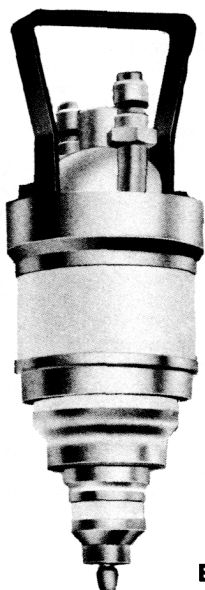


GL-7985 TETRODE

VHF-UHF
RING-SEAL CONSTRUCTION
GROUNDED-GRID CIRCUIT

WATER COOLED
METAL AND CERAMIC
INTEGRAL WATER JACKET



The GL-7985 is a four-electrode transmitting tube featuring a metal-and-ceramic envelope 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 $3\frac{1}{2}$ kilowatts. Cooling is accomplished by water and forced air with the water jacket an integral part of the anode. The cathode is a unipotential thoriated-tungsten cylinder, heated by electron bombardment. Maxi-

imum ratings apply up to 800 megacycles, although higher frequency operation is possible.

In narrow band, Class C, grounded-grid, amplitude-modulated service, the GL-7985 has a useful carrier-power output in excess of one kilowatt. In Class C Telegraphy, it has a useful power output of 3.0 kilowatts of continuous power as an amplifier or oscillator.

As a Class B radio-frequency power amplifier, the tube is capable of delivering 1100 watts of power with 20 watts of drive at carrier level.

	Electrical		
	Minimum	Bogey	Maximum
Cathode			
Heater Voltage.....	—	6.7	7.0 Volts
Heater Current at 7.0 Volts			
Without Cathode Bombarding.....	—	14.5	— Amperes
With 150 Watts Cathode Bombarding.....	—	13.5	— Amperes
Heater Starting Current....	—	—	25 Amperes
Heater Cold Resistance....	—	0.041	— Ohms
Cathode Bombarding			
Power*.....	—	170	195 Watts
Cathode Bombarding Voltage, DC			
For 170 Watts Bombarding Power.....	—	650	— Volts
For 195 Watts Bombarding Power.....	—	700	— Volts
Cathode Heating Time....	1	—	— Minutes
Amplification Factor, G_2 to G_1 , $E_b = 4000$ volts, $I_b = 0.5$ Ampere.....	—	20	—
Peak Cathode Current†.....	—	—	6 Amperes
Direct Interelectrode Capacitances			
Cathode to Plate§.....	—	0.01	— μmf
Input, G_2 tied to G_1	—	27.8	— μmf
Output, G_2 tied to G_1 ¶.....	—	6.4	— μmf

Mechanical	
Mounting Position—Vertical, Anode-end Up	
Net Weight, approximate.....	2.0 Pounds

Thermal	
Type of Cooling—Water and Forced Air	
Water Flow	
Anode.....	3.0 Min Gallons per Minute
Pressure Drop at	
Rated Flow.....	20 Max Pounds per Square Inch
Water Pressure.....	80 Max Pounds per Square Inch
Outlet Water Temperature.....	70 Max C
Air Flow	
Screen-grid to Control-grid	
Seals.....	15 Min Cubic Feet per Minute
Heater-to-Cathode Seals.....	7.5 Min Cubic Feet per Minute
Anode Ceramic.....	10 Min Cubic Feet per Minute
Temperature at Any	
Point.....	200 Max C

Water and forced-air cooling to be applied before and during the application of any voltages. Water cooling may be discontinued with removal of all voltages. Air flow on heater-to-cathode seals must be maintained for one minute after removal of heater voltage.

RADIO-FREQUENCY POWER AMPLIFIER—CLASS B

Carrier Conditions per Tube for use with a Maximum Modulation Factor of 1.0

Maximum Ratings, Absolute Values

DC Plate Voltage.....	7000	Volts
DC Grid-No. 2 Voltage.....	750	Volts
DC Plate Current.....	0.600	Ampere
Plate Input.....	6.0	Kilowatts
Grid-No. 2 Input.....	25	Watts
Plate Dissipation.....	3.5	Kilowatts

Typical Operation

Grounded-grid Circuit, 225–400 Megacycles

DC Plate Voltage.....	7000	Volts
DC Grid-No. 2 Voltage.....	600	Volts
DC Grid-No. 1 Voltage, approximate...	–35	Volts
Peak RF Plate Voltage, approximate...	5500	Volts
Peak RF Grid-No. 1 Voltage, approximate...	105	Volts
DC Plate Current.....	0.475	Ampere
Zero Signal DC Plate Current.....	0.115	Ampere
$E_b = 7000$ volts, $E_{c2} = 600$ volts, E_{c1} adjusted for $I_b = 0.115$ amperes		
DC Grid-No. 2 Current.....	0.010	Ampere
DC Grid-No. 1 Current.....	0.025	Ampere
Driving Power, approximate.....	80	Watts
Measured at crest of audio-frequency cycle with modulation factor of 1.0		
Power Output#.....	1100	Watts
Circuit Efficiency.....	90	Percent
Plate Dissipation.....	2300	Watts
Cathode Bombarding Power*.....	160	Watts
Cathode Bombarding Voltage.....	610	Volts
Cathode Bombarding Current.....	0.260	Ampere

PLATE MODULATED RADIO-FREQUENCY AMPLIFIER—CLASS C TELEPHONY

Carrier Conditions With a Maximum Modulation Factor of 1.0, Screen Modulation Required

Maximum Ratings, Absolute Values

DC Plate Voltage.....	4500	Volts
DC Grid-No. 2 Voltage.....	500	Volts
DC Grid-No. 1 Voltage.....	–120	Volts
DC Plate Current.....	0.80	Ampere
DC Grid-No. 1 Current.....	0.120	Ampere
Plate Input.....	3.60	Kilowatts
Grid-No. 2 Input.....	25	Watts
Plate Dissipation.....	3.5	Kilowatts

Typical Operation

Grounded-grid Circuit at 400 Megacycles

DC Plate Voltage.....	4000	Volts
DC Grid-No. 2 Voltage.....	400	Volts
DC Grid-No. 1 Voltage.....	–100	Volts
Peak RF Plate Voltage.....	2500	Volts
Peak RF Driving Voltage.....	120	Volts
DC Plate Current.....	0.570	Ampere
DC Grid-No. 2 Current.....	0.020	Ampere
DC Grid-No. 1 Current, approximate...	0.100	Ampere
Driving Power, approximate.....	100	Watts
Power Output#.....	1250	Watts
Output Circuit Efficiency.....	90	Percent
Cathode Bombarding Power*.....	165	Watts
Cathode Bombarding Voltage, approx...	630	Volts
Cathode Bombarding Current, approx...	0.260	Ampere

RADIO-FREQUENCY AMPLIFIER AND OSCILLATOR—CLASS C TELEGRAPHY

Key Down Conditions per Tube Without Amplitude Modulation

Maximum Ratings, Absolute Values

DC Plate Voltage.....	7000	Volts
DC Grid-No. 2 Voltage.....	750	Volts
DC Plate Current.....	1.0	Amperes
Plate Input.....	6.0	Kilowatts
Grid-No. 2 Input.....	40	Watts

Plate Dissipation.....	3.5	Kilowatts
DC Grid-No. 1 Voltage.....	120	Volts
DC Grid-No. 1 Current.....	0.150	Ampere

Typical Operation

Grounded-grid Circuit at 400 Megacycles

DC Plate Voltage.....	4500	6500	Volts
DC Grid-No. 2 Voltage.....	600	700	Volts
DC Grid-No. 1 Voltage.....	-120	-100	Volts
Peak RF Plate Voltage, approximate	3000	—	Volts
Peak RF Grid-No. 1 Voltage.....	140	140	Volts
DC Plate Current.....	0.6	0.8	Ampere
DC Grid-No. 2 Current.....	0.018	0.025	Ampere
DC Grid-No. 1 Current.....	0.080	0.100	Ampere
Driving Power, approximate.....	100	100	Watts
Power Output, approximate#.....	1800	3200	Watts
Output Circuit Efficiency.....	90	90	Percent
Cathode Bombarding Power*.....	160	165	Watts
Cathode Bombarding Voltage, approximate.....	610	630	Volts
Cathode Bombarding Current, approximate.....	0.260	0.260	Ampere

Grounded-grid Circuit at 800 Megacycles

DC Plate Voltage.....	4500	Volts
DC Grid-No. 2 Voltage.....	600	Volts
DC Grid-No. 1 Voltage.....	-120	Volts
Peak RF Plate Voltage, approximate.....	3000	Volts
Peak RF Grid-No. 1 Voltage.....	140	Volts
DC Plate Current.....	0.6	Ampere
DC Grid-No. 2 Current.....	0.018	Ampere
DC Grid-No. 1 Current.....	0.080	Ampere
Driving Power, approximate.....	90	Watts
Power Output, approximate#.....	1250	Watts
Output Circuit Efficiency.....	83	Percent
Cathode Bombarding Power*.....	150	Watts
Cathode Bombarding Voltage, approximate.....	600	Volts
Cathode Bombarding Current, approximate.....	0.250	Ampere

* The cathode of the GL-7985, 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 cathode power input to prevent overheating of the cathode with resulting short life. In any case it is important from a tube life standpoint to keep the cathode power at as low a level as possible consistent with required performance. Bombardment power should be monitored by a suitable wattmeter or DC voltmeter and milliammeter arrangement. For long life, the tube should be put in operation with about 180 watts bombarding power. After the circuit has been adjusted for proper tube operation, bombarding voltage should be reduced to a value slightly above that at which circuit performance is affected. Minor circuit readjustment may be necessary after the above adjustment. The procedure for determining proper bombarding power should be repeated periodically.

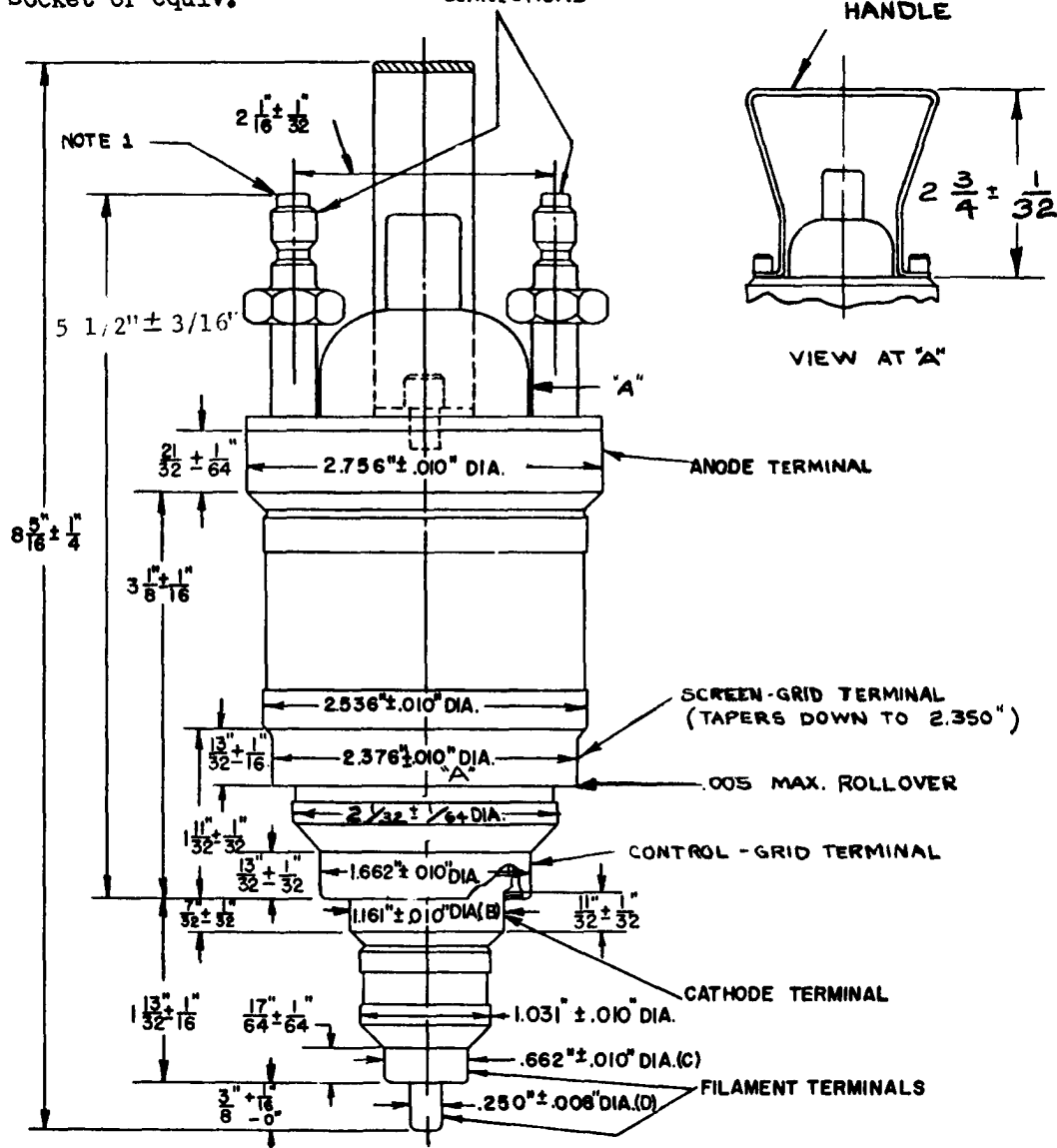
‡ Represents maximum usable cathode current (plate current plus current to each grid) for any condition of operation.

§ Measured with complete isolation between cathode and plate.

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

Useful power output including power transferred from driver stage.

WATER CONNECTIONS



Total Indicator Readings -
Diameter A - 0.024 inches
Diameter B - 0.024 "
Diameter C - 0.030 "
Diameter D - 0.050 "