



# REFLEX KLYSTRON

oscillator  
**VA-6310**  
**V-260**

8.5 - 10.0 kmc  
125 mw

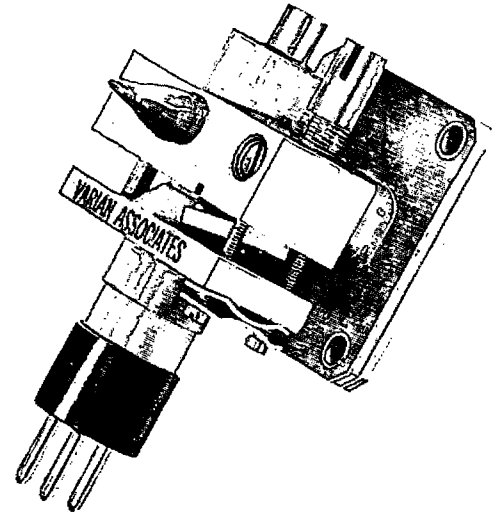
**DATA SHEET**

## APPLICATION

The VA-6310/V-260 is intended for radar application particularly under rugged service conditions. It will operate from conventional power supplies and with conventional crystal mixers, greatly increasing the ruggedness and reliability of any radar system to which it may be applied. It will produce adequate power output and electronic tuning range with resonator voltage as low as 200 volts.

## FEATURES

Low microphonics . . . Negligible barometric frequency coefficient . . . Matched load operation without matching sections . . . Waveguide output . . . Linear reflector voltage tracking . . . Rapid warm-up . . . Removable inserts in flange holes simplify insulation when required.



### GENERAL CHARACTERISTICS

Frequency Range . . . . . 8.5 to 10 kmc  
Heater Voltage . . . . . 6.3 v  
Heater Current . . . . . 1.2 amp

### MAXIMUM RATINGS

Resonator Voltage . . . . . 350 v  
Resonator Current . . . . . 42 ma  
Reflector Voltage . . . . . 0 to -1000 v

### MECHANICAL CHARACTERISTICS

Cathode . . . . . Oxide coated, unipotential  
Maximum Dimensions . . . . . 3 3/4 x 1 1/4 x 1 3/8 in.  
Weight . . . . . 6 oz  
Output Connector . . . . . Bolts to UG-39/U flange  
or UG-40A/U choke for  
1 x 1/2 x 0.050 in. waveguide  
Base . . . . . Pee-wee, 3-pin (A3-1)  
Top Cap . . . . . Miniature (C1-4)  
Mounting Position . . . . . Any  
Cooling . . . . . Convection<sup>1</sup>  
Tuner . . . . . Single screw tuner<sup>2</sup>  
Tuning Torque (starting) . . . . . <50 in.-oz  
Shock . . . . . Withstands up to 250 G<sup>3</sup>  
Microphonics . . . . . Less than 500 kc<sup>4</sup>

### AVERAGE ELECTRICAL CHARACTERISTICS

Resonator Voltage . . . . .	200	300	300	v
Mode . . . . .	6 3/4	5 3/4	4 3/4	
Frequency . . . . .	9.3	9.3	9.3	kmc
Resonator Current . . . . .	17	28	28	ma
Reflector Voltage . . . . .	-120	-160	-250	v
Power Output (load VSWR<1.1)	20	70	125	mw
Electronic Tuning Range <sup>5</sup> . . . . .	30	48	35	mc
Modulation Sensitivity . . . . .	2.5	1.5	1.1	mc/v
Warm-up Time <sup>6</sup> . . . . .	15	15	15	sec
Temperature Coefficient . . . . .	-60	-60	-60	kc/°C

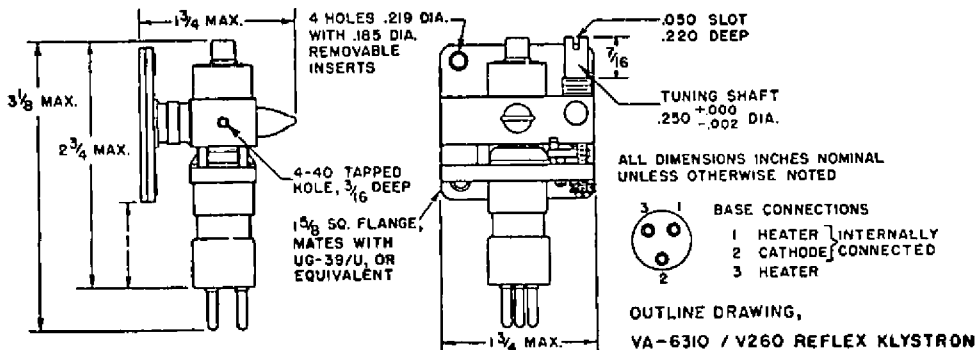
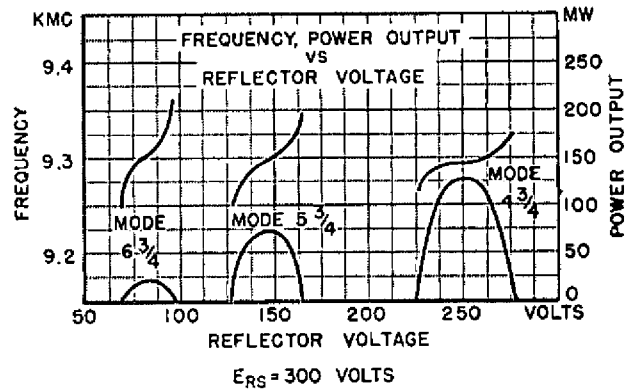
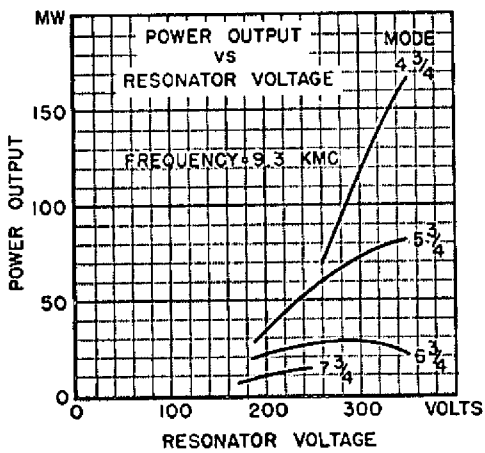
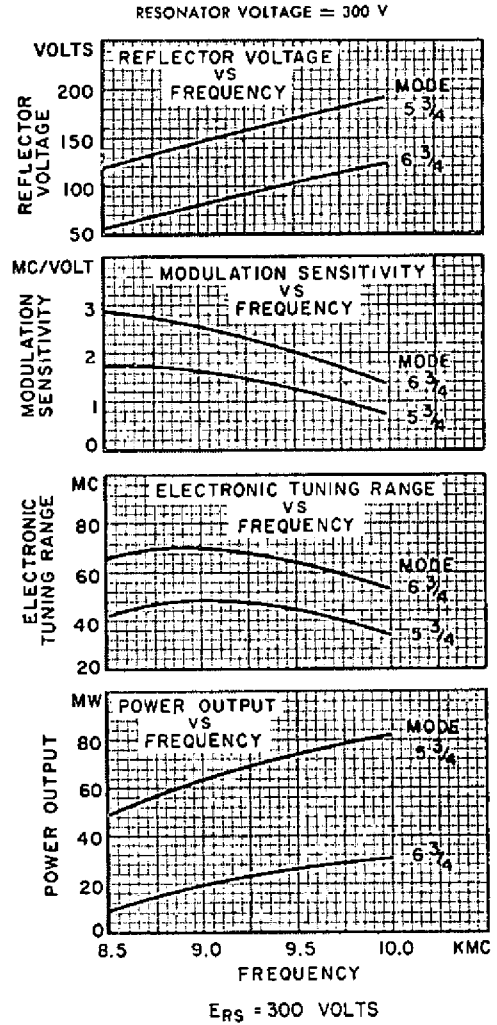
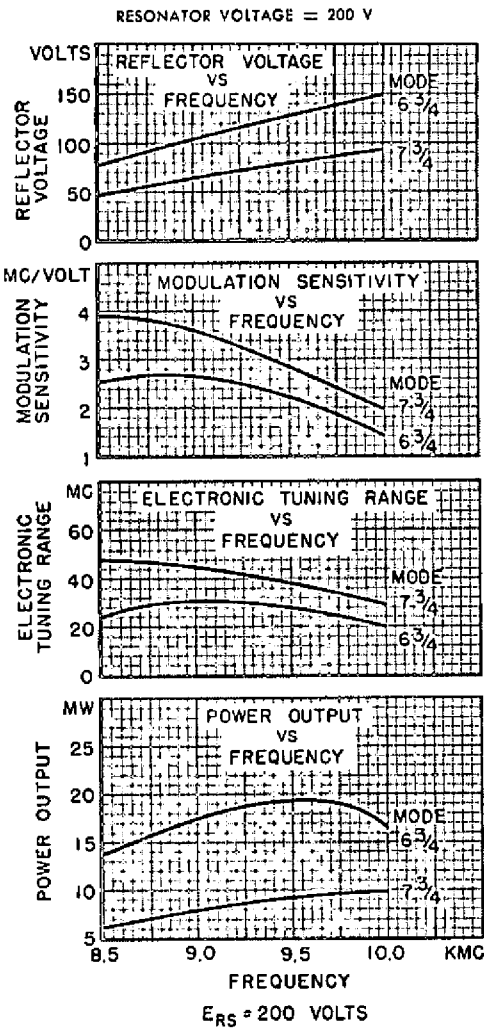
Operation over the published frequency range on the 5 3/4 mode at a resonator potential of 300 volts will provide at least 25 milliwatts power output (VSWR<1.1) and 30 mc Electronic Tuning Range.

#### NOTES:

1. Forced-air cooling required above 10 watts resonator power input.
2. Approximately 2 turns to cover frequency range. Positive mechanical stops are provided.
3. A 200 G shock of 10 milliseconds duration produces a permanent frequency change of the order of 2 mc.
4. At resonant peaks, a 5 G audio-frequency vibration may produce frequency modulation of as much as 2 mc.
5. Between half-power points.
6. Before oscillation begins.

Additional operation and application information available upon request.

ALL CURVES ARE TYPICAL DATA



SPECIFICATION  
 TYPE VA-6310/V-260 REFLEX KLYSTRON

Description: Klystron, Integral Cavity, Tuner, Waveguide Output  
 Tuner Plate Altitude  
 Ratings: Ef Ers Er Ik Temp. Feet  
 Absolute V Vdc Vdc mAdc °C  
 Maximum: 6.3 ± 10% 350 0 to -1000 42 200 10,000  
 Test Cond: 6.3 300 -55 to -225 -- Notes 1 & 2  
 Dimensions: As per outline \*\*Cathode: Coated Unipotential

<u>Ref.</u>	<u>Test</u>	<u>Conditions</u>	<u>Min.</u>	<u>Max.</u>
3.1	Qualification Approval:	Required for JAN markings		
4.5	Holding Period:	t=168 hours		
4.9.5.1	*Torque:			
4.9.18	*Carton Drop:	(d) Package Group 1 Carton Size N		
4.9.19	**Vibration(1):	Power Output(1) 10G; F=50 to 1000 cps t=5 min.		
4.9.19	Vibration(2):	10G; F=60; t=120 Note 4	Ir: 0	10 uAdc
4.9.20.5	**Shock:	Power Output(1); G=200		
4.10.8	*Heater Current:		If: 1.08	1.32 A
4.10.6.7.1	∕Total Reflector Current:	Notes 5 & 6	Ir: --	3 uAdc
4.10.1.1	∕Emission:	Ef=5.7; Note 6	Δ Ik/Ik: --	-15 %
4.10.4.6	Cathode Current:	Er(Mode 5)/max Po F=10,000 ± .3% Mc	Ik: 20	32 mAdc
4.10.7.3.2	Tunable Frequency:		F: 8,500	10,000 Mc

<u>Ref.</u>	<u>Test</u>	<u>Conditions</u>	<u>Min.</u>	<u>Max.</u>
4.15.1	Power Output (1):	Er(Mode 5)/max Po F=8500 $\pm$ .3% Mc	Po: 25	-- mW
4.15.1	Power Output (2):	Er(Mode 5)/max Po F=10,000 $\pm$ .3% Mc	Po: 25	-- mW
4.15.1	**Power Output (3):	Er(Mode 5)/max Po F=8500 to 10,000 Mc	Po: 25	-- mW
4.10.5.4	Reflector Voltage (1):	Power Output (1)	Er: -85	-135 Vdc
4.10.5.4	*Reflector Voltage (2):	Power Output (2)	Er: -160	-225 Vdc
4.15.3	*Electronic Tuning Range:	Mode 5; 50% max Po; F=8500 to 10,000 Mc; Note 6	$\Delta$ F: 30	---- Mc
4.15.5	**Temperature Compensation:	Power Output (1) TA=20° to 60°C F=9300 $\pm$ .3% Mc	Coeff: 0.0	-.20 Mc/°C
---	**Frequency Modulation	Power Output (2); Ef=5.7 to 7.0 Vdc	$\Delta$ F: ---	.1 Mc
4.11	Life Test:	Group C Power Output (1)	t: 500	---- hrs
4.11.4	Life Test End Point:	Power Output (1) Reflector Current t=5min	$\Delta$ Po/Po: 0 Ir: ----	-20 % 10 uAdc

References are to paragraphs in "Military Specifications for Electron Tubes MIL-E-1B".

Note 1: All oscillation tests except vibration test shall be made with the tube rigidly connected to a UG39/U flange on appropriate RG52/U waveguide equipment and the load VSWR for the tube shall be less than 1.1. Forced air cooling is required for power inputs above 10 watts.

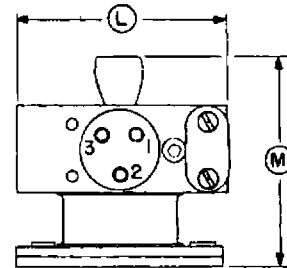
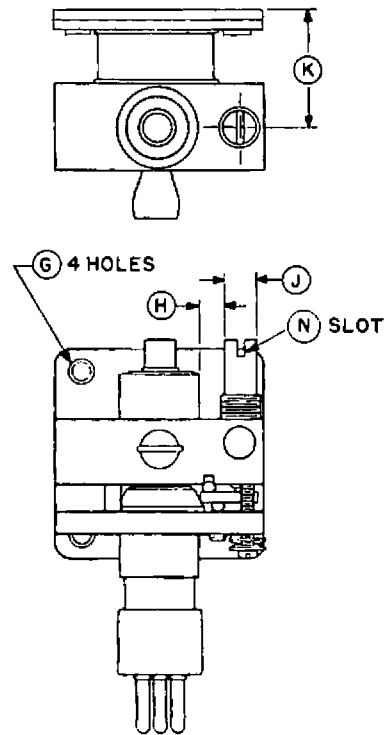
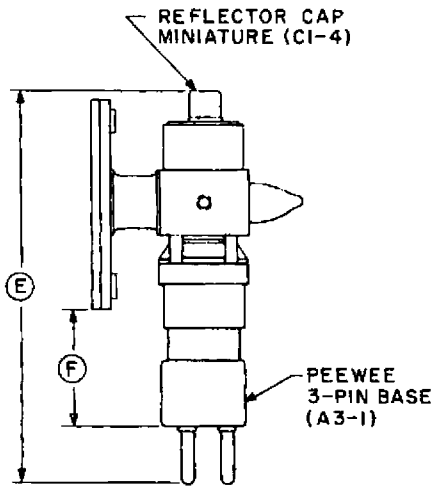
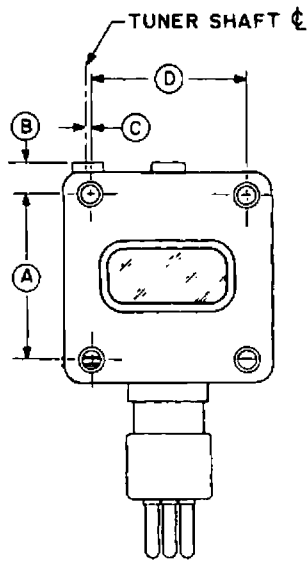
Note 2: The temperature of the base and cap should not exceed 120°C.

Note 3: The reflector current shall be recorded with a Brush Model BL202 recorder or equivalent. There shall be no reflector current bursts greater than the limit shown

Note 4: After two minutes with all voltages applied, total reflector current shall not exceed the specified limits.

Note 5: The tube shall not be oscillating during the test.

Note 6: The power output shall have no discontinuities between half-power points for either direction of reflector voltage change.



**BASE CONNECTIONS**

- PIN 1\* HEATER
- PIN 2\* CATHODE
- PIN 3 HEATER

\*PINS 1&2 ARE INTERNALLY CONNECTED

REF.	DIMENSIONS
A	1.284 MAX. 1.276 MIN.
**B	.187 NOM.
*C	.070 MAX. .010 MIN.
D	1.224 MAX. 1.216 MIN.
*E	3.125 MAX.
**F	1.00 MAX.
*G	.219 DIA. NOM. WITH .185 DIA. NOM. REMOVABLE INSERTS
**H	.160 MIN.
*J	.250 MAX. .248 MIN.
*K	.936 MAX. .850 MIN.
**L	1.75 MAX.
M	1.813 MAX.
*N	.050 WIDE X .220 DEEP NOM.

**NOTE:** Eyelet-type inserts in the flange mounting holes are 0.219 O.D. , 0.185 I.D. , nominal, and are easily removable from rear of flange. With inserts in place, the mounting holes provide clearance for #8 screws. With inserts removed, the mounting holes permit use of insulating bushings where d-c isolation between tube flange and waveguide system is desired.

**SPECIFICATION DRAWING, VA-6310/V-260 REFLEX KLYSTRON**

**Dwg. 260B  
5-8-53**