = 125V$ $V_{SG} = 65V$		100%					1

NOTES

- (1) Heater voltage 6.3V A.C. to be applied for at least one minute before test.
- (2) Bandwidth of measuring instruments 50 c/s to 10 Mc/s.
- (3) To be measured across the target resistance, with screened lead making total output cap. = 100 pF.
- (4) The valves selected for this test are to be run in the circuit shown in Fig. 4a. The beam will be static on target 'O'.
- (5) The valves selected for this test are to be run in the circuit shown in Fig. 5.

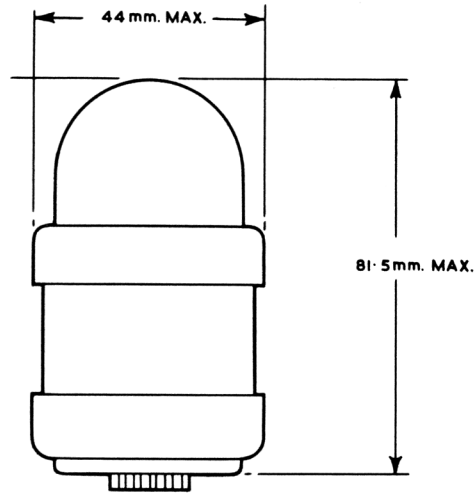
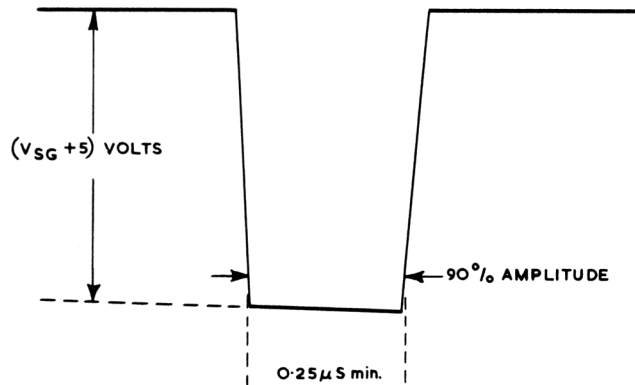
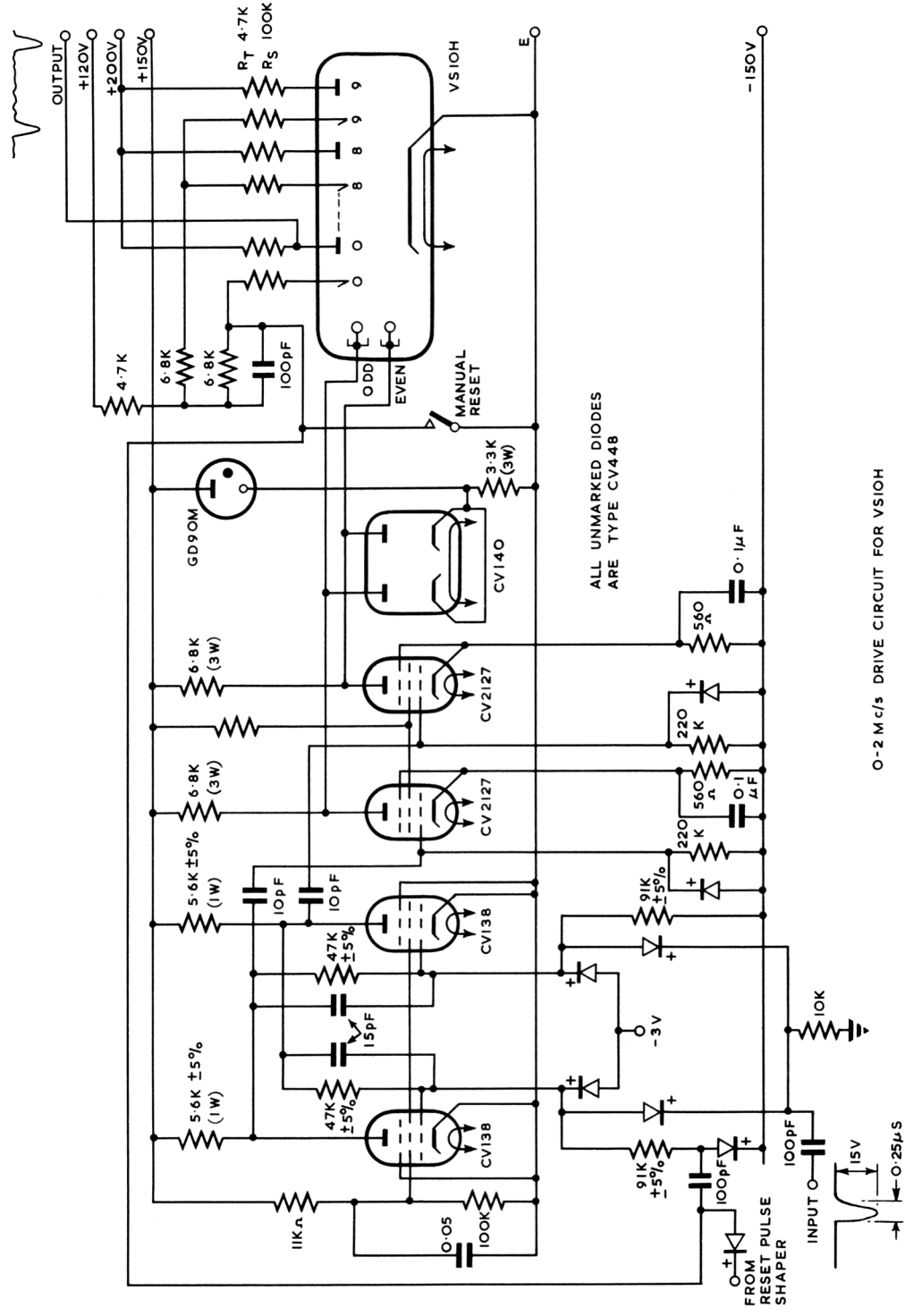


FIG. 1.



NOTE : AT MAXIMUM SPEED CARE MUST BE TAKEN TO ENSURE
THAT PULSE CROSS-OVER DOES NOT OCCUR BELOW +35V
WITH RESPECT TO CATHODE.

FIG. 2.



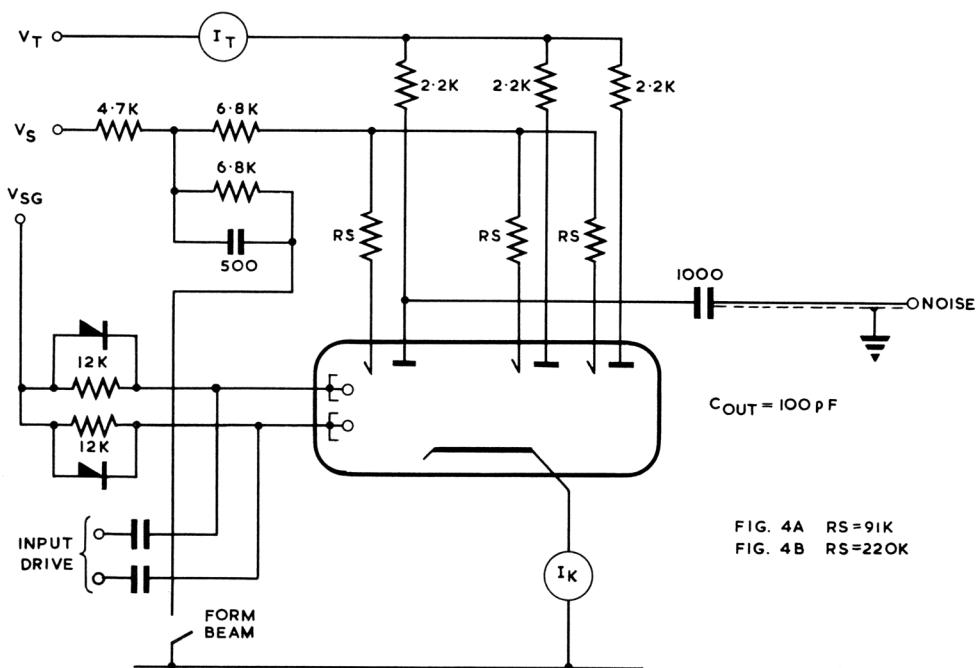


FIG. 4.

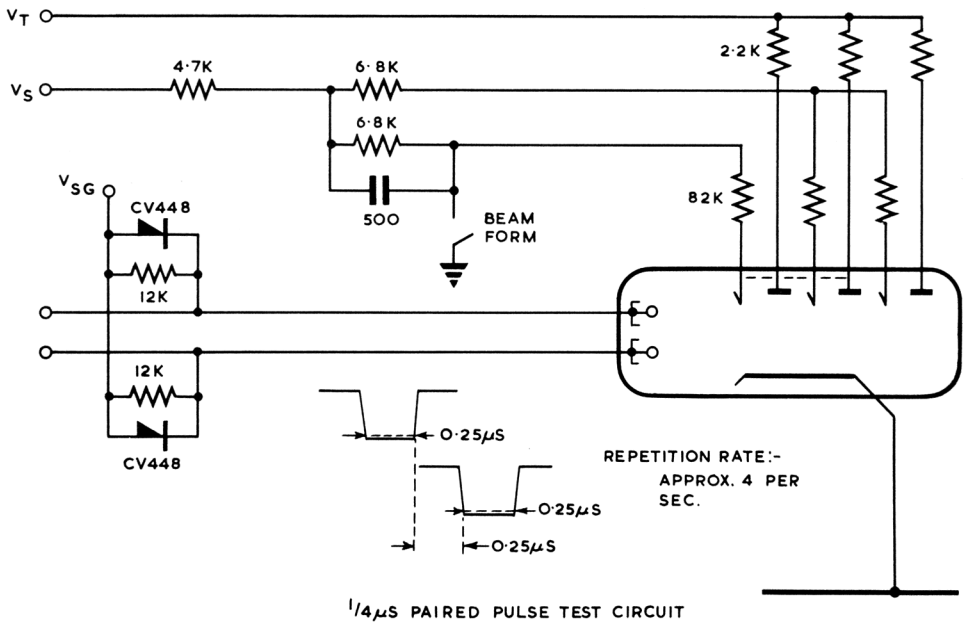


FIG. 5.