MILITARY SPECIFICATION SHEET

ELECTRON TUBE, MAGNETRON

TYPE 8982

This specification is approved for use by Naval Electronic Systems Command, Department of the Navy, and is available for use by all Departments and Agencies of the Department of Defense.

The complete requirements for procuring the electron tube described herein shall consist of this document and the latest issue of Specification MIL-E-1.

DESCRIPTION: Coaxial, pulsed, tunable frequency range from 15,500 to 17,500 MHz, 135-kw peak power output, integral magnet, air cooled

ABSOLUTE RATINGS:

Parameter:	Ef	if(surge)	If	tk	ib	Pi	pi	epy	tpc	rrv
Unit:	V	a	A	sec	a	W	kw	kv	µs	kv/µs
Maximum:	13.9	13.6	3.5	---	24	350	365	20	2.75	160
Minimum:	---	---	3.0	270	5	---	---	---	0.20	120
	(Note 1)	(Note 2)		(Note 1)						(Note 3)

ABSOLUTE RATINGS:

Parameter:	prr	Du	VSWR	Temperature		Pressurization		Tuner
				Input terminal	Body	Input	Output	torque
Unit:	pps	---	---	°C	°C	psia	psia	in.-oz
Maximum:	5,000	0.0011	1.5	300	150	45	45	50
Minimum:	---	---	---	-40	-40	10	15	---
				(Note 4)	(Note 4)			(Note 5)

PHYSICAL CHARACTERISTICS:

Marking: See note 6 and figure 1 (top view)
Dimensions: See figure 1
Weight: 14 pounds (maximum)
Cooling: See notes 4, 8, and 9 and figure 1
Cooling arrangement: See figure 2
Mounting plate: See figure 2
Mounting position: Any
Magnetic field: See note 7
Cathode: Unipotential
Construction: Metal and ceramic

TEST CONDITIONS:

Parameter:	Ef	Du	tpc	trc	tfc	VSWR
Unit:	V	---	µs	µs	µs	---
Tolerance:	---	±0.00002	±10%	Max	Max	Max
Test condition 1:	7.1	0.0010	2.5	0.10	0.35	1.10
Test condition 2:	9.6 (Note 1)	0.0005	0.25	0.10	0.25	1.10

FREQUENCY		
F	MHz	±
F1	15,500	20
F1.4	15,700	20
F2	16,000	20
F3	16,500	20
F4	17,000	20
F5	17,500	20

TEST CONDITIONS:

Parameter:	rrv	ib	Droop	Ripple	F
Unit:	kv/µs	a	a	%	MHz
Tolerance:	Min	+0.5 -0.0	Max	Max	±20
Test condition 1:	140	19	3	±20	F1, F3, F5
Test condition 2:	150 (Note 3)	19	2 (Note 11)	±10	F1, F3, F5

GENERAL:

Qualification - Required (See note 37)
Shelf life - 18 months (See note 10)

METHOD	REQUIREMENT OR TEST	NOTES	TEST	CONDITIONS	SYMBOL	LIMITS		UNIT
						MINIMUM	MAXIMUM	
	Qualification inspection							
1006	Salt spray	14, 15	-	Test condition B	---	---	---	---
1011	Humidity	15	-	RH = 95%; TA = 32°to 71°C	---	---	---	---
1032	Vibration, mechanical	15, 16	-	No voltages	---	---	---	---
1042	Shock, specified pulse	15, 17	-	No voltages; test condition A	---	---	---	---
---	Thermal shock	15, 18	-	TA = -54° to + 71°C	---	---	---	---
1047	Low-temperature operation	15, 19	1	TA(soak) = -54°C; F3; TA(operating) = -40°C	---	---	---	---
1047	High-temperature operation	15	1	TA(operating) = +85°C; t = 4 hours; F3	---	---	---	---
1143	Forced cooling	4, 8, 9	1	TA = 50°C(max)	ΔT(body)	---	150	°C
4027	Temperature coefficient	4, 8, 12	1	F3; T(body) = 75° to 140°C	ΔF/ΔT	---	-0.5	MHz/°C
4028	Barometric pressure, reduced	13	1	psia = 523 mmHg (20.6 inch Hg); F5; t = 15 minutes	---	---	---	---
---	Atmospheric frequency shift	20	-	F4; psia = 0.55; no voltages	ΔF	---	9	MHz
4223	Starting torque or force (1)	21, 22	-	TA = -40°C	Torque	---	25	in. - oz
4223	Mechanical tuning fatigue	23, 24	-	Ef = 12.6 V; t(cycle) = 1 to 10 seconds	---	5,000	---	Cycles
4223	Tuner stop endurance	25	-	No voltages	Torque	50	---	in. - oz
1136	Rough-handling test end points	-	-	Drop height = 30 inches	---	---	---	---
	Quality conformance inspection, part 1	26	-					
4289	Heater current, nonoperating	-	-	Ef = 12.6 V; tk = 270(max)	If	2.9	3.5	A
4223	Starting torque or force (2)	21	-	TA = 30°C(max)	Torque	---	10	in. - oz
4223	Operating torque or force	21	-	TA = 30°C(max)	Torque	1.0	10	in. - oz
4223	Mechanical tuning range	4, 8	1	T(body) = 40°±10°C Upper limit Lower limit	 F F	 17,500 ---	 --- 15,500	 MHz MHz
4250	Power output	27	1		po	125	---	kw
4250	Power output (ratio)	28 28	1 1	F1 to F5 F2 to F4	Ratio Ratio	--- ---	1.30:1 1.25:1	--- ---
4306	Pulse voltage	-	1	F5	epy	16.0	18.0	kv
4308	RF bandwidth (1)	29	1	VSWR ≥ 1.5:1	BW	---	0.85/tpc	MHz
4308	Minor lobe ratio (1)	29	1	VSWR ≥ 1.5:1	Ratio	8.0	---	dB
4315	Stability (1)	30	1	VSWR ≥ 1.5:1	MP	---	0.5	%

METHOD	REQUIREMENT OR TEST	NOTES	TEST	CONDITIONS	SYMBOL	LIMITS		UNIT
						MINIMUM	MAXIMUM	
	Quality conformance inspection, part 1 - Continued							
---	RF pulse collapse	31, 32	1	VSWR ≥ 1.5:1	t	---	1.0	sec
	Quality conformance inspection, part 2							
4003	Pressurizing	Figure 1 f, p	-	Method B; 45 psia (min) input and output	Leak rate	---	0.1	Cu in./ min
4223	Resettability	33	1	F3 ±40 MHz	ΔF	---	3.0	MHz
4223	Mechanical tuning rate	-	1	VSWR = 1.5:1				
				F5 to F1	---	6.85	7.15	Turns
				F5 to F2	---	4.66	4.87	Turns
				F5 to F3	---	2.80	2.96	Turns
				F5 to F4	---	1.28	1.40	Turns
4266	Direct - interelectrode capacitance	-	-	Cathode terminal to mounting plate	Cin	2.0	20	pF
4302	Frequency change (warmup)	34	1	F5; T(body) = 100°C ±20°C	ΔF	---	25	MHz
4306	Pulse voltage (change)	-	1	F1 to F5	Δepy	0.65	1.35	kv
		-	1	F2 to F5	Δepy	0.30	0.80	kv
4308	RF bandwidth (2)	29	2	VSWR ≥ 1.5:1	BW	---	6.0/tpc	MHz
4308	Minor lobe ratio (2)	29	2	VSWR ≥ 1.5:1	Ratio	8.0	---	dB
4310	Frequency pulling figure	-	1	VSWR ≥ 1.5:1	ΔF	---	8.0	MHz
4315	Stability (2)	30	2	VSWR ≥ 1.5:1	MP	---	0.5	%
4315	Starting stability	30, 35	1	F3 +40 MHz; VSWR ≥ 1.5:1	MP	---	1.5	%
	Quality conformance inspection, part 3							
4551	Intermittent life	36	1, 2	Group D; VSWR ≥ 1.5:1 cycled through λg every 30 minutes of high voltage time. Starting at F1 and increasing in 200 MHz increments every 8 radiate hours for the duration of the life test	t	1,500	---	cycles
---	Intermittent life-test end points:	-	-					
4223	Mechanical tuning range	4, 8	1	T(body) = 40°+10°C				
				Upper limit	F	17,500	---	MHz
				Lower limit	F	---	15,500	MHz
4250	Power output	27	1		po	100	---	kw
4308	RF bandwidth (1)	29	1	VSWR ≥ 1.5:1	BW	---	1.25/tpc	MHz
		29	2	VSWR ≥ 1.5:1	BW	---	10/tpc	MHz
4308	Minor lobe ratio (1), (2)	29	1, 2	VSWR ≥ 1.5:1	Ratio	5.0	---	dB

METHOD	REQUIREMENT OR TEST	NOTES	TEST	CONDITIONS	SYMBOL	LIMITS		UNIT
						MINIMUM	MAXIMUM	
	Quality conformance inspection, part 3 - Continued Intermittent life-test end points: - Continued							
4315	Stability (1), (2)	30	1, 2	VSWR $\geq$ 1.5:1	MP	---	1.0	%
---	RF pulse collapse	31, 32	1	VSWR $\geq$ 1.5:1	t	---	1.0	sec

NOTES:

1. Prior to the application of high voltage, the cathode shall be heated to the required operating temperature by applying 12.6 volts for 270 seconds (minimum). Upon the application of anode voltage the heater voltage shall be reduced to the specified value.

2. This shall be the maximum instantaneous surge current. There shall be a suitable series impedance during starting time to limit the surge current to this value. The cold resistance of heater is approximately 0.5 ohm.

3. The rate of rise voltage (rrv) shall be measured in accordance with method 4304 and defined by the steepest tangent to the leading edge of the voltage pulse above the 70 percent amplitude point. Any capacitance used in the viewing (measuring) circuit shall not exceed 6 picofarads (pF).

4. Temperature shall be measured at the point specified on figure 1.

5. The tuning mechanism shall be capable of withstanding a static torque of 50 in.-oz at the ends of its travel.

6. In addition to regular markings (tube type, serial number, manufacturer's name, etc.) code letters and dial settings shall be marked on the tube to indicate positions of the tuner drive for the following frequencies under test condition 1 and with the body temperature 40° $\pm$10°C. Tuner is to be rotated in a clockwise direction for each reading. See notes 4 and 8.

Frequency	Code letter designation
15,500 MHz $\pm$20 MHz	F1
15,700 MHz $\pm$20 MHz	F1.4
16,000 MHz $\pm$20 MHz	F2
16,500 MHz $\pm$20 MHz	F3
17,000 MHz $\pm$20 MHz	F4
17,500 MHz $\pm$20 MHz	F5

7. The magnets of the TUT shall be magnetized such that the north seeking pointer of the compass will point toward the TUT input.

8. Temperature measurements shall be made only after thermal equilibrium has been obtained.

9. With a total airflow of approximately 10 cfm at approximately 760 mmHg, 50°C (max), directed through the cooling fins towards the body of the TUT from a duct placed 0.0625 inch (1.59 mm) maximum from the cooling fins, the specified rise above ambient temperature shall not be exceeded (see figure 2).

10. The shelf life requirements shall be as follows:

    a. Tubes tested and procured in accordance with this tube specification sheet (TSS) shall be capable of a shelf life for a period of 18 months after the date of shipment from the manufacturer's plant. At anytime during this shelf life period the tubes shall be capable of meeting all requirements of quality conformance inspection, part 1, as specified herein. Tubes found to be defective within the shelf life period shall be replaced by the manufacturer at no cost to the Government.

    b. A shelf life period of 90 days with the quality conformance inspection, part 2, starting stability test shall be instituted during continuous production. The starting stability shall be performed on four tubes per month when the tube is in continuous production, but shipments of that month's production shall not be held pending completion of the test. Tubes shall be considered to conform to this TSS when three of the four tubes for each of the first three months production and 75 percent of the cumulative quantity pass the test. If either of the above conditions are not satisfied, shipments shall be halted until three or four tubes of current production conform to the starting stability test.

11. The current amplitude at the leading edge of the pulse shall not be less than the current amplitude of the trailing edge of the pulse disregarding both the spike and ripple.

12. The TUT shall be placed in a suitable enclosed container to obtain thermal equilibrium. Temperature measurements shall be made only after thermal equilibrium has been obtained. The frequency shall be measured at the extremes of any 30°C temperature difference in the specified temperature range.

NOTES: - Continued

13. The TUT shall be placed in a chamber and the atmospheric pressure reduced to 523 mmHg (20.6 inch Hg). The TUT shall be operated under the specified test conditions and shall show no evidence of corona or arcing.

14. The TUT shall be mounted such that the high-voltage bushing is covered and the waveguide output assembly is sealed. After 48 hours, the TUT shall be removed from the salt solution, washed with clean water and dried with an air hose. The tuner shall be removed and inspected for water. After completing this inspection (assuming no water was found within the tuner) the TUT shall be reassembled and tested for conformance to the specified tests of quality conformance inspection, part 1.

15. After completing the requirements of this test, the TUT shall show no mechanical failure and shall satisfy the requirements of the following quality conformance inspection, part 1 tests: Pulse voltage, power output, stability, RF bandwidth, minor lobes, frequency pulling figure, and RF pulse collapse.

16. The tube shall be mounted in a resonance free jig and vibrated with sinusoidal excitation in each of three mutually perpendicular planes through the following amplitudes:

5 to 36 Hz	5 G
36 to 46 Hz	0.045 inch DA
46 to 500 Hz	4 G

Cycling test: The frequency shall vary from 5 to 500 to 5 Hz with approximately logarithmic progression, and shall require approximately 30 minutes to traverse the range. This constitutes one cycle. The TUT shall be vibrated for one such cycle in each of the three planes.

Resonance test: Mechanical resonant frequencies of the tube shall be determined during the cycling test.

Vibration test schedule (times shown refer to one axis)

Type	Room temperature
Resonance	30 minutes
Cycling	30 minutes

17. This test shall be performed on a high impact shock machine ror electronic devices (see Drawing 180-JAN), or as follows: A resilient cushion of suitable size and hardness shall be interposed between hammer and anvil of table and a suitable hammer angle selected to produce a shock of the specified magnitude and duration. The mounting plate (see figure 2) of the TUT shall be bolted with nonmagnetic metallic bolts to either the table or the standard angle bracket, depending upon the direction of the desired shock, using a 1-9/16 (39.68) nonmagnetic metallic spacer between the TUT mounting plate and the table or angle bracket. The shock shall be measured on the nonmagnetic spacer. The TUT shall be given one shock in each of the following directions:

    a. Parallel to cathode, with cathode terminals pointing away from the hammer.

    b. Perpendicular to cathode axis and output waveguide axis.

    c. Perpendicular to cathode axis and parallel to the output waveguide axis.

18. The TUT shall be placed in and held for 1 hour in a chamber whose temperature is -54°C. The TUT shall then be removed and held until its body temperature is within ±5°C of room ambient temperature. The TUT shall then be placed in and held for 1 hour in a chamber whose temperature is +71°C. Remove the TUT from the chamber and allow to stabilize at room ambient temperature. (See MIL-STD-202, method 107).

19. The TUT shall be soaked for 24 hours in a chamber whose temperature is -54°C. After completing the soaking period, the TUT shall be held in the chamber at a temperature of -40°C.

20. Measure the TUT resonant frequency with the inner dial set at F4, using a suitable local oscillator and frequency measuring device. Then reduce the atmospheric pressure on the TUT to 0.55 psia (maximum), and remeasure the TUT resonant frequency. The frequency shift shall not exceed the specified limit.

NOTES: - Continued

21. This measurement shall be made between 20 and 30 rpm. This torque is exerted by the tuner drive shaft on a coupled shaft rotating between 20 and 30 rpm as the tuner drive shaft is allowed to transverse F1 to F5. This torque shall not exceed the specified limit. The tuner drive mechanism shall not be "set" against either mechanical stop.

22. This test shall be performed after being subjected to the mechanical fatigue test.

23. Separate samples shall be required for this test. This is a destructive test. Life-test samples may be used.

24. After completing this test, the TUT shall satisfy the requirements of all quality conformance inspection, part 1 tests, and the resettability (backlash) test of quality conformance inspection, part 2.

25. Apply 50 to 55 in.-oz of torque to the turner drive shaft with the tuner mechanism set against the lower and upper frequency mechanical stops, respectively. The radial and axial force applied to the tuner drive shaft shall not exceed 16 ounces during this test. After completing this test there shall be no evidence of mechanical damage to the tuner drive mechanism and the TUT shall satisfy the requirements of the starting torque or force (1) test specified herein.

26. Unless otherwise specified the AQL for all tests listed under quality conformance inspection, part 1, shall be 1.0, inspection level II.

27. The power output shall be continuous while tuning at a rate not to exceed 500 MHz per minute over the range from F1 to F5.

28. The ratio of the maximum to minimum power across the specified frequency band with a constant anode current shall not exceed the specified limits.

29. The TUT shall be operated into a transmission line adjusted in phase to produce maximum spectrum degradation.

30. Stability shall be measured in terms of the average number of output pulses missing, expressed as a percentage of the number of input pulses applied during the period of observation. The missing pulses (MP) due to any causes, are considered to be missing if the rf energy is less than 70 percent of the normal energy level. The stability shall be measured when VSWR of 1.5:1 minimum is introduced in the load and the phase is adjusted at the start of each measurement interval to produce maximum instability. The missing pulse count shall be performed over a 3-minute test interval of a 6-minute test period.

31. Requirements shall be demonstrated by conducting the test while tuning at a rate not to exceed 500 MHz per minute over the range from F1 to F5, with data recorded at F1, F1.4, F2, F3, F4, and F5.

32. The RF output pulse of the TUT shall be viewed on a oscilloscope while tuning the TUT between F1 and F5 at the same time varying the phase of mismatch. The pulse shall be observed to detect any sign of pulse collapse on the trailing edge of the pulse. If pulse collapse is observed and substained for more than the specified limit, the TUT shall be rejected.

33. The frequency obtained by turning the tuning mechanism to a given setting in one direction shall be reproducible within specified limits when returning to that same setting from the opposite direction after thermal equilibrium.

34. Cooling air shall be directed through the cooling fins by means of the cooling fixture of figure 2 (or equivalent). The TUT body temperature shall be measured at the point indicated on figure 2, and shall be between 80° and 120°C after thermal equilibrium has been reached. The TUT may be operated and the airflow preset 6 hours (minimum) before the test, however, the TUT shall not have been operated for 6 hours prior to the performance of this test. This test shall be performed in the following manner: Anode voltage shall be applied after a 150 second (maximum) heater warmup time. The frequency shall then be measured at approximately 3-minute intervals until frequency stabilization occurs. The frequency deviation from the stabilization frequency shall not exceed the limit specified herein.

NOTES: - Continued

35. The standby heater voltage (Ef) shall be 11.9 volts. The anode voltage shall be applied 270 seconds after application of the standby heater voltage, then the heater voltage shall be reduced to 6.4 volts. The VSWR shall be adjusted to the phase producing maximum instability and the missing pulse (MP) counted for a period of 3-minutes starting 30 seconds after application of high voltage.

36. The intermittent life test shall be conducted in accordance with the following cycle:

Test condition	Duration (minimum)	Ef
Standby	5 minutes	12.6 V
Test condition 2	5 minutes	9.6 V
Test condition 1	35 minutes	7.1 V
Off	15 minutes	0.0 V

37. Repairability of this tube must be demonstrated to obtain qualification approval. This demonstration shall be considered satisfactory when the following criteria is satisfied:

    a. The tube must have its three major subassemblies demounted (namely: the cathode, body, and tuner assembly), then remounted and reprocessed through bakeout and electrical testing.

    b. Following the demounting and remounting procedure, the TUT shall be tested for conformance to all electrical tests listed under quality conformance inspection, part 1.

Custodian:
Navy - EC

Review activity:
DLA - ES

User activities:
Navy - AS, OS, MC, CG

Preparing activity:
Navy - EC

Agent:
DLA - ES

(Project 5960-N128)

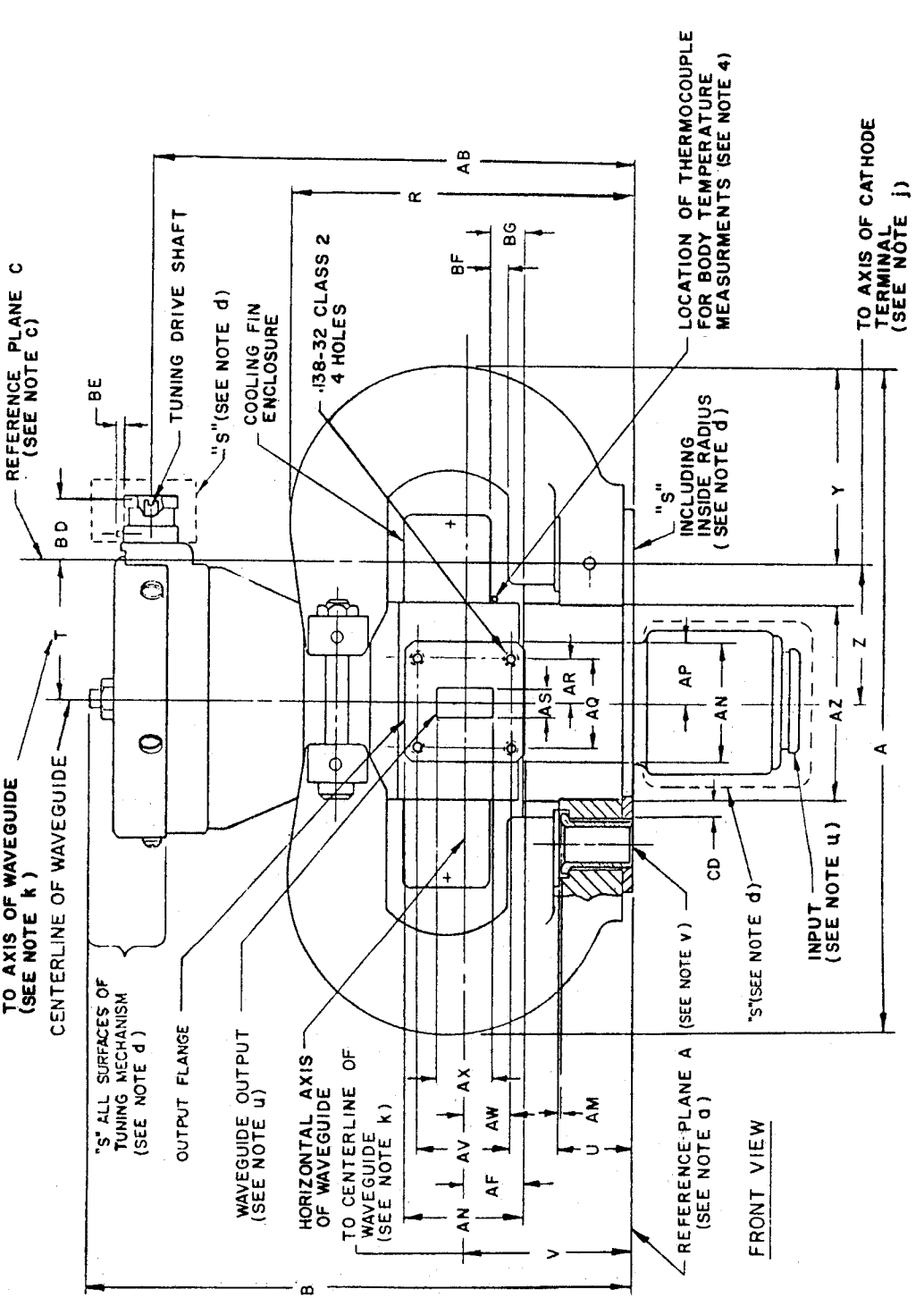


FIGURE 1. Outline drawing of electron tube type8982.

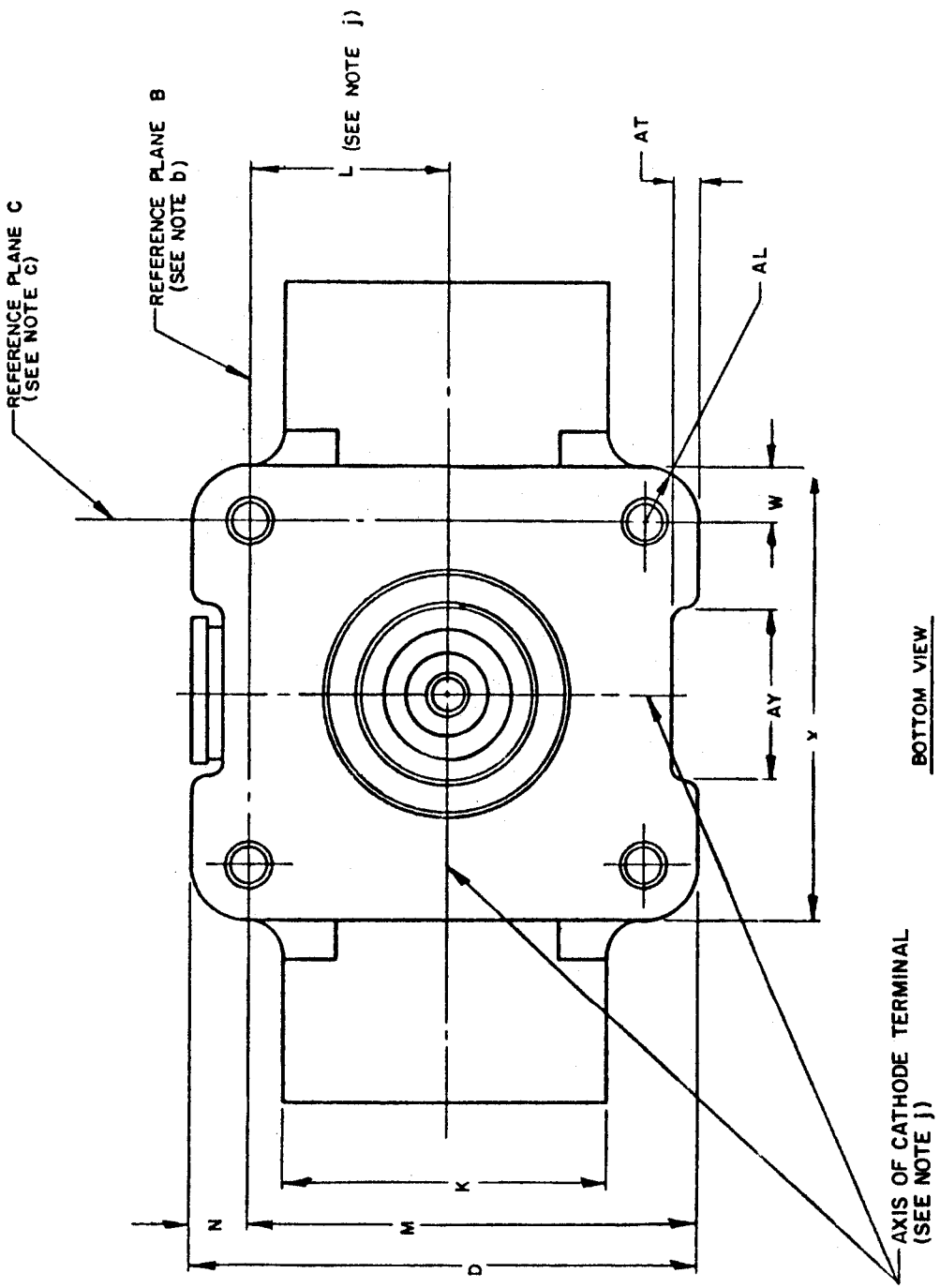


FIGURE 1. Outline drawing of electron tube type8982 - Continued.

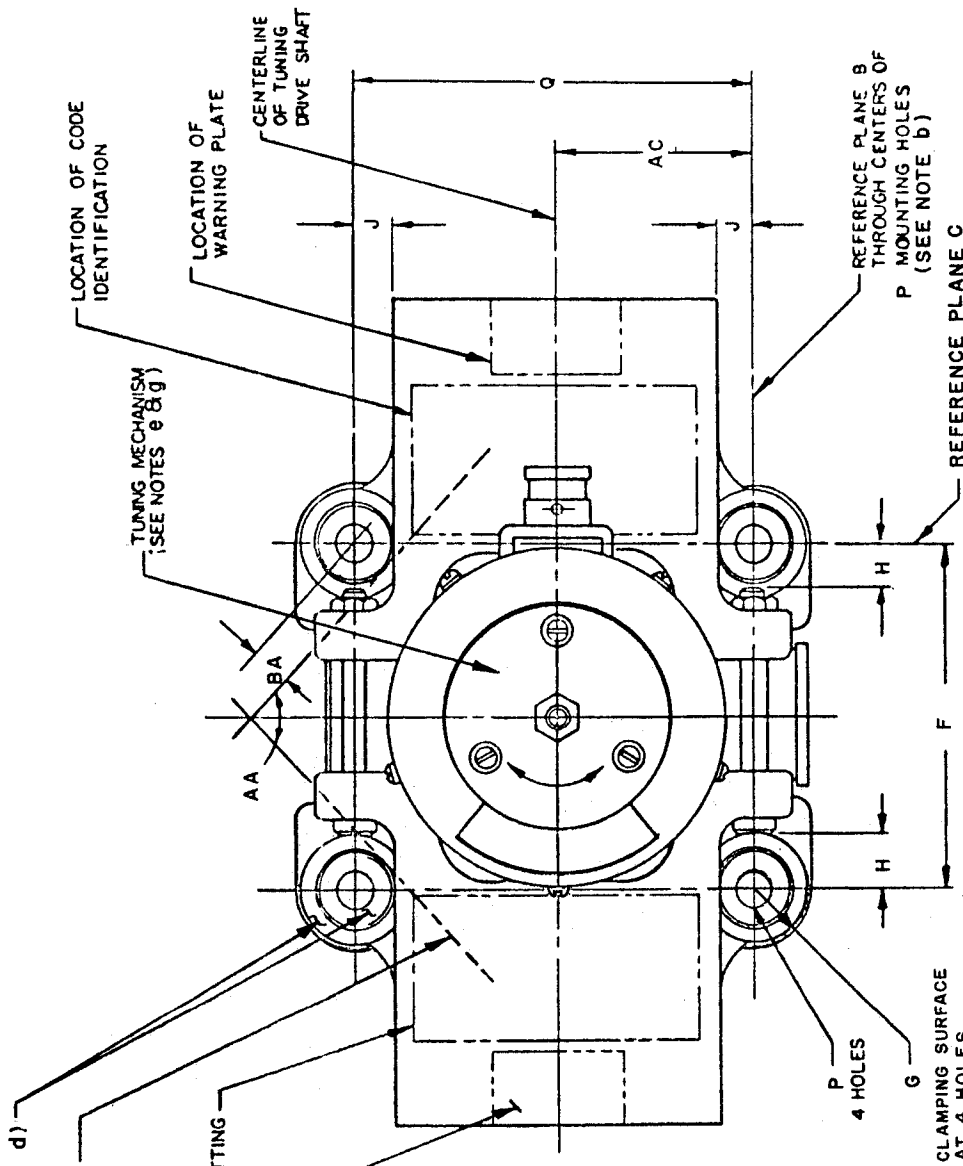


FIGURE 1. Outline drawing of electron tube type 8982 - Continued.

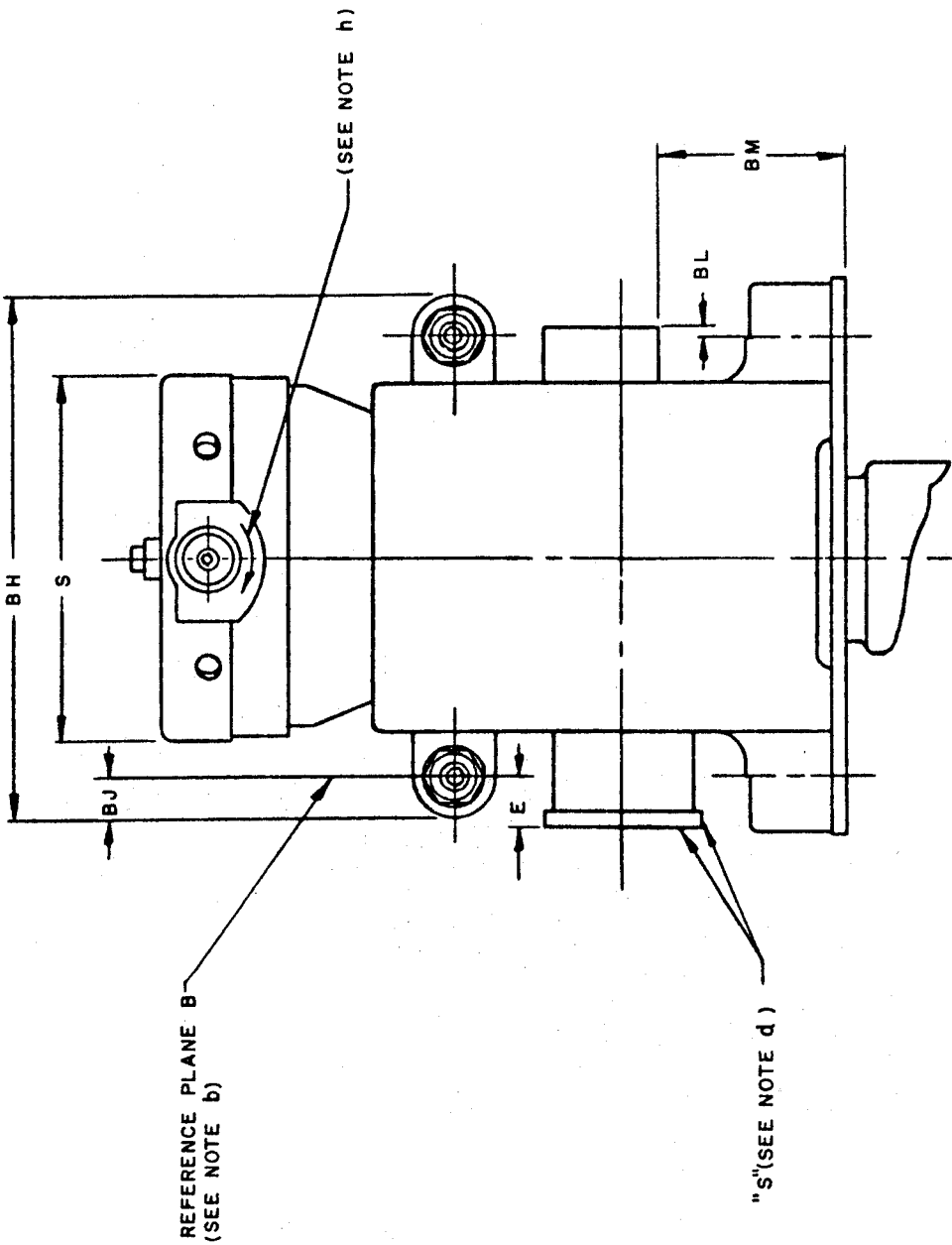


FIGURE 1. Outline drawing of electron tube type 8982 - Continued.

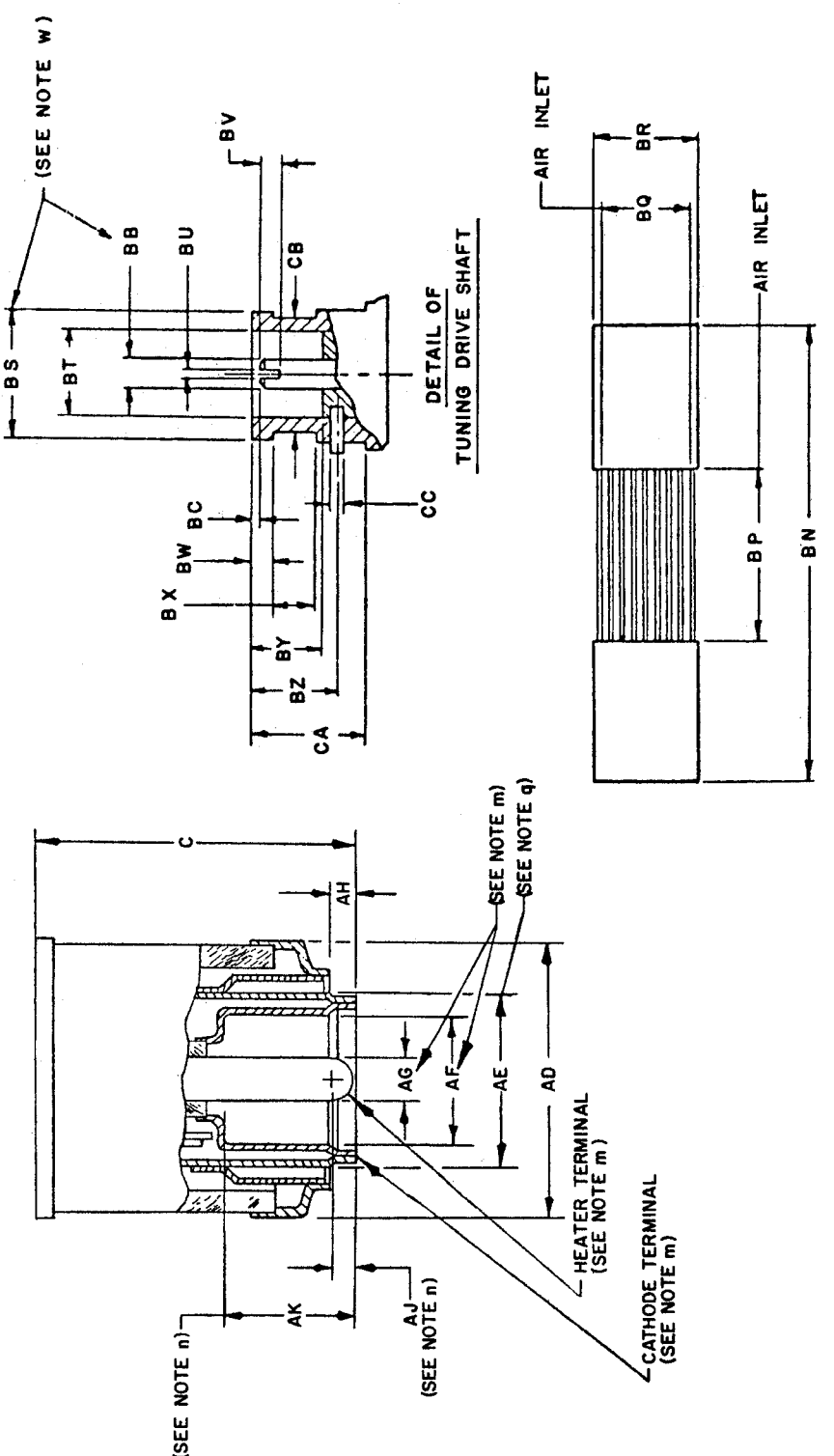


FIGURE 1. Outline drawing of electron tube type 8982 - Continued.

LTR	Dimensions in inches with metric equivalents (mm) in parentheses			
	Minimum		Maximum	
Qualification inspection				
A	---	---	7.50	(190.5)
B	---	---	6.00	(152.4)
D	---	---	4.562	(115.87)
G	.468R	(11.89)	---	---
H	.312	(7.92)	---	---
J	.250	(6.35)	---	---
K	---	---	3.00	(76.2)
L	1.745	(44.32)	1.755	(44.58)
M	---	---	4.031	(102.39)
N	---	---	.531	(13.49)
P	.339 Dia	(8.61)	.349 Dia	(8.86)
R	---	---	4.00	(101.6)
S	2.969 Dia	(75.41)	3.250 Dia	(82.55)
W	.469	(11.91)	.531	(13.49)
X	---	---	4.062	(103.17)
AH	.125	(3.18)	---	---
AN	1.281	(32.54)	1.343	(34.11)
AP	.625	(15.88)	.687	(17.45)
AQ	.952	(24.18)	.960	(24.38)
AR	.476	(12.09)	.480	(12.19)
AS	.309	(7.85)	.313	(7.95)
AV	.991	(25.17)	.999	(25.37)
AW	.4955	(12.586)	.4995	(12.687)
AX	.620	(15.75)	.624	(15.85)
AY	1.469	(37.31)	1.531	(38.89)
BA	.375	(9.52)	---	---
BE	.047	(1.19)	.093	(2.36)
BF	.125	(3.18)	---	---
BG	.265	(6.73)	---	---
BH	---	---	4.375	(111.12)
BJ	---	---	.437	(11.10)
BR	---	---	.969	(24.61)
BS	.560 Dia	(14.22)	.564 Dia	(14.33)
BT	.370 Dia	(9.40)	.380	(9.65)
BV	.084	(2.13)	.104	(2.64)
BW	.089	(2.26)	.099	(2.51)
BX	.183	(4.65)	.193	(4.90)
BZ	.360	(9.14)	.390	(9.91)
CA	.490	(12.45)	.510	(12.95)
CC	.050	(1.27)	.066	(1.68)
CD	.093	(2.36)	---	---

FIGURE 1. Outline drawing of electron tube type 8982 - Continued.

LTR	Dimensions in inches with metric equivalents (mm) in parentheses	
	Minimum	Maximum
	Quality conformance inspection, part 1 (See note 26)	
C	1.813 (46.05)	1.937 (49.20)
E	.305 (7.75)	.365 (9.27)
F	2.990 (75.95)	3.010 (76.45)
Q	3.490 (88.65)	3.510 (89.15)
AB	5.188 (131.78)	5.312 (134.92)
AC	1.719 (43.66)	1.781 (45.24)
AE	.977 Dia(24.82)	1.093 (27.76)
AM	.000 (.00)	.015 (.38)
BB	.124 Dia(3.15)	.125 (3.18)
BC	.021 (.53)	.041 (1.04)
	Quality conformance inspection, part 2	
T	1.469 (37.31)	1.531 (38.89)
U	.844 (21.44)	.906 (23.01)
V	1.781 (45.24)	1.843 (46.81)
Y	--- ---	2.250 (57.15)
Z	1.500 (38.10)	1.500 (38.10)
AD	--- ---	1.625 (41.28)
AF	.747 Dia(18.97)	.753 (19.13)
AG	.247 Dia(6.27)	.253 Dia(6.43)
AJ	--- ---	.156 (3.96)
AK	.750 (19.05)	--- ---
BD	.612 (15.54)	.672 (17.07)
BL	.031 (.79)	.155 (3.94)
BM	1.484 (37.69)	1.609 (40.87)
BP	1.406 (35.71)	1.530 (38.86)
BU	.041 (1.04)	.045 (1.14)
BY	.313 (7.95)	.343 (8.71)
	Nominal dimensions	
AA	84°	
AL	.500 R (12.70)	
AT	.250 (6.35)	
AZ	2.125 Dia(53.98)	
BN	3.937 (100.00)	
BQ	.812 (20.62)	
CB	.500 Dia(12.70)	

FIGURE 1. Outline drawing of electron tube type 8982 - Continued.

NOTES:

a. Reference plane A is defined as that plane which is coincident with the face of the mounting surface as shown.

b. Reference plane B is defined as that plane which is perpendicular to reference plane A, and which passes through centers of mounting holes as shown.

c. Reference plane C is defined as that plane which is mutually perpendicular to reference planes A and B, and which passes through centers of mounting holes as shown.

d. All metal parts except those designated 'S' shall be protected with paint or other suitable finish.

e. Gear and pinion of tuning mechanism shall be free from corrosion, paint, or other obstruction.

f. With the output flange clamped against the modified choke flange (UG-541/U with clearance holes instead of tapped holes), using the gasket (synthetic rubber part No. MS90064-4) and with the specified air pressure applied to the interior of the waveguide, the internal-to-external leak rate shall not exceed 0.1 cubic-inch per minute.

g. Tuning mechanism rests against stop at a position above F5 frequency, for shipment.

h. The frequency increases when drive shaft is driven in direction indicated by arrow.

j. Axis of cathode terminal shall occupy specified location within .05 R (1.27). Note k shall apply.

k. Limits include angular and lateral deviations.

m. Heater terminal and cathode terminal shall be concentric within .010 (.25).

n. These dimensions define extremities of cylindrical sections given by the 'AG' and 'AF' dimensions.

p. With the base plate clamped against the mounting plate (figure 3), using gasket MS-8444-60-0-233 and with the specified air pressure applied so as to surround the entire input terminal beyond the base plate, the internal-to-external leak rate shall not exceed 0.1 cubic-inch per minute.

q. No clamping on this diameter.

r. Protective cover (if supplied) over tuning head must be removed before the tube is used.

s. Tube is provided with internal stop for impact caused by unrestrained tuner drive motion for maximum of 50 impacts.

t. The inner laminations of cooling fins are not painted; however, there may be a slight overspray of the enamel.

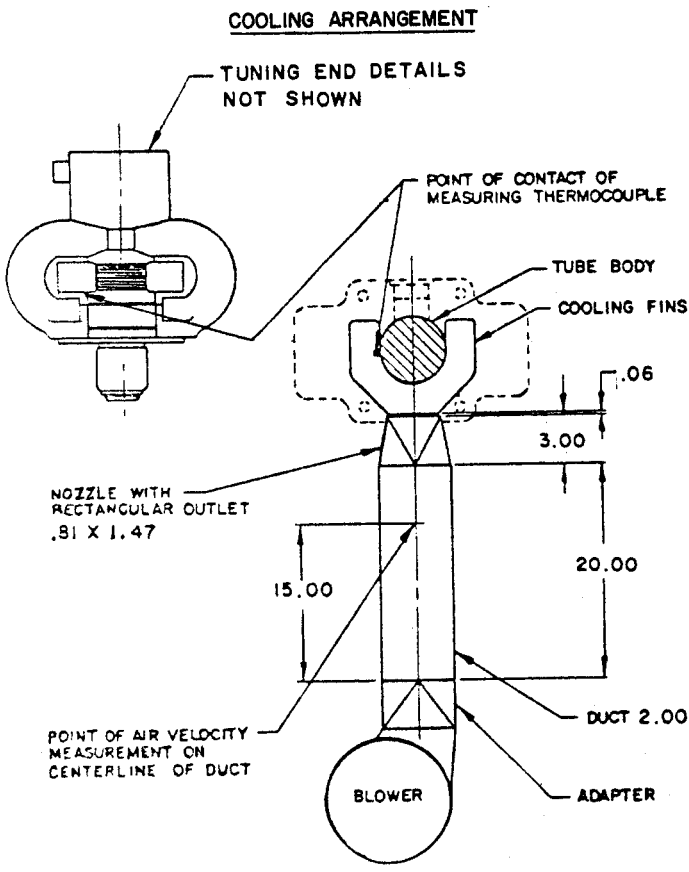
u. The opening of the waveguide and the input shall be enclosed by a dust cover when the tube is not in use.

v. Hollow bushing flush or underflush with respect to both reference plane and clamping surface.

w. These diameters to be concentric within .005 FIR., (.13).

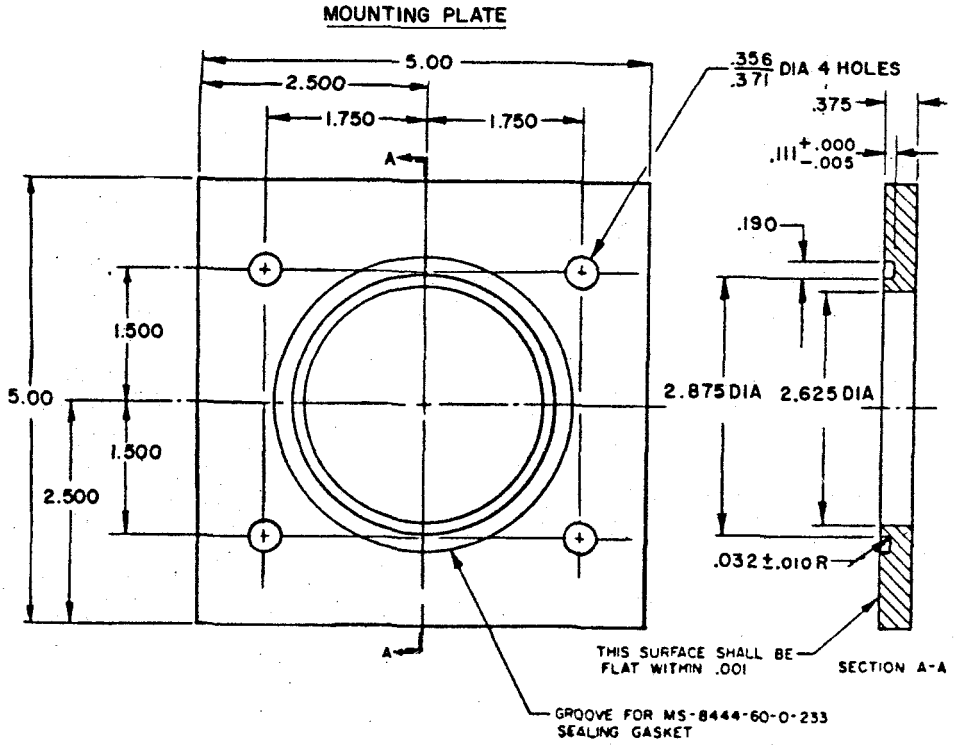
x. Exhaust tubulation and other obstructions shall not enter the space above the clamping surface, dimension G.

FIGURE 1. Outline drawing of electron tube type 8982 - Continued.



INCHES	MM
.06	1.5
.81	20.6
1.47	37.3
2.00	50.8
3.00	76.2
15.00	381.0
20.00	508.0

FIGURE 2. Cooling arrangement and mounting plate.



INCHES	MM
.001	.03
.005	.13
.010	.25
.032	.81
.111	2.82
.190	4.83
.356	9.04
.371	9.42
.375	9.52
1.500	38.10
1.750	44.45
2.500	63.50
2.625	66.68
2.875	73.02
5.00	127.0

NOTES:
a. Dimensions are in inches.
b. Metric equivalents are given for general information only and are based upon 1.00 inch = 25.4 mm.
c. Unless otherwise specified, tolerances are .XX ±.02 (.51 mm), .XXX ±.005 (.13 mm).

FIGURE 2. Cooling arrangement and mounting plate - Continued.

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