engineering DATA

VACUUM TUBE DEPARTMENT

F-6996

GENERAL DESCRIPTION

The F-6996 is a 10 watt CW traveling wave amplifier tube having 30 db gain and 8000 to 9600 mc frequency range. It is constructed in a rugged metal envelope with a helix type slow wave structure. The integral matching circuit is in 50 ohm coaxial line and is provided with type "N" connectors (waveguide fittings can be supplied). The tube is self aligning in the external solenoid which is required to provide a uniform magnetic field. A convergent beam gun and oxide impregnated cathode are used. The tube is suitable for either CW or pulse service.

ELECTRICAL RATINGS, ABSOLUTE VALUES

Heater Voltage	6.3 (±10%) volts
Heater Current	2.3 amperes
Maximum Anode Voltage (Note 1)	3400 volts
Maximum Shell Current (Note 2)	3 ma
Maximum Collector Voltage (Note 3)	3500 volts
Maximum Collector Dissipation (Note 4)	200 watts
Maximum Control Electrode Voltage (Note 5)	-250 volts

ELECTRICAL INFORMATION

Maximum Frequency	9600 mc
Minimum Frequency	8000 mc
Minimum Cold Transmission Loss	50 db
Capacitance	
Control Electrode to All Other Elements	10 μμfd
All Gun Elements to Shell	4.8 μμfd

MECHANICAL INFORMATION

Type of Cathode	Oxide Impregnated Unipotential
Base, Small Shell Duodecal, 5 Pin, JETEC Designation	B5-57
Type of Envelope	Metal
Magnetic Field Strength (Nominal)	1300 gauss
Length of Magnetic Field	6.75 inches uniform
Mounting Position	Any
Weight (not including Magnet)	1 pound, 7 ounces
R-F Input and Output Impedance and Type Conductor	50 ohm coax with Type N Jack UG-23B/U

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Federal Telephone and Radio Company

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MECHANICAL INFORMATION (continued)

Type of Cooling	Forced Air
Glass Temperature	160°C max.
Cooling Air Required (Note 4)	70 cfm

TYPICAL OPERATION AS POWER AMPLIFIER

Anode Voltage	3200 volts
Shell Current	1 ma
Collector Voltage	3300 volts
Collector Current	50 ma
Control Electrode Voltage	-15 volts
Power Output	10 watts nominal
Gain	30 db nominal
Duty Cycle	
R-F	Variable to 1.0
Beam	1.0

Note 1: All voltages shown are with respect to cathode. Anode and helix are connected internally to the shell. The shell is normally operated at approximate ground potential and the d-c connection is made to the shell of the solenoid.

Note 2: The shell current is the difference between the cathode current and collector current. Since this current, in general, should be minimized, it is desirable to measure the current from shell to ground. It is recommended that overload protection be provided to remove high voltage if the shell current exceeds 3 ma.

Note 3: It is generally desirable to operate the collector at 50 to 100 volts positive with respect to shell, and potential difference between collector and shell should be limited to 300 volts maximum.

Note 4: Forced air cooling of collector is required for average collector power in excess of 10 watts. As the collector power is increased, the air flow required increases. At the maximum collector power of 200 watts, a minimum air flow of 70 cfm through the cooling fins is required.

Note 5: The control electrode voltage is adjusted for maximum beam transmission (collector current/cathode current).

Operating Procedure:

(1) Insert tube in solenoid, secure in place with stops provided, make connections.

(2) Turn on cooling air, solenoid voltage (adjust to approximately 1300 gauss), heater voltage, collector voltage (if used), control electrode voltage (approximately -20 volts).

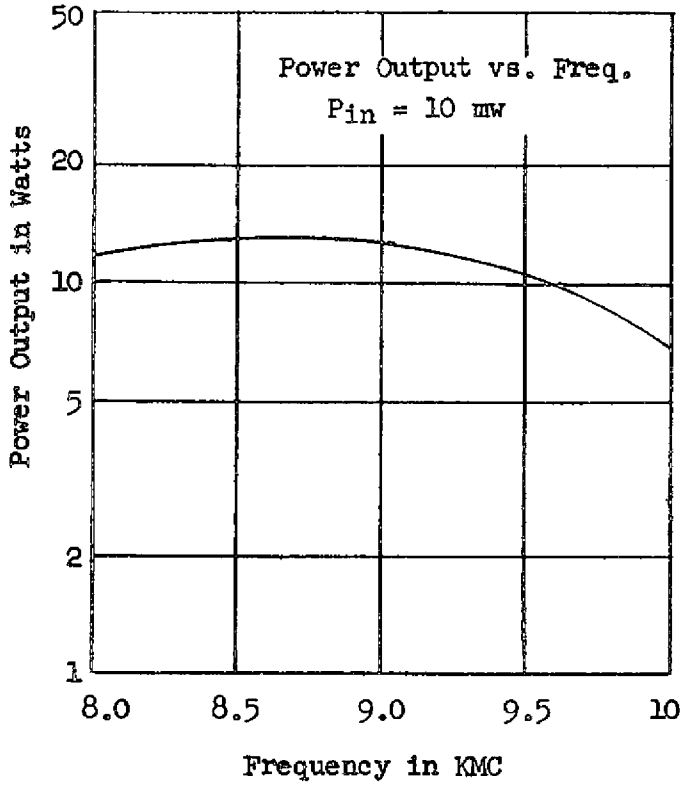
(3) Raise high voltage to desired value, adjusting solenoid voltage and control electrode voltage for maximum collector current, and observing care not to exceed 3 ma shell current. It may be necessary to rotate the tube in the solenoid to the point giving best transmission.

(4) The above procedure is not required after initial set up; however, heater voltage should be applied one minute before applying high voltage, and proper magnetic field and control electrode voltage must be applied before applying high voltage. Observance of the 3 ma maximum limit on shell current is essential to prevent tube damage.

Standard solenoids to operate this tube are available, and solenoids designed for particular applications can be supplied.

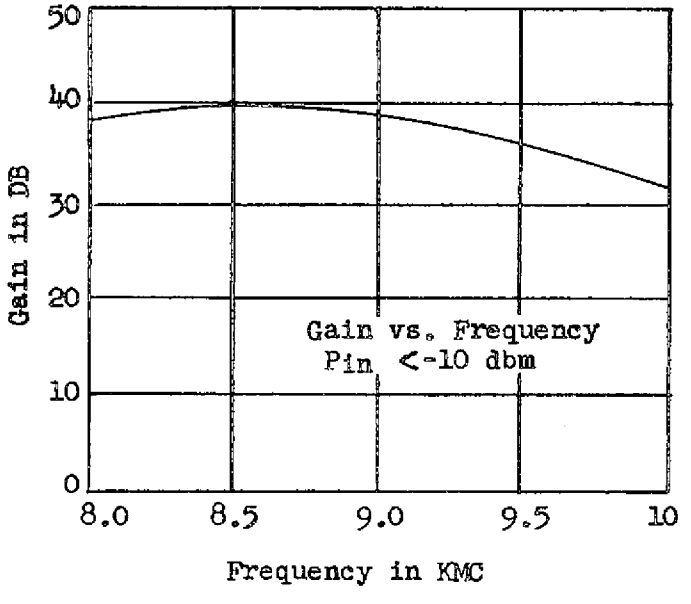
Additional information for specific applications can be obtained from the Vacuum Tube Engineering Department.

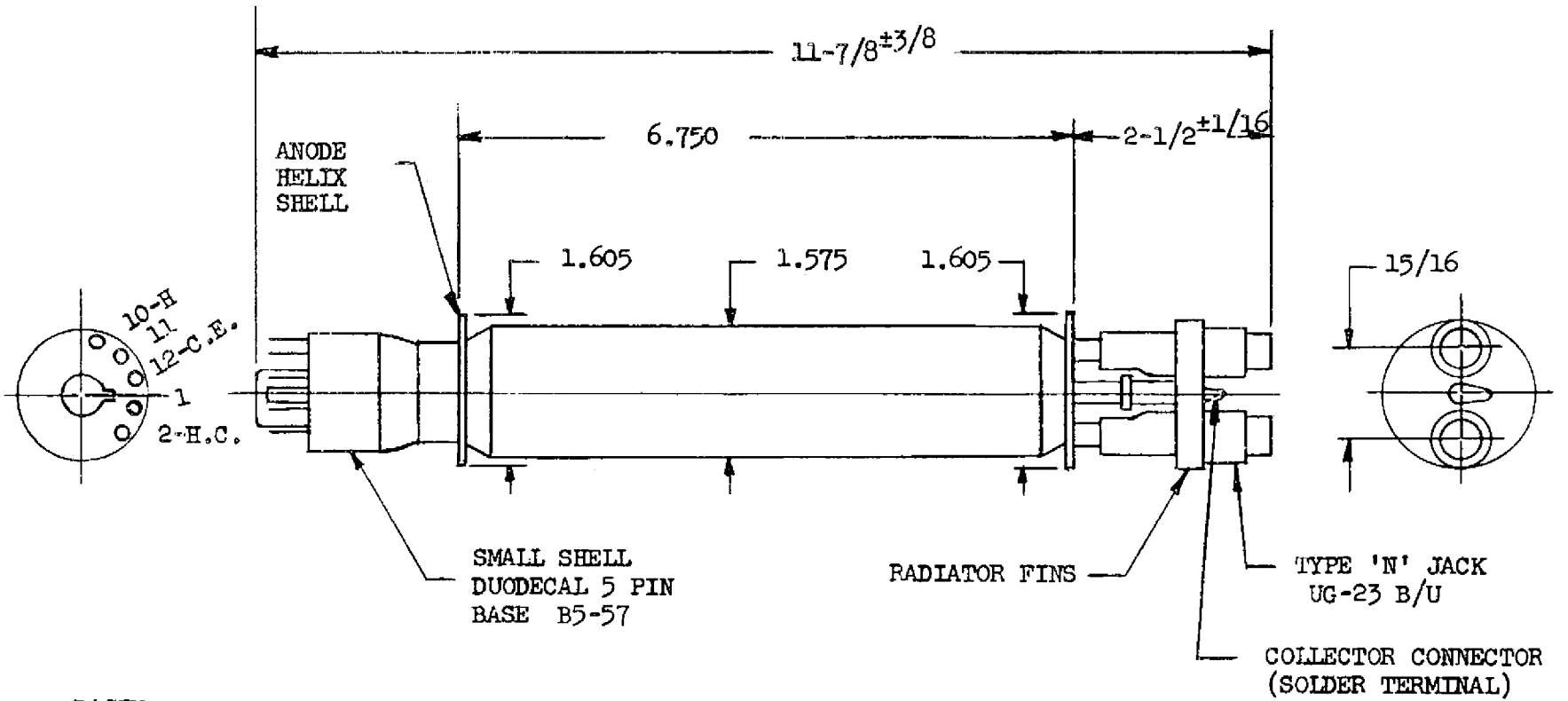
TYPICAL CHARACTERISTICS F-6996



Magnetic field and control electrode voltage set for best transmission.

Voltage set at approximately 3200 volts.





BASING

PIN	ELEMENT
1	NO CONN.
2	HEATER-CATHODE
10	HEATER
11	NO CONN.
12	CONTROL ELECTRODE

TRAVELING WAVE TUBE TYPES F-6658, F-6868, and F-6996