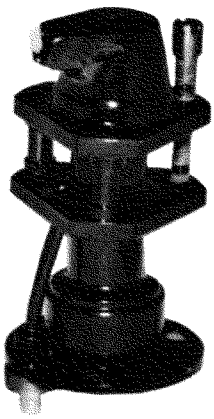
EITEL-McCULLOUGH, INC.
SAN BRUNO, CALIFORNIA

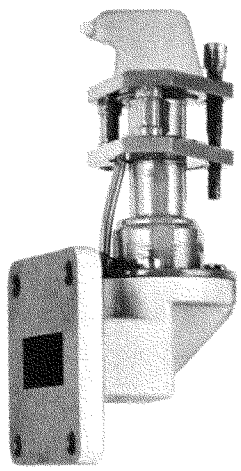
1K015XA AND 1K015XG KLYSTRONS • X-BAND OSCILLATORS

The EIMAC 1K015XA and 1K015XG are ruggedized, integral-cavity, X-band, reflex klystrons intended for local oscillator service under conditions of severe shock, vibration or sustained acceleration.

The 1K015X type tubes are available with either coaxial output or waveguide output. The r-f terminal of the 1K015XA is a coaxial connector. For waveguide output, the r-f terminal of the 1K015XG is the Eimac transition section.



1K015XA
(Coaxial Output)



1K015XG
(Waveguide Output)

GENERAL CHARACTERISTICS

ELECTRICAL

Cathode: Coated Unipotential

Heater Voltage	6.3	volts
Heater Current	0.80	amperes
▶ Frequency Range - - - (8400 thru 9600 Mc)	900	Mc

(See paragraph: Mechanical Tuning in Application)

MECHANICAL

High Impact Shock*	100	g
Axial Vibration Test (20-2000 cycles)*	10	g

Mounting (See Outline Drawing):
- 1K015XA: Three-hole flange and coaxial r-f terminal
- or
- 1K015XG: In conjunction with an Eimac transition section mounts directly on a UG-39/U waveguide flange

Connections:

Heater	White wire at base
Heater and Cathode	Black wire at base
Resonator	Shell of tube
Repeller	White wire at top

Output (See Outline Drawings): 1K015XA: Coaxial fitting, 1K015XG: UG-39/U waveguide flange

*The shock and vibration tests are applicable to both coaxial and waveguide outputs.

▶ Indicates change from sheet dated 7-22-54

Mounting Position		Any
Cooling		Convection and Radiation
Maximum Over-all Dimensions:	Coaxial Output	Waveguide Output
Length	2-3/8 inches	3-9/16 inches
Diameter	1-3/16 inches	———
Width	———	1-15/32 inches
▶ Net Weight	1.5 ounces	3.2 ounces
Shipping Weight	4 ounces	8 ounces

MAXIMUM RATINGS

D-C RESONATOR VOLTAGE	350 MAX. VOLTS
RESONATOR DISSIPATION	15 MAX. WATTS
D-C CATHODE CURRENT	50 MAX. MA
D-C REPELLER VOLTAGE	
Positive Limit	0 MAX. VOLTS
Negative Limit	500 MAX. VOLTS

TYPICAL OPERATION (With flat load)

Mode	6¾	7¾	5¾	6¾	
D-C Resonator Voltage	250	250	300	300	volts
D-C Cathode Current	36	36	47	47	mA
D-C Repeller Voltage	-110	-65	-170	-95	volts
Power Output	45	30	100	65	mW
Frequency	9000	9000	9000	9000	Mc/s
Electronic Tuning Range	40	55	40	60	Mc/s

APPLICATION

Mounting—The 1K015XA is provided with a three-hole base flange for solid mounting directly to the equipment chassis, to an insulating support or to the Eimac transition section to make the 1K015XG. No socket or tube clamp is necessary.

Cooling—No special provisions are ordinarily required for the cooling of the 1K015XA or 1K015XG. The resonator will dissipate 15 watts of power by radiation and convection in ambient temperatures up to 100°C.

Resonator—The resonator of the 1K015XA and 1K015XG is integral with the shell of the tube. For this reason it is often convenient to operate the resonator at chassis potential, with the repeller and cathode at appropriate negative potentials. The coaxial output connection also lends itself to d-c isolation of the resonator from chassis potential. All voltages given in the list of Maximum Ratings and in the Typical Operation data are measured with respect to the cathode of the tube.

Cathode—Heater voltage should be at the rated value of 6.3 volts. Variations should be kept within the range of 5.7 to 6.9 volts. The cathode is internally connected to one side of the heater. If the resonator is operated at chassis potential, the heater transformer must be insulated for the cathode-to-resonator potential.

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Repeller—There will be an optimum repeller voltage for any given output frequency, and the range of electronic tuning or frequency modulation under control of the repeller voltage will vary with output frequency and choice of repeller mode. These relations are shown for a typical tube in the accompanying curves.

Repeller voltages must be negative with respect to the cathode at all times.

Mechanical Tuning—Mechanical tuning is accomplished by a single screw with a differential thread. The tuning rate is approximately 100 Mc. per turn. The particular range desired should be specified. Standard tuning range adjustment, unless otherwise specified, will be for 8600 to 9400 Mc.

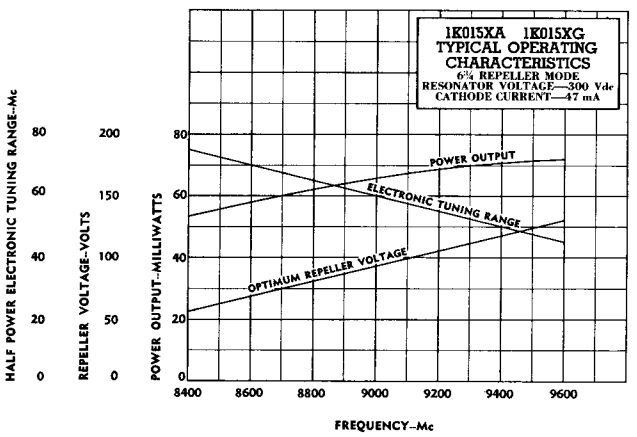
Output—Curves illustrating the variation of power output with operating frequency for a typical tube are shown below. These curves assume a flat load and optimum repeller voltages at all frequencies. With a VSWR mismatch of 2 to 1, the power output will not fall below one-half the indicated power.

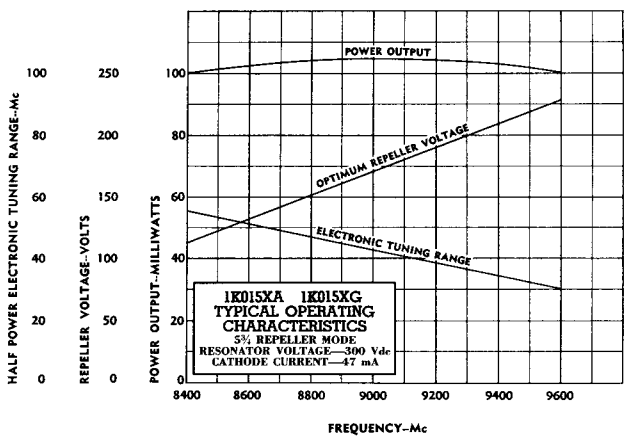
Frequency Stability—Under axial vibration of 10g maximum acceleration, the spectrum width is less than 1.0 Mc. The frequency modulation response to vibration along other axes of the tube is approximately one-half that for the axial direction.

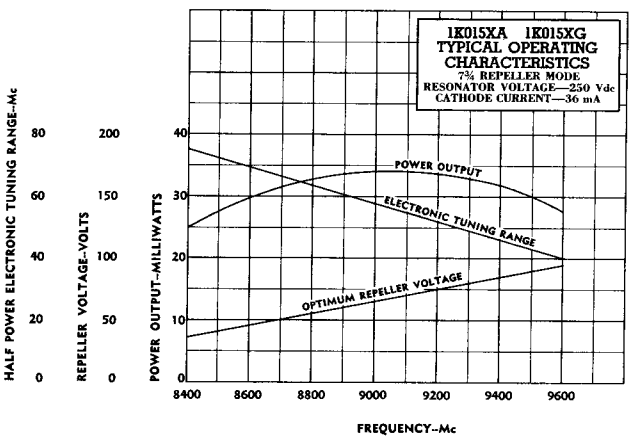
Frequency variations within the range of normal operating temperatures do not exceed ±0.1 Mc/°C.

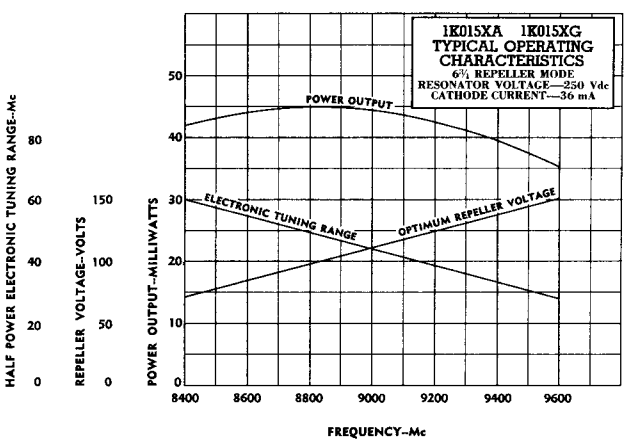
Starting Time—The 1K015XA and 1K015XG will be within ±10 Mc of operating frequency in less than one minute after applying voltages.

TYPICAL OPERATING CHARACTERISTICS 1K015XA AND 1K015XG









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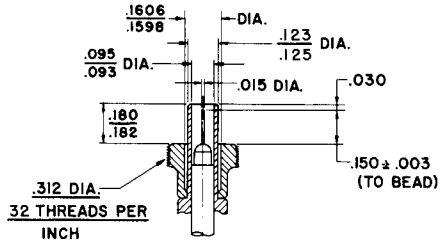
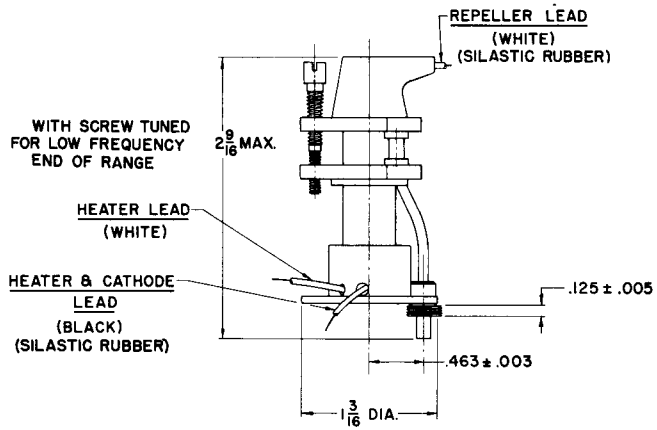
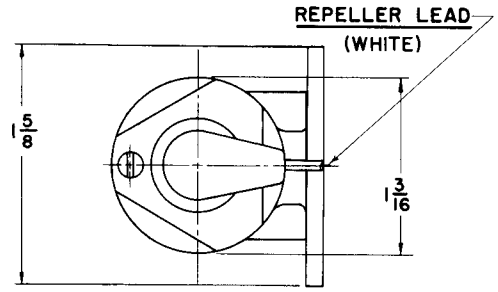


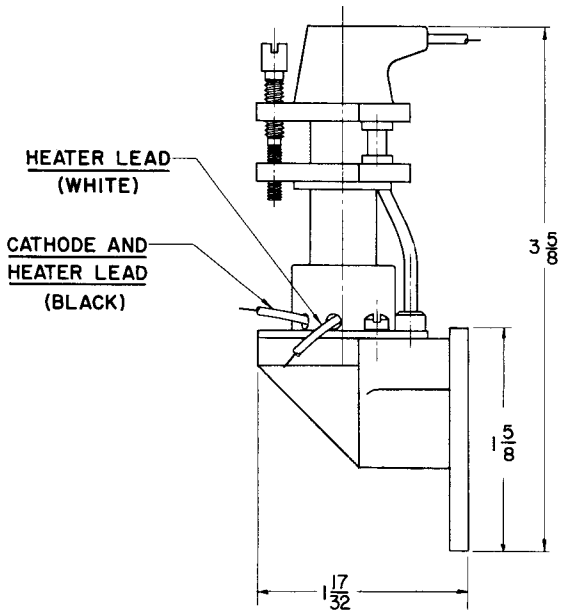
CONNECTOR DETAIL



BOTTOM VIEW

IKO15XA (COAXIAL OUTPUT)





IKO15XG (WAVEGUIDE OUTPUT)

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