GL-6942

TETRODE

ONE KILOWATT UHF TELEVISION OUTPUT — FORCED-AIR COOLED

UHF TETRODE — METAL AND CERAMIC

GROUNDED-GRID CIRCUITS — INTEGRAL RADIATOR

THORIATED TUNGSTEN CATHODE

DESCRIPTION AND RATING

The GL-6942 is a four-electrode transmitting tube featuring a metal-and-ceramic envelope designed for use as a power amplifier or oscillator in grounded-grid circuits with both grids maintained at radio-frequency ground potential. The output circuit is connected between the anode and the screen grid. The anode is capable of dissipating one and one-half kilowatts. Cooling is accomplished by forced air with the radiator an integral part of the anode. The cathode is indirectly heated thoriated tungsten. Maximum ratings apply up to 900 megacycles.

When used as a Class B grounded-grid broad-band television amplifier this tube has a useful synchronizing peak-power output of one kilowatt at 900 megacycles; in narrow band Class C service the output is one kilowatt of continuous power as an amplifier or oscillator. Because of its ratings, the tube is also well adapted to use in dielectric-heating equipment.

High operating efficiency is assured because of the small size and close spacing of the tube electrodes, the ring-seal construction, and the low-loss factor due to the silver-plated external parts and the ceramic insulators. In addition, the grounded-grid construction eliminates the necessity for neutralization in a properly designed circuit. The small size of the GL-6942 permits compact mounting, and the ring-seal construction allows quick plug-in installation.

TECHNICAL INFORMATION

GENERAL

Electrical	Minimum	Bogey	Maximum	
Heater Voltage*	--	5.7	6.0	Volts
Heater Current at Bogey Voltage	21	23	24	Amperes
Heater Starting Current	--	--	36	Amperes
Heater Cold Resistance	--	0.02	--	Ohms
Cathode Heating Time	1	--	--	Minutes

G E N E R A L E L E C T R I C C O M P A N Y

from JETEC release #1818, Jan. 7, 1957

Electrical (Cont'd)	Minimum	Bogey	Maximum	
Amplification Factor, G_2 to G_1 E_b=475 Volts, I_b=0.250 Ampere	12	17	22	
Peak Cathode Current ≠	--	--	3.0	Amperes
Direct Interelectrode Capacitances				
Cathode - Plate ≠	--	--	0.04	µµf
Input, G_2 tied to G_1	15.5	17.0	18.5	µµf
Output, G_2 tied to G_1 ≠	4.8	5.5	5.8	µµf

Mechanical

Mounting Position - Vertical
Air Flow ≠≠
Through Radiator (See drawing for air duct form)

Plate Dissipation	1.5	Kilowatts
Air Flow	60 Min	Cubic Feet per Minute
Static Pressure	1.5	Inches Water
Heater to Cathode Seals	12 Min	Cubic Feet per Minute
Screen-Grid to Control-Grid Seals	6 Min	Cubic Feet per Minute
Anode to Screen-Grid Ceramic Insulator	6 Min	Cubic Feet per Minute
Incoming Air Temperature	45 Max	C
Radiator Hub Temperature at Fin Adjacent to Anode Seal	180 Max	C
Ceramic Temperature at Any Point	200 Max	C
Net Weight	3.6	Pounds

Forced-air cooling to be applied before and during the application of any voltages. Forced-air cooling must be maintained for one minute after the removal of all voltages.

MAXIMUM RATINGS AND TYPICAL OPERATING CONDITIONS

Radio-Frequency Amplifier - Class B Television Service
Synchronizing-Level Conditions per Tube Unless Otherwise Specified

Maximum Ratings, Absolute Values

DC Plate Voltage	4000 Max	Volts
DC Grid-No. 2 Voltage	600 Max	Volts
DC Plate Current	0.7 Max	Amperes
Plate Input	2.5 Max	Kilowatts
Grid-No. 2 Input	25 Max	Watts
Plate Dissipation	1.5 Max	Kilowatts

Typical Operation - Grounded-Grid Circuit up to 900 Megacycles
Bandwidth 6 Megacycles, measured to 1 db point

DC Plate Voltage	3500	Volts
DC Grid-No. 2 Voltage	500	Volts
DC Grid-No. 1 Voltage	-40	Volts
Peak RF Plate Voltage		
Synchronizing Level	2500	Volts
Pedestal Level	1875	Volts

Peak RF Driving Voltage		
Synchronizing Level	110	Volts
Pedestal Level	70	Volts
DC Plate Current		
Synchronizing Level	0.520	Amperes
Pedestal Level	0.360	Amperes
DC Grid-No. 2, Pedestal Level	0.035	Amperes
DC Grid-No. 1 Current		
Synchronizing Level	0.110	Amperes
Pedestal Level	0.035	Amperes
Driving Power at Tube, approximate		
Synchronizing Level	100	Watts
Pedestal Level	25	Watts
Power Output, approximate		
Synchronizing Level ◊	1000	Watts
Pedestal Level ◊	560	Watts

PLATE-MODULATED RADIO-FREQUENCY POWER AMPLIFIER - CLASS C TELEPHONY

Carrier Conditions with a Maximum Modulation Factor of 1.0

Maximum Ratings, Absolute Values		
DC Plate Voltage	3200 Max	Volts
DC Grid-No. 2 Voltage	600 Max	Volts
DC Grid-No. 1 Voltage	-120 Max	Volts
DC Plate Current	0.35 Max	Amperes
DC Grid-No. 1 Current	0.10 Max	Amperes
Plate Input	1.12 Max	Kilowatts
Grid-No. 2 Input	10 Max	Watts
Plate Dissipation	1200 Max	Watts

Typical Operation, Grounded-Grid Circuit up to 900 Megacycles		
DC Plate Voltage	3000	Volts
DC Grid-No. 2 Voltage	500	Volts
DC Grid-No. 1 Voltage	-100	Volts
Peak RF Plate Voltage	2300	Volts
Peak RF Driving Voltage	137	Volts
DC Plate Current	0.25	Amperes
DC Grid-No. 2 Current	0.01	Amperes
DC Grid-No. 1 Current, approximate	0.047	Amperes
Driving Power, approximate ⊓	38	Watts
Power Output △	565	Watts

RADIO-FREQUENCY POWER AMPLIFIER AND OSCILLATOR - CLASS C TELEGRAPHY

Key-Down Conditions per Tube without Amplitude Modulation ∅

Maximum Ratings, Absolute Values		
DC Plate Voltage	4000 Max	Volts
DC Grid-No. 2 Voltage	600 Max	Volts
DC Grid-No. 1 Voltage	-150 Max	Volts
DC Plate Current	0.7 Max	Amperes
DC Grid-No. 1 Current	0.10 Max	Amperes
Plate Input	2.5 Max	Kilowatts
Grid-No. 2 Input	25 Max	Watts
Plate Dissipation	1.5 Max	Kilowatts

Typical Operation - Grounded-Grid Circuit up to 900 Megacycles

DC Plate Voltage	3800	Volts
DC Grid-No. 2 Voltage	500	Volts
DC Grid-No. 1 Voltage	-120	Volts
Peak RF Plate Voltage, approximate	2750	Volts
Peak RF Grid-No. 1 Voltage	195	Volts
DC Plate Current	0.500	Amperes
DC Grid-No. 2 Current	0.022	Amperes
DC Grid-No. 1 Current, approximate	0.075	Amperes
Driving Power, approximate	150	Watts
Power Output, approximate Δ	1200	Watts

* The cathode of the GL-6942 because of transit-time effects which raise the temperature of the cathode, is subjected to considerable back bombardment in ultra-high-frequency service. The amount of heating due to bombardment is a function of the operating conditions and frequency, and must be compensated for by a reduction of the heater input to prevent overheating of the cathode with resulting short life. For long life, the GL-6942 should be put in operation with rated heater voltage. After the circuit has been adjusted for proper tube operation the heater voltage should be reduced to a value slightly above that at which circuit performance is affected. At a frequency of 900 megacycles and with typical operating conditions the heater voltage can be reduced to approximately 5.3 volts. At lower frequencies, the reduction will be less. Minor circuit readjustment may be necessary after this adjustment.

ƒ Represents maximum useable cathode current (plate current plus current to each grid) for any condition of operation.

ƒƒ Measured with a 6-inch diameter flat metal disk attached to the screen-grid ring. Control grid connected to the screen grid.

ƒƒƒ Output capacitance measured between anode and screen grid. Control grid connected directly to screen grid.

ƒƒƒƒ The volume of cooling air indicated for the various seals is approximate only. Distribution of cooling air will vary with the cavity configuration about the tube. For most satisfactory operation the maximum temperature of any point on the tube shall be below 200 C.

◊ Useful power output including power transferred from driver stage.

π The carrier of the driver modulated 100 percent.

ø Modulation essentially negative may be used if the positive peak of the envelope does not exceed 115 percent of the carrier conditions.

Δ Total anode power output including power transferred from driver stage.

ELECTRONIC COMPONENTS DIVISION
GENERAL ELECTRIC
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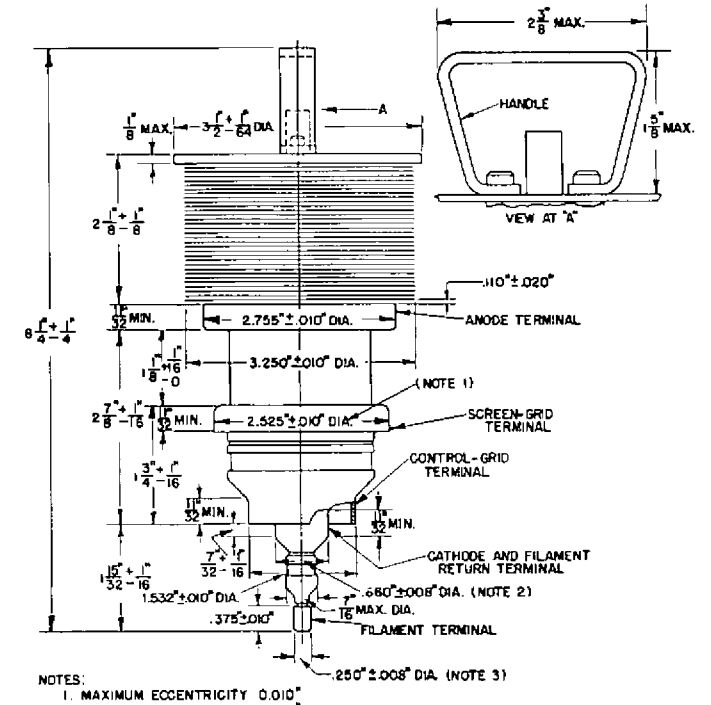
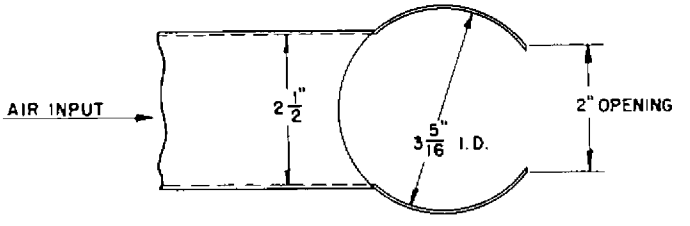
GL-6942

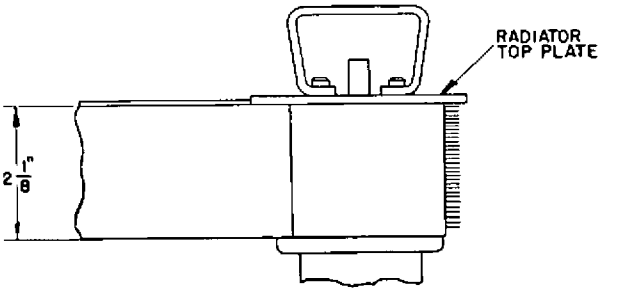


NOTES:
1. MAXIMUM ECCENTRICITY 0.010"
2. MAXIMUM ECCENTRICITY 0.015"
3. MAXIMUM ECCENTRICITY 0.030"
WITH RESPECT TO CENTERLINE DETERMINED BY CENTERS OF ANODE TERMINAL AND CONTROL-GRID TERMINAL.

BLOWER DUCT



TOP VIEW



SIDE VIEW (WITH TUBE IN PLACE)