



## KLYSTRONS

Reflex Klystrons of rugged construction for use as a local oscillator. They have been designed for use in the most severe environmental conditions where extreme frequency stability and reliability are required. The two types are identical except for Tuner Screw turns to cover the tuning range.

SZ51

SZ51A

### PHYSICAL DATA.

Dimensions	...	...	See Drawings on Page 3.
Output Connection	...	...	Bolts to UG-39/U flange or UG-40A/U choke for lin. x 0.5in. x 0.05in. waveguide.
Mounting Position	...	...	Any.
Weight	...	...	6 oz. (180gm.) approx.
Base	...	...	Moulded with flying leads.
Top Cap	...	...	Moulded with flying lead.

### FREQUENCY.

Operating Range	...	...	8450 ± 400 Mc/s.
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### TUNING.

A single screw tuner covers the tuning frequency range in approximately 1½ in. turns. For tuner screw settings see the graphs on page 7 (SZ51) & page 8 (SZ51A). The average tuner torque is 30 in./oz. (max. 35 in./oz.).

### HEATER.

Heater Voltage	...	...	...	6.3 volts.
Heater Current	...	...	...	1.2 ± 10% amps.

### RATINGS.

Max. Heater Voltage	...	...	...	6.9 volts.
Min. Heater Voltage	...	...	...	5.7 volts.
Max. Resonator Voltage	...	...	...	350 volts.
Max. Resonator Current	...	...	...	60 mA.
Max. V <sub>h-k</sub>	...	...	...	45 volts.
Max. Body Temperature	...	...	...	200 °C.
Reflector Voltage (negative)	...	...	...	0-500 volts.

### COOLING.

Designed for cooling by conduction and free air circulation. Forced air cooling is not usually required but the Klystron body temperature should not be allowed to exceed 200°C.

### CHARACTERISTICS AND TYPICAL OPERATION

Frequency Range	...	8450 ± 400	Mc/s.		
Heater Voltage	...	6.3	volts.		
Load	...	Matched			
Resonator Voltage	...	350	volts.		
		Min.	Av.	Max.	
*Reflector Voltage	...	-90	—	-185	volts.
Resonator Current	...	—	50	60	mA.
Reflector Current	...	—	—	10	μA.
Power Output	...	40	120	—	mW.
Electronic Tuning					
Range	...	30	—	80	Mc/s.
Modulation Sensitivity	...	0.6	—	2.7	Mc/s / volt.
Temperature					
Coefficient	...	-100	-30	+50	kc/s / °C.
Heater Voltage					
Coefficient	...	—	—	1.5	Mc/s / volt.

\*See Graph on page 5





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CHARACTERISTICS AND TYPICAL OPERATION. (cont.)

†Noise	... ..	$<3 \times 10^{-14}$ W/ Mc/s/ mW
‡Tuner Resetting Accuracy (max. $\Delta F$ .)	... ..	1 Mc/s.
§Tuner Side Thrust (max. $\Delta F$ .)	... ..	0.5 Mc/s.
¶Pressure Coefficient (Max. $\Delta F$ .)	... ..	2 Mc/s.

Vibration.

The max. peak to peak frequency variation from vibration of 40<sub>2</sub>c/s to 4 kc/s at 10g peak to peak is 0.2 Mc/s.

Shock.

The maximum frequency deviation due to shock of 150g. is 1.5 Mc/s.

NOTES ON OPERATION.

Mounting.

The klystron should be securely bolted to the mating waveguide flange. Normally the anode (tube body) is operated at earth potential ; when operated with the anode above earth potential suitable insulation should be provided between the tube and waveguide flanges.\*\*

Application of Voltages.

It is important that the circuit in which a new klystron is being installed is thoroughly checked before the application of any voltages. The applied voltages should not exceed the maximum published ratings under any circumstances.

Reflector Voltage.

The Reflector must never be operated at a potential positive with respect to that of the cathode, nor should its power supply be disconnected during the time the resonator voltage is applied. When the reflector voltage is modulated the magnitude of the modulating voltage must be limited to the extent necessary to prevent positive excursions of the reflector voltage. A protective diode connected directly between the reflector and the cathode can be used to prevent the reflector from becoming positive. The performance of this diode should be checked regularly as it will normally be operated at zero current drain, an operating condition which materially reduces the life.

Load.

For correct functioning the load should present a VSWR of less than 1.4 to the tube at the operating frequency.

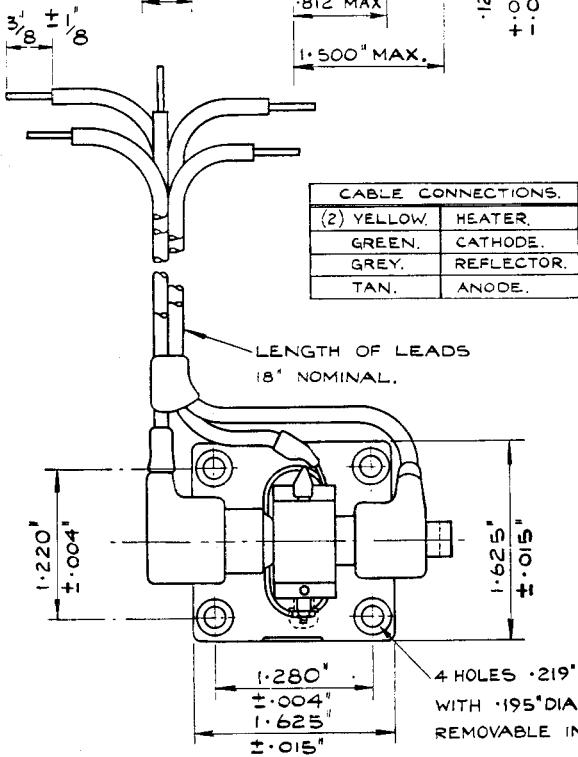
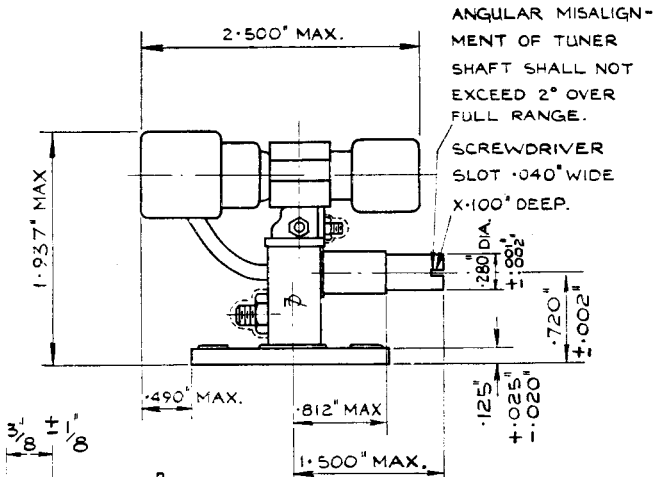
†The R.F. noise is the sum of the R.F. noise power in two channels 40 Mc/s. above and below the frequency of oscillation, compared to normal noise at 290°K. in the same channels. The noise standard used in these measurements is a CV1881 discharge tube. The noise power is expressed as Watts per Mc/s. of I.F. band width per milliwatt of R.F. output power.

‡Resetting accuracy defines the frequency deviation which can result from turning the tuner screw through approximately half a turn in either direction, then returning it to its original position.

§The frequency deviation, caused by side thrust due to the application a 1/2lb. weight to the top of the tuner spindle in each of two mutually perpendicular axes both of which are perpendicular to the spindle axis.

¶The frequency deviation measured when the atmosphere pressure surrounding the valve and inside the set and cavity is increased from 1/10th atmosphere to 1 atmosphere in 1 minute (max.).

\*\*To facilitate insulated mounting the eyelets in the fixing bolt holes are removable

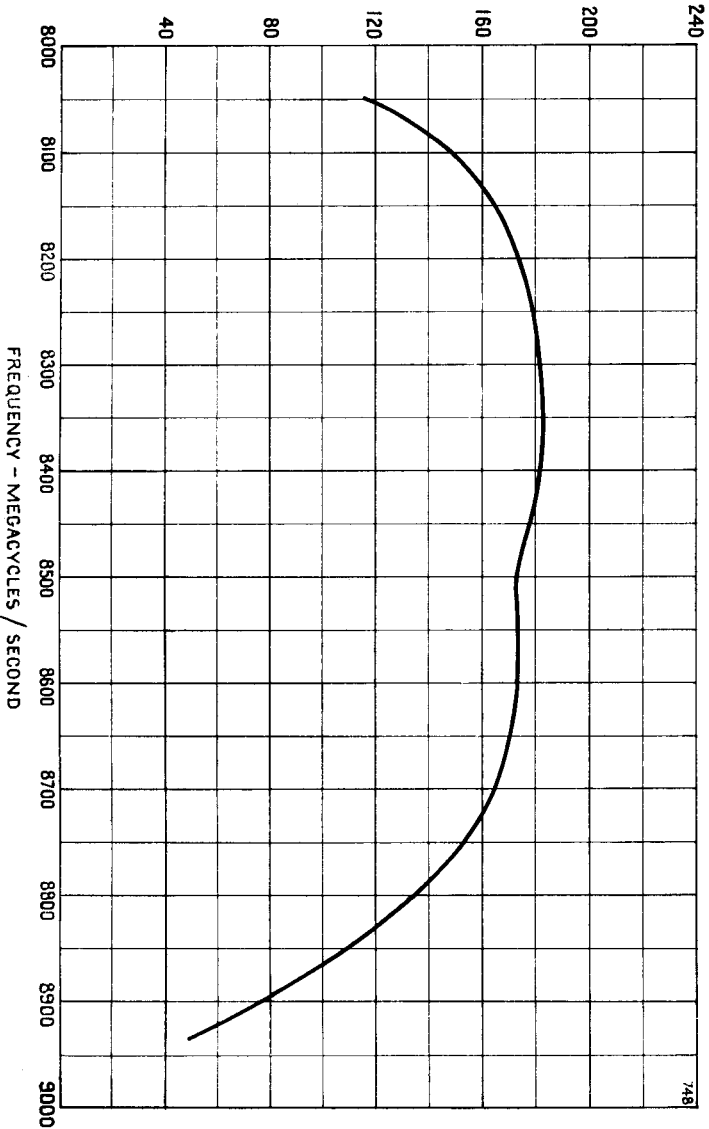


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SZ5IA

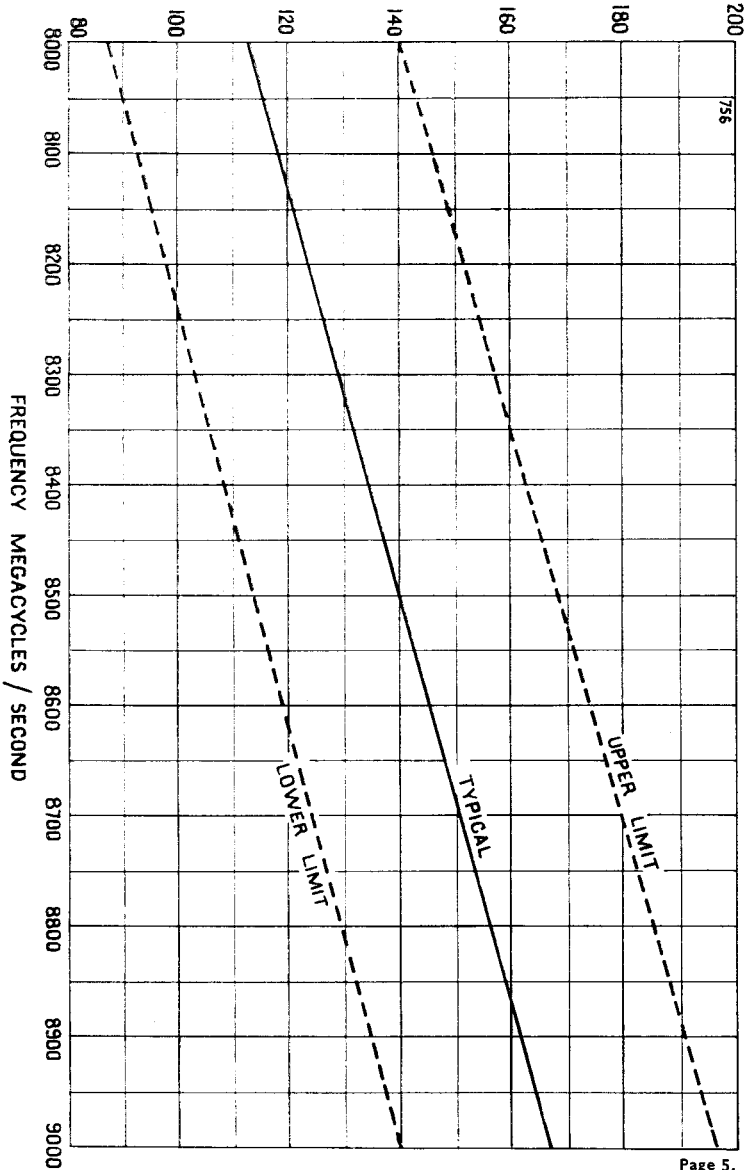
POWER OUTPUT/FREQUENCY CHARACTERISTIC

MATCHED LOAD POWER OUTPUT - MILLIWATTS



748

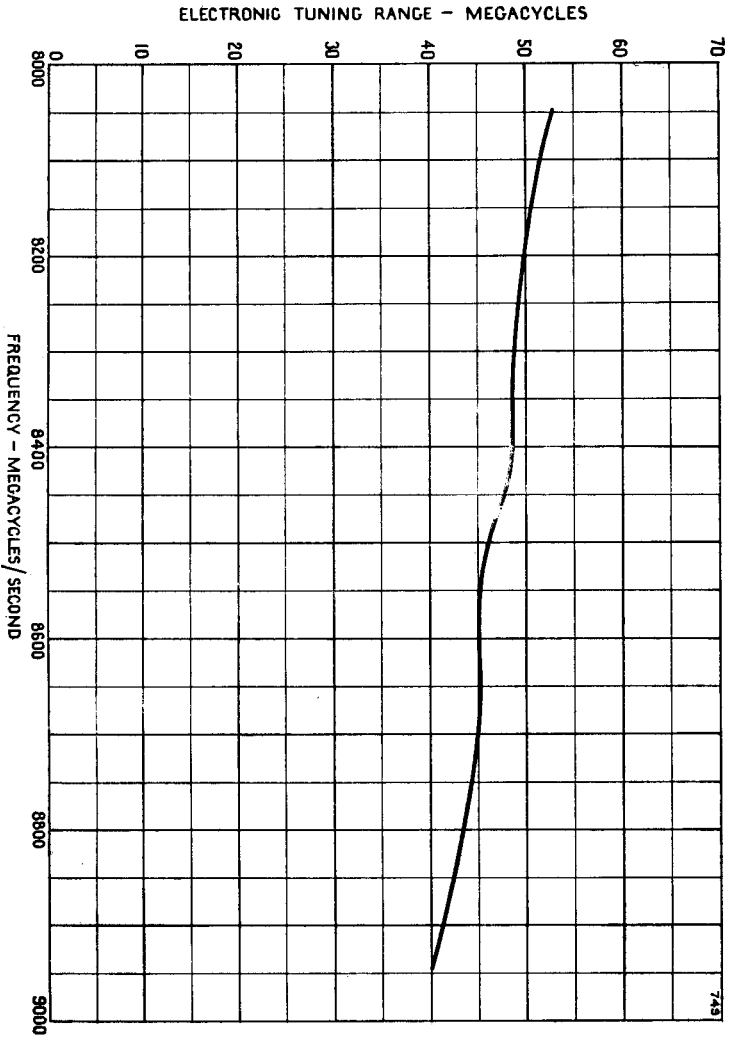
REFLECTOR VOLTS/FREQUENCY CHARACTERISTICS.  
Reflector Voltage at Maximum Power Point.  
REFLECTOR VOLTAGE - VOLTS





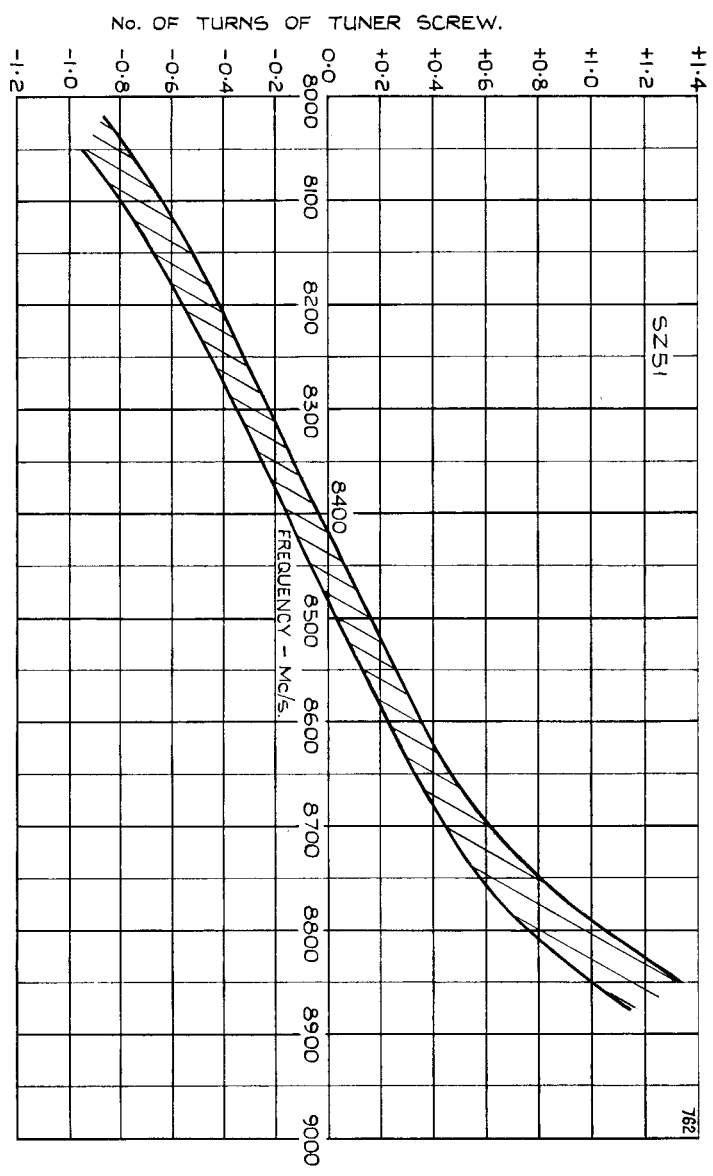
SZ51  
SZ51A

ELECTRONIC TUNING RANGE



**TUNER SCREW SETTING.**

(The tuner screw setting for any frequency should lie within the area enclosed by the two lines.)



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