EITEL-McCULLOUGH, INC.
SAN CARLOS, CALIFORNIA

EM-1086

L-BAND PACKAGED VOLTAGE TUNABLE MAGNETRON

The Eimac EM-1086 is a ruggedized, ceramic and metal packaged voltage-tunable magnetron capable of delivering a minimum output power of 15 watts into a 50 ohm termination over the frequency range of 940-1060 megacycles.

Eimac's three terminal VTM circuit has been used in this tube to give a more uniform output circuit with the added advantage of one-third more heat dissipating area extending out of the VTM envelope.

The electron injection design incorporated in this magnetron minimizes back-bombardment of the indirectly heated EMA cathode with resultant long life. This design also reduced output power variation across the tuning range by limiting the cathode current variation resulting from anode voltage changes.

The linear tuning characteristics of this magnetron simplifies programming the frequency sweep, by eliminating the complicated compensating networks required by other voltage tunable oscillators.

The EM-1086 Circuit Assembly has been designed for use with this tube to cover the specified frequency range and includes the permanent magnet and rf circuitry. Electrical connections to the tube are completed by means of flexible leads.

GENERAL CHARACTERISTICS

ELECTRICAL

Cathode:	Unipotential, EMA	
	Warm-up Time	30 seconds
Heater:	Voltage (AC or DC)	6.3 volts
	Current	1.0 ampere
Minimum Output Power		15 watts
Frequency Range		940 to 1060 megacycles

MECHANICAL

Operating Position	any
Cooling	see note
Electrical Connections	flexible leads
RF Output Coupling	TNC male (6" flexible Rf connector)
Net Weight, including magnet and circuit	3.5 pounds
Shipping Weight	10 pounds
Maximum Overall Dimensions (Magnet and Circuit):	
Height	3 inches
Width	1.575 inches
Length	4.556 inches

MAXIMUM RATINGS

Anode Voltage*	2500 volts
Cathode Current	35 milliamperes
Injection Anode Voltage*	750 volts
Injection Anode Current	1 milliampere

TYPICAL OPERATION (EM-1086 Circuit Assembly, Load VSWR=1.15:1)

Frequency Range	940-1060	megacycles
Anode Voltage* (Note 1)	1840-2075	volts
Cathode Current	21 - 25	milliamperes
Typical Power Output	16 - 16	watts
Anode FM Sensitivity	.50	Mc/volt
Injection Anode Voltage	500	volts
Injection Anode Current	.02	milliamperes
Heater Voltage (AC)	6.3	volts
Heater Current (AC)	0.8	amperes

*All voltages referred to the cathode.

Note 1. The operating frequency is determined by the Anode Voltage.

APPLICATION

Cooling: To insure normal operation over prolonged periods, sufficient cooling is required so that the EM-1086 magnet temperature does not exceed 70°C.

Anode: The operating frequency is determined by the anode voltage. The anode is mounted in direct electrical contact with the external circuit. Therefore, it is often convenient to operate the anode at chassis potential with the cathode and injection anode at appropriate negative potentials.

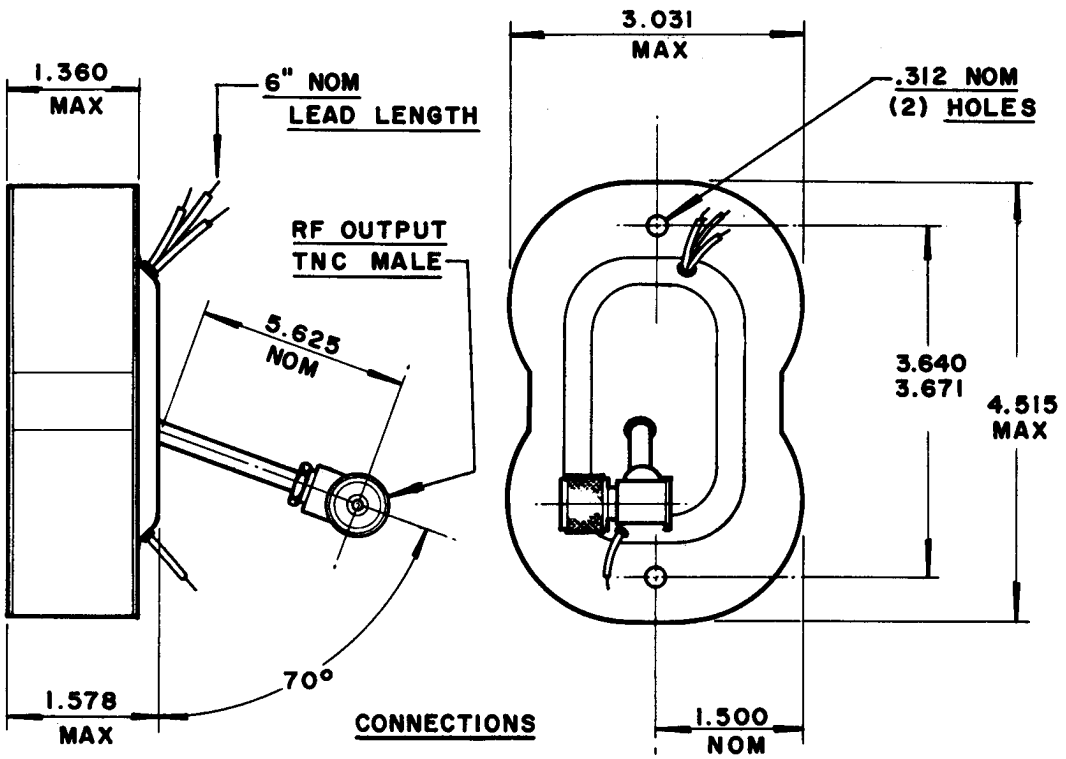
Cathode: The cathode and one leg of the heater are internally connected. Therefore, the heater supply must be insulated for the maximum tuning voltage.

The heater voltage should be maintained within ±5% of the rated value of 6.3 volts if variations in performance are to be minimized and the best tube life obtained. Either alternating or direct current may be used to energize the EM-1086 heater in most applications as a result of the advanced counterwound helical heater package. In applications where residual FM at the power supply frequency must be held to an absolute minimum, it is recommended that direct current be used for the heater.

Proximity of Ferrous Materials: To minimize variations in performance, ferrous materials should be kept at least 6 inches from the magnetron package. Modulation of the tube may be produced by rotating ferrous materials and such parts as fans, shafts and couplings should be placed as far from the magnetron package as possible. Transformers and chokes should not be placed in such close proximity to the tube that their stray magnetic fields will interfere with the magnetron operation.

Temperature Stability: The permanent magnet for the EM-1086 has been temperature stabilized to minimize frequency changes caused by variations in the ambient temperature. The temperature/frequency coefficient for the EM-1086 package is typically .02% of the operating frequency per degree Centigrade. Thus, for an operating frequency of 1,000 megacycles, the temperature/frequency coefficient is typically 200 kilocycles per degree Centigrade. A positive change in temperature will always produce a positive change in frequency.

Special Applications: For any additional information concerning this tube or its application, write to Microwave Product Manager, Eitel-McCullough, Inc., San Carlos, California, telephone LYtell 1-1451.
Cable: EIMAC.



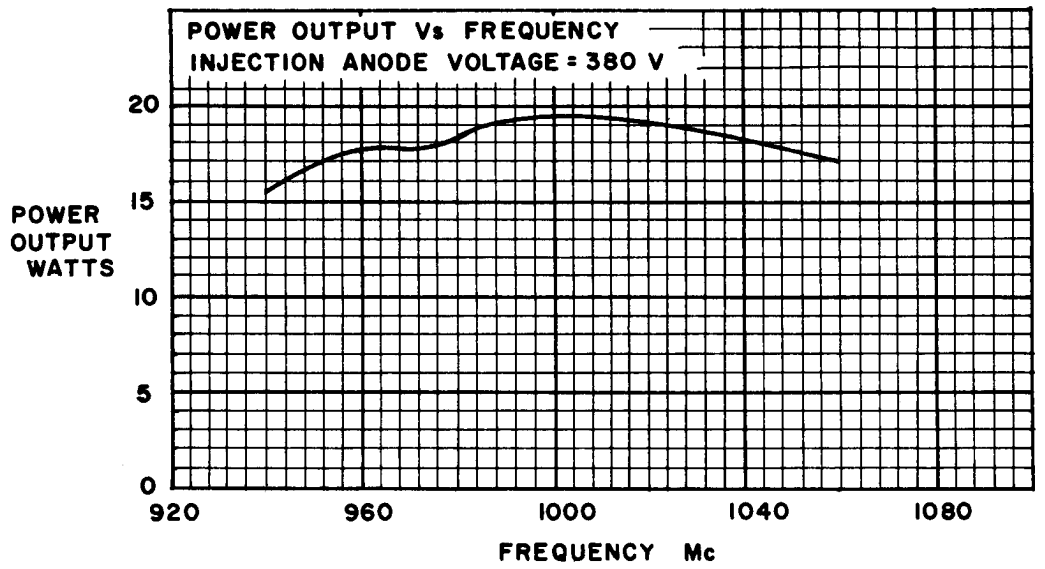
CONNECTIONS

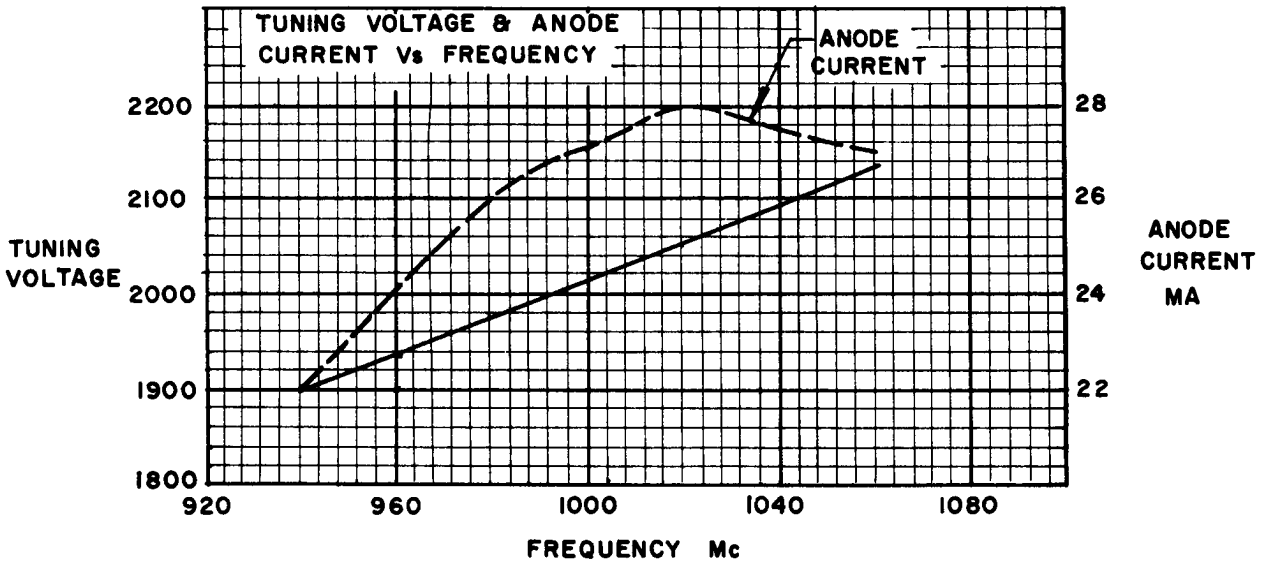
GROUND - BLACK

HEATER — BLUE

HEATER CATHODE — RED

INJECTION ANODE — WHITE


POWER OUTPUT Vs FREQUENCY
INJECTION ANODE VOLTAGE = 380 V
POWER OUTPUT WATTS
20
15
10
5
0
920
960
1000
1040
1080
FREQUENCY Mc


TUNING VOLTAGE & ANODE CURRENT Vs FREQUENCY
ANODE CURRENT
TUNING VOLTAGE
2200
2100
2000
1900
1800
28
26
24
22
ANODE CURRENT MA
920
960
1000
1040
1080
FREQUENCY Mc