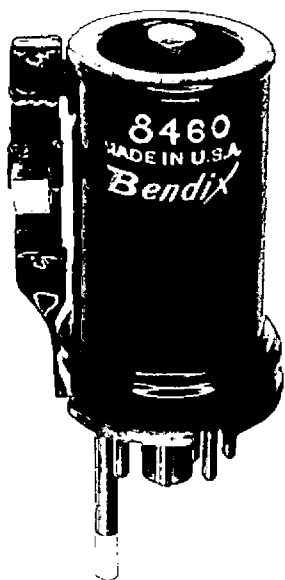


REFLEX KLYSTRON

(MECHANICALLY TUNED)

DESCRIPTION



The 8460 (Bendix Type TK-106) is a ruggedized, low voltage, mechanically tuned, X-band reflex klystron oscillator designed for use in pulse or CW applications over the frequency range of 8.5 to 9.66 Gc/sec.

Although different in design and physical appearance, the 8460 is an exact electrical and mechanical retrofit for the 2K25 and in addition to its pulse capabilities, has equivalent or superior performance in all CW operating characteristics. It may be used interchangeably in existing 2K25 sockets with no equipment modification.

Of particular interest is the mechanical tuner design. As with the 2K25, tuning is accomplished by rotation of the drive nut located in the center of the tuner bows. However, unlike the 2K25, this motion is transmitted to the resonant cavity through a highly flexible diaphragm in the wall of the vacuum envelope, and there is no overstressing of the structure. Mechanical stops at both extremes of the tuning range prevent accidental damage to the structure by exceeding the mechanical tuning range. This design approach results in greatly extended tuning life (Specified tuner life 10,000 cycles minimum), ability to operate in applications requiring repetitive tuning, low temperature coefficient, reduced frequency variation with changes in ambient pressure, and minimal mechanical tuning hysteresis (repeatability of frequency vs. tuner setting).

The coaxial output of the tube is coupled into a standard 1" x 1/2" waveguide through a transducer, or launching section, such as that defined by Military Drawing 227-JAN or equivalent. The use of teflon as the coaxial insulator eliminates insulator breakage and removes the limitation on maximum coaxial line ambient temperature when using polystyrene.

A detailed description of the 8460 design features is available in Bendix Engineering Data Release Issue 44, File No. M-9, which describes the similar CW Bendix type TK-99/8294.

APPLICATION NOTES

Cooling: Convection cooling is normally sufficient. If the tube is to be operated in a small enclosure, care should be taken to insure adequate ventilation to prevent excessive bulb temperature that will decrease the normal life of the tube.

Output Load: The tube has been designed for operation into a matched load. When operation into a reactive load is necessary, adequate attenuation should be inserted between the load and the tube to limit the SWR at the tube and thus prevent impairment of performance.

Repeller Modes: The tube is designed for optimum operation in the repeller voltage mode defined in this data sheet, however, other modes exist at other repeller voltages and these may be used when desired. In design of AFC circuits these other modes must be considered to assure lock-in on the desired mode.

Safety Precautions: (1) Repeller voltage must always be negative, relative to the cathode. (2) Bulb should be at ground potential whenever the application permits. (3) Resonator voltage should not be applied without repeller voltage.

MAXIMUM RATINGS (ABSOLUTE VALUES)

Resonator Voltage	350 Vdc
Reflector Voltage	—350 Vdc
Filament Voltage	6.3V $\pm$ 8%
Cathode Current	37 ma D.C.
Heater-Cathode Voltage	100 Vdc

PHYSICAL CHARACTERISTICS

Dimensions:	Refer to outline drawing
Base:	Fits standard octal socket with #4 pin enlarged to 3/16"
Coupling to Waveguide:	Coaxial output fits standard 227-JAN tube mount or equivalent
Cooling:	Convection
Mounting Position:	Any
Cavity:	Integral
Bulb:	Metal

THE Bendix CORPORATION
Red Bank Division, EATONTOWN, NEW JERSEY

ELECTRICAL CHARACTERISTICS & TEST CONDITIONS

Test Conditions and Specification Limits

TEST PRODUCTION TESTS:	CONDITIONS	SYMBOL	LIMITS		UNITS
			MIN.	MAX.	
Cathode Current		I_k	—	32	mAdc
Change in Cathode Current	$E_f=6.3$ to $5.8V$; $t=120$;	$\Delta I_k/I_k$	—	15	%
Power Output	$E_r/\text{Max } P_o$; $F=8500$ to 9660 Mc	P_o	20	—	mW
Reflector Voltage (1):	Mode A; $F=9660 \pm 0.3\% \text{ Mc}$	E_r	—143	—200	Vdc
Total Reflector Current	$E_r= -150 \text{ Vdc}$	I_r	—	7.0	$\mu \text{ Adc}$
Reflector Lkg. Current:	$E_r= -150 \text{ Vdc}$	I_r	—	5.0	$\mu \text{ Adc}$
Reflector Gas Current:	$E_r= -150 \text{ Vdc}$	I_r	—	2.0	$\mu \text{ Adc}$
Dimensions:	See Outline Drawing				
DESIGN TESTS:					
Heater Cathode Lkg.	$E_{hk}= \pm 45 \text{ Vdc}$	I_{hk} :	—	100	$\mu \text{ Adc}$
Heater Current	$E_f= 6.3 \text{ V.}$	I_f	410	470	mA
Insulation of Electrodes:	300 Vdc; Tube Cold	R_{krs} :	2.0	—	Megs
		R_{hrs} :	2.0	—	Megs
Bump	$E_r/\text{Max } P_o$	$\Delta P_o/P_o$	—	± 10	%
Electronic Tuning:	$E_r/\pm 50\% \text{ Max } P_o$; $F=9370 \text{ Mc} \pm 0.3\%$	ΔF	35	—	Mc
Hysteresis: (1)	$E_r/\text{Max } P_o$	Ratio		.25	
PULSED OPERATION:					
Output Pulse Duration	$E_r/\text{Max } P_o$; $F=8900 \pm .03\% \text{ Mc}$ Input $t_p=.27 \mu \text{ sec}$; $prr=2000$; $e_o=30 \text{ mv}$	t_p	.22	—	$\mu \text{ sec}$
Output Pulse Delay	$E_r/\text{Max } P_o$; $F=8900 \pm .03\% \text{ Mc}$ Input $t_p=.27 \mu \text{ sec}$; $prr=2000$; $e_o=30 \text{ mv}$	t_d	—	.07	$\mu \text{ sec}$
QUALIFICATION APPROVAL TESTS:					
Tuner Mechanical Fatigue	$F=8500-9660-8500 \text{ Mc}$		10,000	—	Cycles

#1 LUBRICATE TUNING SCREW
WITH ONE DAB OF ANY OTHER
EQUALLY NON-CORROSIVE
LUBRICANT. TUNING SCREW
SHALL OPERATE SMOOTHLY
THROUGH ENTIRE RANGE
WITHOUT BINDING.

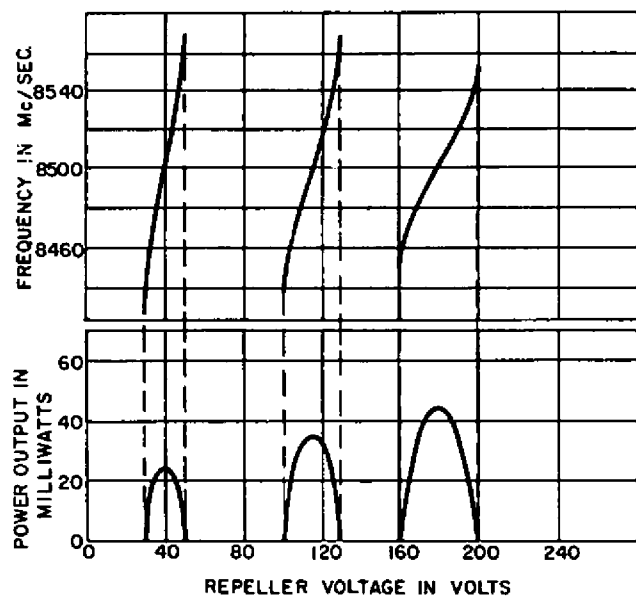
#2 THE BASE SHALL BE CAPABLE
OF BEING INSERTED INTO A
GRAB AS SHOWN BELOW:



AVERAGE CHARACTERISTICS

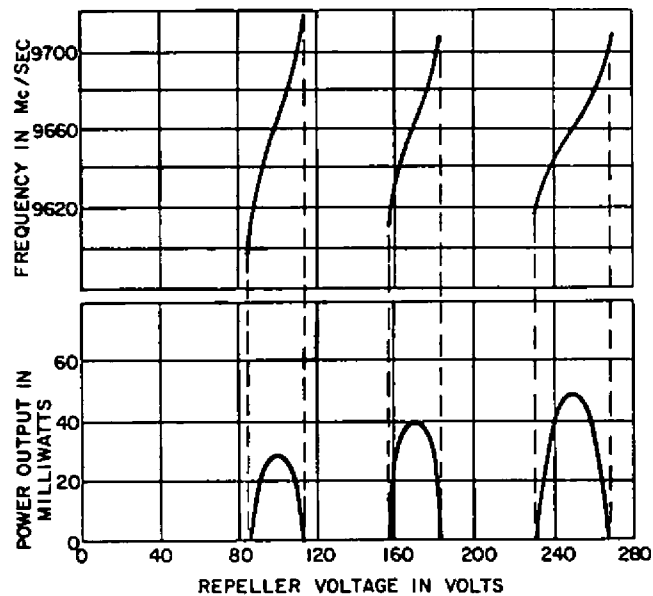
POWER OUTPUT AND FREQUENCY
VS REPELLER VOLTAGE

8460

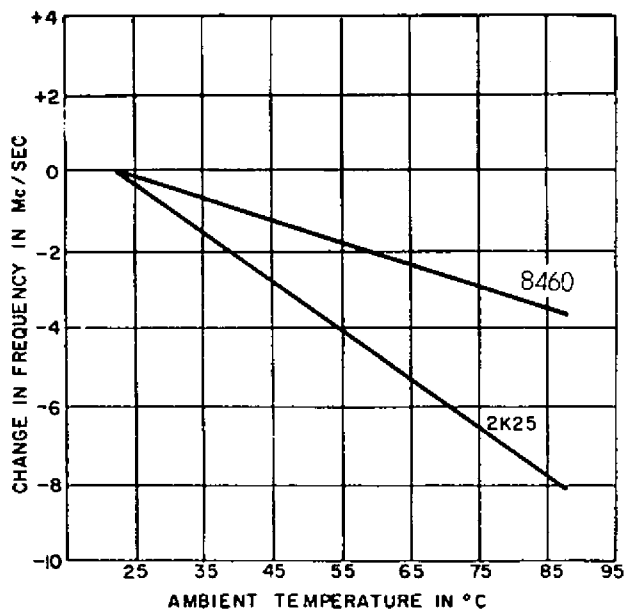


POWER OUTPUT AND FREQUENCY
VS REPELLER VOLTAGE

8460



COMPARATIVE
FREQUENCY CHANGE
VS AMBIENT TEMPERATURE
(MEASUREMENT MADE AT 9370 Mc/SEC)



COMPARATIVE
FREQUENCY CHANGE
VS AMBIENT PRESSURE

