from JETEC release #1495, July 11, 1955

VARIAN associates

REFLEX KLYSTRON

DATA SHEET

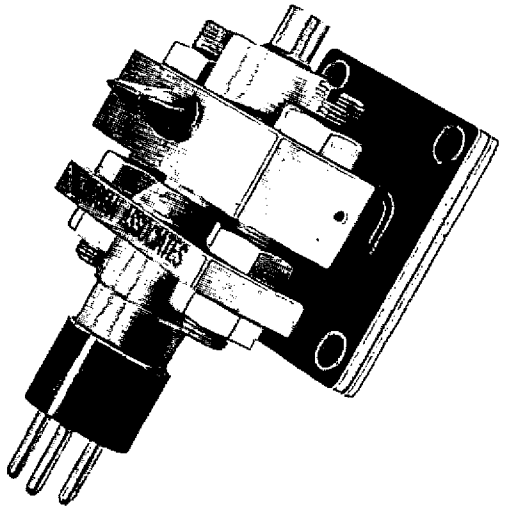
oscillator

VA-6313*

8.5 - 10.5 kMc

APPLICATION

The VA-6313 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 operate at much lower resonator voltages than most local oscillator klystrons, producing adequate power output and electronic tuning range with resonator voltage as low as 150 volts.



FEATURES

Extremely rugged construction . . . Low microphonics . . . Lock-nut tuning . . . Matched load operation without matching sections . . . Waveguide output . . . Rapid warm-up . . . Negligible barometric frequency coefficient.

GENERAL CHARACTERISTICS

Frequency Range	8.5 to 10.5 kMc
Heater Voltage	6.3 volts
Heater Current	1.2 A

MECHANICAL CHARACTERISTICS

Cathode	Oxide coated, unipotential
Maximum Dimensions	3⅛ x 1-13/16 x 1¾ in.
Weight	6 oz
Output Connector	Bolts to UG-39/U flange or UG-40A/U choke for 1 x 0.50 x 0.050 in. waveguide
Base	Pee-wee, 3-pin (A3-1)
Top Cap	Miniature (C1-4)
Mounting Position	Any
Cooling	Convection [1]
Tuner	Lock-nut [2]
Shock	Withstands up to 250 G
Microphonics	Less than 50 kc [3]

MAXIMUM RATINGS

Resonator Voltage	385 volts
Resonator Current	74 mA
Reflector Voltage	0 to −1000 volts

ELECTRICAL CHARACTERISTICS

Operation between 8500 and 10,500 Mc, Matched Load, Ef = 6.3 volts

Resonator Voltage = 350 volts Mode 4¾

	Min.	*Avg.*	*Max.*	
Resonator Current	----	52	60	mA
Reflector Voltage (at 9.3 kMc)	----	−150	----	volts
Power Output	50	120	----	mW
Electronic Tuning Range [4]	40	65	----	Mc
Modulation Sensitivity	----	1.0	----	Mc/V
Temperature Coefficient	−200	−60	+200	kc/°C
Warm-Up Time [5]	----	15	----	sec

NOTES:

1. Forced-air cooling required above 10 watts resonator power input.
2. Stops provided on low-frequency end.
3. At resonant peaks, a 10 G audio-frequency vibration may produce frequency modulation of as much as 2 Mc.
4. Between half-power points.
5. Before oscillation begins.

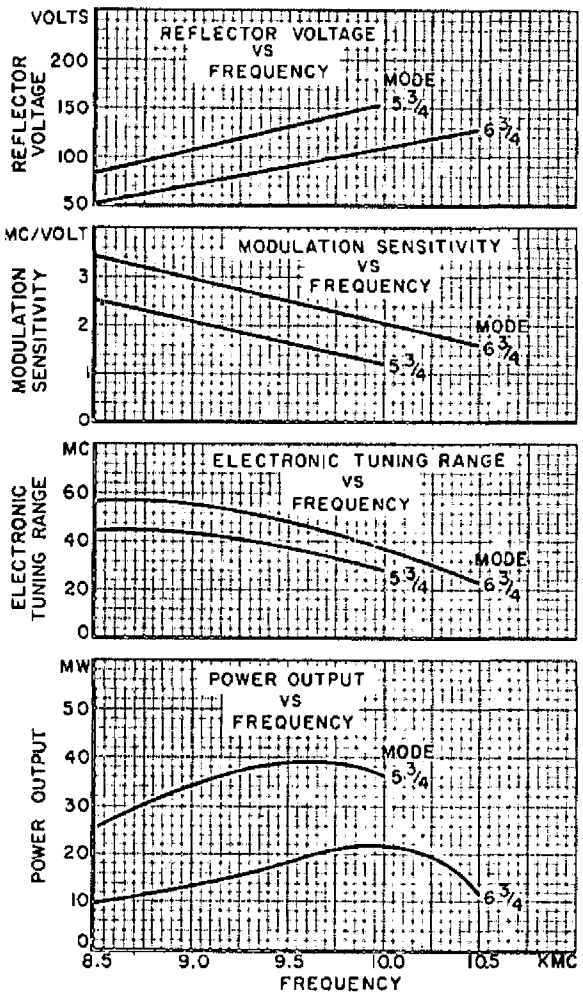
* Formerly designated VA-6313/V-280

Additional operation and application information available upon request.

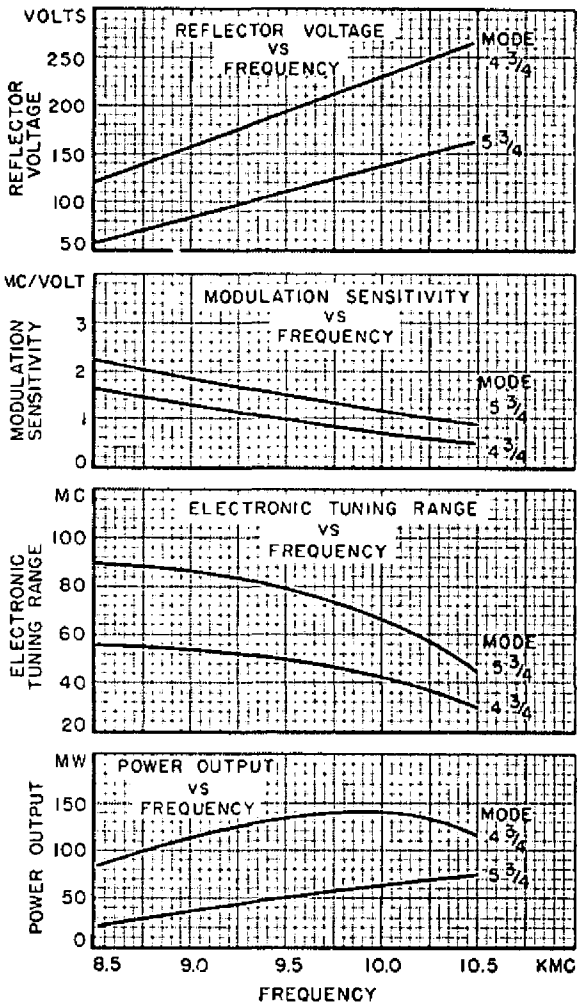
VA-6313

ALL CURVES ARE TYPICAL DATA

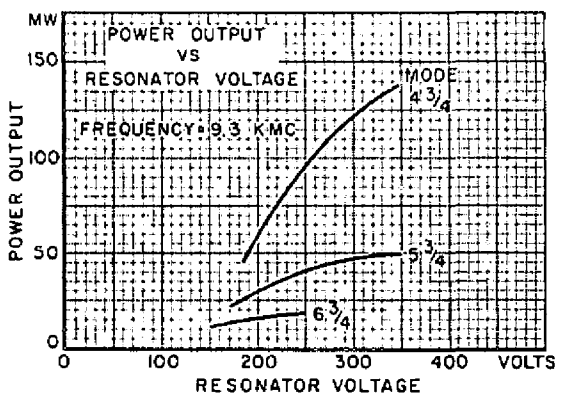
RESONATOR VOLTAGE = 200 V LOAD VSWR > 1.1 RESONATOR VOLTAGE = 300 V

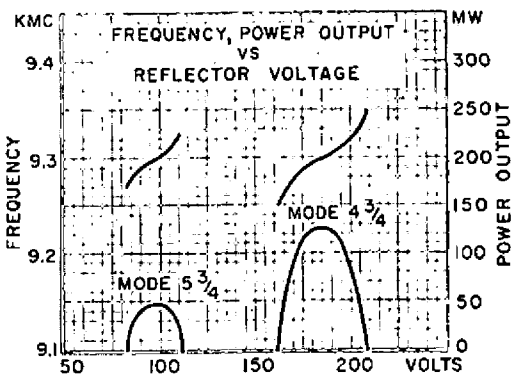


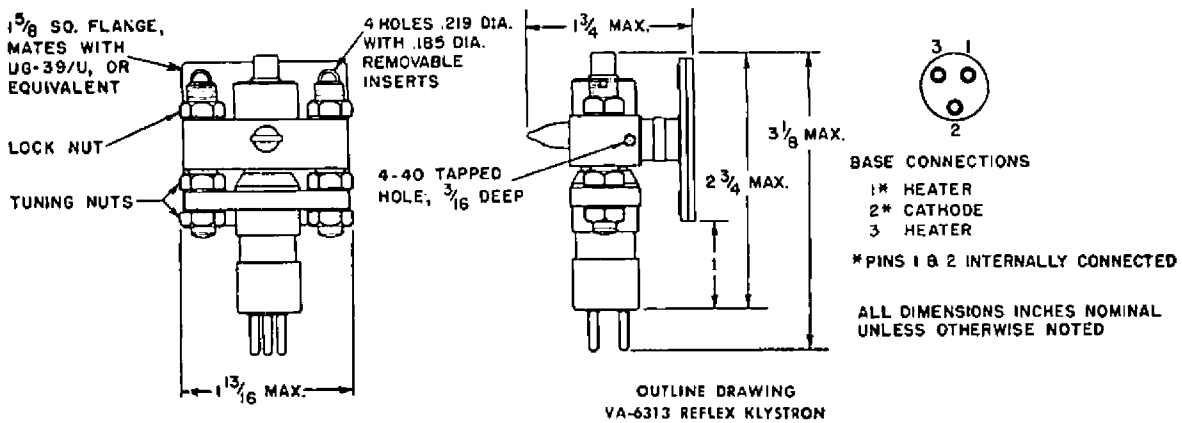
E_{RS} = 200 VOLTS



E_{RS} = 300 VOLTS







OUTLINE DRAWING
VA-6313 REFLEX KLYSTRON

Pub. 63B Printed in U.S.A. 3M455

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SPECIFICATION

TYPE VA-6313/V-280 / VA-6314/V-290 REFLEX KLYSTRON

Description: Klystron, Integral Cavity, Tuner, Waveguide Output

Ratings:	Ef	Ers	Er	Ik	Tuner Plate Temp oC	Altitude Feet	Altitude Feet
Absolute	V	Vdc	Vdc	mAdc		VA-6313/V-280	VA-6314/V-290
Maximum:	6.3± 10%	385	0 to -1000	74	200	10,000	No Limit
Test Cond:	6.3	350	-50 to -300	---	Notes 1 & 2		

Dimensions: As per outline

**Cathode: Coated Unipotential

Ref.	Test	Conditions	Min.	Max.	
3.1	Qualification Approval:	Required for JAN markings			
4.5	Holding Period:	t=168 hours			
4.9.5.1	*Torque:	Note 3			
4.9.18	*Carton Drop:	(d)Package Group 1 Carton Size N			
4.9.19	**Vibration(1):	Power Output (3) 10G; F=50 to 1000 cps t=5 min.			
4.9.19	Vibration(2):	Ers=200 Vdc; 10G; F=60 t=120; Note 4	Ir: 0	10	uAdc
4.9.20.5	**Shock:	Power Output(3) 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 4)/max Po F=10,000 ± .3% Mc	Ik: ---	60	mAdc
4.10.7.3.2	Tunable Frequency:		F; 8500	10,500	Mc
4.15.1	Power Output(1):	Er(Mode 4)/max Po F=8500 ± .3%	Po: 50	---	mW

Ref.	Test	Conditions		Min.	Max.	
4.15.1	Power Output(2):	Er(Mode 4)/max Po F=10,000 ± .3% Mc	Po:	100	--	mW
4.15.1	*Power Output(3):	Ers=200 Vdc; Er (Mode 6)/max Po; F=9300 ± .3% Mc	Po:	8	--	mW.
4.10.5.4	Reflector Voltage(1):	Power Output(1)	Er:	-85	-145	Vdc
4.10.5.4	Reflector Voltage(2):	Power Output(2)	Er:	-170	-255	Vdc
4.10.5.4	*Reflector Voltage(3):	Power Output(3)	Er:	-40	-110	Vdc
4.15.3	*Electronic Tuning Range(1):	Mode 4; 50% max Po F=8500 to 10,000 Mc Note 7	ΔF:	40	--	Mc
4.15.3	*Electronic Tuning Range(2):	Mode 6; 50% max Po F=9300; Ers=200 v Note 7	ΔF:	35	--	Mc
--	*Modulation Sensitivity:	Power Output(3) ΔF = ± 2.5 Mc max	Coeff:	2.0	4.0	Mc/V
4.15.5	**Temperature Compensation:	Power Output(3) TA = -10 to +40°C	Coeff:	--	.20	Mc/°C
--	**Frequency Modulation:	Power Output (2) Ef=5.7 to 7.0 Vdc	ΔF:	--	.1	Mc
4.11	Life Test:	Group C Power Output(3)	t:	500	--	hrs
4.11.4	Life Test End Point:	Power Output(1) Reflector Current t=5 min.	ΔPo/Po: Ir:	0 --	-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: Temperature of base and cap of VA-6313/V-280 should not exceed 120°C.

Note 3: Not applicable to VA-6314/V-290.

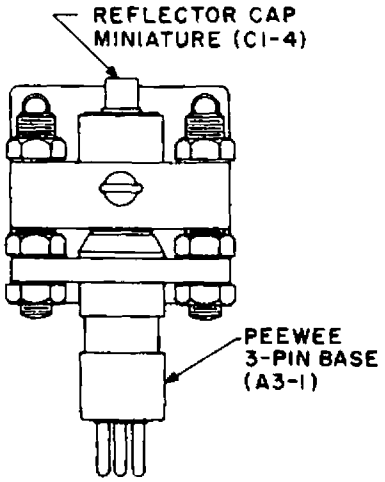
7/23/53
280-290

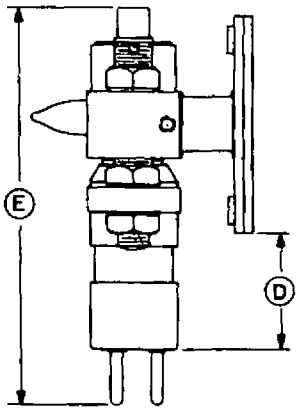
Note 4: The reflector current shall be recorded with a Brush Model BL202 recorder or equivalent. There shall be no reflector current bursts greater than the limits shown.

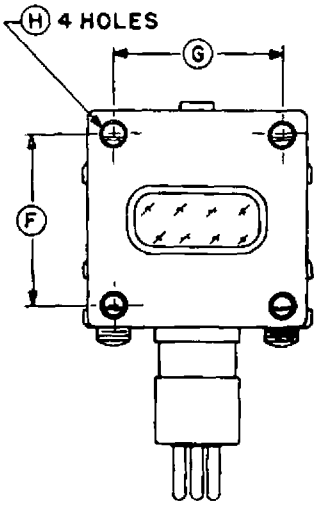
Note 5: After two minutes with all voltages applied, total reflector current shall not exceed the specified limits.

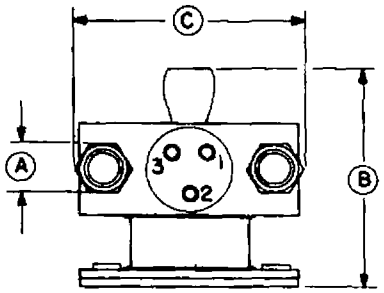
Note 6: The tube shall not be oscillating during the test.

Note 7: The power output shall have no discontinuities between half-power points for either direction of reflector voltage change.









REF.	DIMENSIONS
** A	.438 NOM.
B	1.813 MAX.
** C	1.813 MAX.
** D	1.00 MAX.
* E	3.125 MAX.
F	1.284 MAX. 1.276 MIN.
G	1.224 MAX. 1.216 MIN.
*H	.219 DIA.NOM.WITH .185 DIA. NOM. REMOVABLE INSERTS

BASE CONNECTIONS

PIN 1* HEATER
PIN 2* CATHODE
PIN 3 HEATER

*PINS 1 & 2 ARE INTERNALLY CONNECTED

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-6313/V-280 REFLEX KLYSTRON

Dwg. 280B
4-20-53