ADMIRALTY SIGNAL AND RADAR ESTABLISHMENT

VALVE ELECTRONIC CV1787

Specification AD/CV1787 incorporating MIL-E-1/113A Issue No. 2 dated 10th February 1955. To be read in conjunction with K1006.	SECURITY Specification: Unclassified	Valve: Unclassified

TYPE OF VALVE: Hydrogen Thyratron Modulator

CATHODE: Indirectly heated

ENVELOPE: Glass

PROTOTYPE: 4C35

MARKING
K1001/4
Add:- 4C35
Serial No. .....

BASE
B4D
(Super Jumbo 4-Pin with Bayonet)

RATINGS

			Note
Heater Voltage	(V)	6.3	
Heater Current	(A)	6.0	
Max. Peak Anode Voltage	(kV)	8.0	A,B
Min. D.C. Anode Supply Voltage	(kV)	2.5	A
Max. Peak Inverse Voltage	(kV)	8.0	A,C
Max. Peak Anode Current	(A)	90	A
Min. Trigger Voltage	(V)	175	A,D
Max. Negative Grid Voltage	(V)	200	A
Max. Mean Anode Current	(A)	0.1	A
Max. Rate of rise of Anode Current	(A/us)	1000	A
Max. Value of product of Peak Anode Voltage, Peak Anode Current and Pulse Repetition Rate.	(V x A x p.p.s)	2×10^9	A
Min. Cathode Heating Time	(Mins.)	3	
Ambient Temperature Range	(°C)	-50 to +90	A

CONNECTIONS

Pin	Electrode
1	Grid
2	Heater and Cathode
3	Heater
4	Cathode
T.C.	Anode

TOP CAP
CT3
B.S.448

DIMENSIONS (Inches)

Dimension	Min.	Max.
Length(Overall)	$6\frac{1}{4}$	$6\frac{7}{8}$
Diameter	2	2-9/16

MOUNTING POSITION
Any
See Note F.

NOTES

A. Absolute Maximum or Minimum Values.

B. See Note 3 on Sheet 2 of the attached Specification MIL-E-1/113A.

C. See Note 1 on Sheet 2 of the attached Specification MIL-E-1/113A.

D. See Note 2 on Sheet 2 of the attached Specification MIL-E-1/113A.

E. Cooling of anode lead is permissible but there shall be no air blast directly on the bulb.

F. For clamping directions see Note 17 of the Specification MIL-E-1/113A.

CV 1787
~~CV2520~~

MIL-E-1/113A
26 October 1954
Superseding
MIL-E-1/113
30 March 1953

INDIVIDUAL MILITARY SPECIFICATION SHEET

ELECTRON TUBE, THYRATRON, HYDROGEN, TYPE

JAN-4C35

This specification sheet forms a part of the latest issue of Military Specification MIL-E-1.

Ratings:	Ef	epy	epx	Ebb	Ec	egx	egy	ib	Alt
Absolute	Vac	kv	kv	Vdc	Vdc	v	v	a	ft
Maximum:	6.3/5% -10%	8.0 Note 3	8.0 Note 1	---	---	200	---	90	10,000
Minimum:	---	---	5%epy	2500	---	---	Note 2	---	---
Test Cond.:	6.3	8.0	---	---	0	---	130	---	---

Ratings:	Ib	tk	dik/dt	epy x prr x ib	TA	Cooling	prr
Absolute	mAdc	sec	a/us	---	°C	---	pps
Maximum:	100	---	1000	2.0×10^9	-50 /90	Note 16	---
Minimum:	---	180	---	---		---	---
Test Cond.:	---	180	---	---		---	2800

*Height: 6-1/4 in. min.6-7/8 in. max.
**Base: Super Jumbo 4-Pin with Bayonet, A4-18 with ceramic insert.
Clamping: Note 17
Mounting Position: Any

*Diameter: 2 in. min. 2-9/16 in. max.
**Cap: Medium Metal, C1-5 with Ceramic Spacer or Solid Metal, C1-5

**Pin No.:	1	2	3	4	Cap
Element:	g	h k	h	k	p Note 18

**Cathode: Coated Unipotential
**Envelope: T-20

For miscellaneous requirements see paragraph 3.3, Inspection Instructions for Electron Tubes.

Ref.	Test	Conditions		Min.	Max.	
3.1	Qualification Approval:	Required for JAN Marking				
4.5	Holding Period:	t=96 hrs.				
4.9.18.1.6	Carton Drop:	(d); Package Group 1; Carton Size P				
4.9.19.2	*Vibration(1):	No voltages; Note 5				←
4.9.20.3	**Vibration(2):	No voltages; Notes 4 and 5				←
4.9.19.3	*Bump:	Angle=20°;Note 5				
4.10.8	Heater Current		If:	5.50	6.70	Aac
---	†Instantaneous Starting:	epy=7000v(minimum);Notes 6 and 7		---	---	
4.10.17.2	DC Anode Voltage:	Notes 6 and 8	Ebb:	---	1500	Vdc
---	†Operation(1):	epy=10.0kv(minimum); Notes 6 and 9	egy:	---	130	v
---	*Anode Delay Time:	Operation(1);Note 10; t=120	tad:	---	0.6	us

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Ref.	Test	Conditions		Min.	Max.	
---	*Anode Delay Time Drift:	Anode Delay Time; Note 11	Δ tad:	---	0.15	us
---	*Time Jitter:	epy=3.0kv (maximum); Notes 6 & 12	tj:	---	0.02	us
---	**Operation (2):	TA=90°C; t=5.0hrs; Note 6	egy:	---	130	v
---	Emission:	ik=90a (minimum); prr=60±10%; tp=5.0us±10%; tr=0.5us (maximum); Note 13	egk:	---	150	v
4.11	Life Test:	Group B; Notes 6 and 14;	t:	500	---	hrs.
4.11.4	Life Test End Point:	Operation (1); Note 15	egy:	---	140	v
		DC Anode Voltage	Ebb:	---	2000	Vdc
		Time Jitter	jt:	---	0.04	us

Note 1: In pulsed operation, the peak inverse voltage, exclusive of spike of .05 us maximum duration, shall not exceed 2.5kv during the first 25us after the pulse.

Note 2: Driver pulse, measured at tube socket with thyratron grid disconnected; egy=175v (minimum), time of rise=0.5us (maximum), grid pulse duration=2us (minimum). Impedance of drive circuit=1500 ohms (maximum).

Note 3: For instantaneous starting applications where plate voltage is applied instantaneously, the maximum permissible epy is 7000v and shall not be attained in less than 0.04 seconds.

Note 4: There shall be no pronounced resonance in the specified range.

Note 5: There shall be no evidence of shorts of any kind resulting from this test.

Note 6: The tube shall be tested in the test circuit shown in the attached drawing. Tests performed at repetition rates less than the resonant repetition rate shall be made with a hold-off diode in the charging circuit. The circuit constants shall be chosen so that at epy=8.0kv under resonant charging conditions dik/dt=1000a/us (minimum); ib=90a; tp=0.5 us±10%; prr=3000pps.

Warning: These conditions are specified only for the purpose of determining circuit constants. The actual operating voltage and repetition rates for each test is specified in the conventional manner under the particular conditions or under the general test conditions, as the case may be.

The grid pulse characteristic shall be tp=2.0us (maximum); tr=0.5us (minimum); driver impedance=1500ohms (minimum).

Note 7: This shall be the first test after the holding period. The tube shall operate satisfactorily on push button starting within 3 attempts when the anode voltage (epy) is applied to the tube under test in such a manner as to rise from 0 to 7000v within 0.03 sec. (The filter in the rectifier shall be designed so that the epy reaches at least 3500v within 0.015 sec). The intervals between successive attempts to instantaneously start the tube shall not be less than 10 seconds nor more than 30 seconds. Any tube failing to start within 3 attempts will be considered a failure.

Note 8: This test shall be conducted within 60 seconds after the Operation (1) test.

Note 9: The tube shall operate continuously for five minutes without evidence of arc-back or anode heating.

Note 10: Anode Delay Time (tad) - a time interval between the point on the rising portion of the grid pulse which is 26% of the maximum unloaded pulse amplitude and the point where anode conduction takes place.

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Note 11: During the interval between 2 minutes and 7 minutes of the Anode Delay Time test, the change in anode delay time (Δ tad) relative to the tad value observed on the Anode Delay Time test shall not exceed the specified value.

Note 12: The variation in firing time (tj) shall be measured at 50% of pulse amplitude and shall not be greater than the amount specified.

Note 13: The positive pulse shall be applied to the grid of the tube. Measure the voltage between grid and cathode 2.5us (maximum) after the beginning of the current pulse. The average voltage shall not rise during the last four microseconds. Plate floating.

Note 14: Life test shall shut down every ninety-six (96) hours for a sixty (60) minute interval. Life test shall be conducted with the tube in a horizontal position.

Note 15: Each tube on life test shall be measured at the end of one-hundred (100) hours of life for emission. If the emission reading exceeds 110v at this time, the tube shall be considered as a life test failure at one-hundred (100) hours.

Note 16: Cooling of the anode lead is permissible, but there shall be no air blast directly on the bulb.

Note 17: Clamping is permissible by the base and/or by the bulb in the area up to 2 1/2 inches above the top of the base only.

Note 18: Where equipment is designed to withstand shock and vibration, it is recommended that the anode connector be of the spring clip type. (National Co. type 12 or equivalent)

Note 19: Reference specification shall be of the issue in effect on the date of invitation for bid.