RADIO MANUFACTURERS ASSOCIATION

SUITE 701-4 AMERICAN BUILDING
1317 F STREET, N.W.
WASHINGTON, D. C.

R.M.A. DATA BUREAU
90 West Street
New York, N. Y.

Release No. 335

April 26, 1943

To
Tube Engineers:

Registration has been made by the RMA Data Bureau of the vacuum tube type designations

211	860	893R
843	861	869B
845	862	872
851	889R	
858	893	

as defined by the characteristics and ratings summarized in the attached tabulation, DB-696-A, and given in detail in the attached data, on application of

General Electric Company
Schenectady, New York

Respectfully yours,

RMA DATA BUREAU

By [signature]

LCFHorle/CP

AMPLIFIERS

Design-nation	Structure-Function	Cathode	MECHANICAL				ELECTRICAL					
			Base/Cap	Bulb	Height (max) overall	Basing	Filament E_f v	Filament I_f a	Max. Ratings E_b v	Max. Ratings W_p Watts	Salient g_m	Salient μ
211	Triode PA	fil	1839	T-18	7-7/8	4AZ	10	3.25	1250	75	3600	12
843	Triode PA	htr	M8-079	S-17	5-5/8	5A	2.5	2.5	425	12	1600	7.7
845	Triode PA	fil	1839	T-18	7-7/8	4AZ	10	3.25	1250	100	2800	5.3
851	Triode PA	fil	3117/1902	D=6-1/8	17-5/8	O.D.	11	15.5	2500	600	15000	20.5
858	*Triode PA	fil	See O.D.	D=5-1/8	24-1/2	O.D.	22	52.	20(kv)	20(kw)	4800	42
860	Tetrode	fil	M8-078	O.D.	8-3/4	3F	10	3.25	3000	100	1100	200
861	Tetrode PA	fil	3503/3910 3909	O.D.	17-7/32	O.D.	11	10	3500	400	2400	300
862	*Triode PA	fil	3908	O.D.	60-3/8	O.D.	33	207.	15000	50(kw)	17200	48
889R	Triode PA	fil	See Outline Drawing				11	125.	8500	5(kw)	9000	21
893	*Triode PA	fil	6628A/3935	O.D.	26-3/4	O.D.	10*	61.*	20(kv)	20(kw)	16000	36
893R	Triode PA	fil	6628A/3935	O.D.	25-3/4	O.D.	10*	61.*	20(kv)	20(kw)	16000	36

*for each of 6 strands

RECTIFIERS

									E_{inv} v	I_b (av)a	I_{surge} a
869B	Rect.HW;Hg	fil	3502/3905	D=5-1/16	14-7/16	2A	5.0	18.0	10/20kv*	2.5(30sec)	100(0.1 sec)
872	Rect.HW;Hg	fil	1839/M8-126	T-18	8-1/2	2C	5.	10.	7500	1.25(15sec)	50(0.1 sec)
	*water cooled		O.D.- See outline drawing						*30 to 60/40°C		

GENERAL ELECTRIC

Transmitting Tube GL-211 – Description and Rating

The GL-211 is a general-purpose three-electrode transmitting tube which may be used as a Class A, B, or C amplifier. This tube can be operated at maximum ratings at frequencies as high as 15 megacycles.

TECHNICAL INFORMATION

ELECTRICAL	
Filament Voltage	10 volts
Filament Current	3.25 amperes
Amplification Factor	12
Grid-plate Transconductance, I_b = 60 ma	3600 micromhos
Direct Interelectrode Capacitances	
Grid-plate	14.5 μμf
Input	6 μμf
Output	5.5 μμf
MECHANICAL	
Base Description	Jumbo 4 - Large Pin
Net Weight, approx	8 ounces
Shipping Weight, approx	4 pounds
Installation and Operation	GEH-980

MAXIMUM RATINGS AND TYPICAL OPERATING CONDITIONS

CLASS A A-F AMPLIFIER AND MODULATOR

Filament Voltage		10			volts
D-c Plate Voltage	750	1000	1250	1250 max	volts
Plate Dissipation				75 max	watts
D-c Grid Voltage	-46	-61	-75		volts
Peak Grid Swing, approx	41	56	75		volts
D-c Plate Current	34	53	60		milliamperes
Plate Resistance	4400	3800	3600		ohms
Load Resistance	8800	7600	9200		ohms
Plate Power Output, 5% second harmonic	5.6	12	19.7		watts

CLASS B A-F POWER AMPLIFIER (TWO TUBES)

Filament Voltage	10			volts
D-c Plate Voltage	1000	1250	1250 max	volts
Max Signal Plate Current, per tube§			0.175 max	amperes
D-c Max Signal Plate Input, per tube§			220 max	watts
Plate Dissipation, per tube§			100 max	watts
D-c Grid Voltage	-72	-95		volts
Peak A-f Grid Input Voltage	380	410		volts
Zero Signal Plate Current	20	20		milliamperes
Max Signal Plate Current	320	320		milliamperes
Max Signal Driving Power, approx	7.5	8		watts
Effective Load, plate-to-plate	6900	9000		ohms
Max Signal Plate Power Output	200	260		watts

CLASS B R-F POWER AMPLIFIER

Carrier conditions per tube for use with a maximum modulation factor of 1.0

Filament Voltage	10			volts
D-c Plate Voltage	1000	1250	1250 max	volts
D-c Grid Voltage	-72	-95		volts
D-c Plate Current	0.130	0.106	0.150 max	amperes
Plate Input			150 max	watts

Plate Dissipation			100 max	watts
Peak R-f Grid Input Voltage	125	125		volts
D-c Grid Current, approx	5	1		milliamperes
Driving Power†, approx	10	7.5		watts
Plate Power Output	40	42.5		watts

CLASS C R-F POWER AMPLIFIER AND OSCILLATOR, PLATE MODULATED
Carrier conditions per tube for use with a maximum modulation factor of 1.0

Filament Voltage	10			volts
D-c Plate Voltage	750	1000	1000 max	volts
D-c Grid Voltage	-200	-260	-400 max	volts
D-c Plate Current	0.150	0.150	0.175 max	ampere
D-c Grid Current, approx	0.035	0.035	0.050 max	ampere
Plate Input			175 max	watts
Plate Dissipation			67 max	watts
Peak R-f Grid Input Voltage, approx	350	410		volts
Driving Power, approx	12	14		watts
Plate Power Output	65	100		watts

CLASS C R-F POWER AMPLIFIER AND OSCILLATOR
Key down conditions per tube without modulation‡

Filament Voltage	10				volts
D-c Plate Voltage	750	1000	1250	1250 max	volts
D-c Grid Voltage	-135	-175	-225	-400 max	volts
D-c Plate Current	0.150	0.150	0.150	0.175 max	ampere
D-c Grid Current, approx	0.018	0.018	0.018	0.050 max	ampere
Plate Input				220 max	watts
Plate Dissipation				100 max	watts
Peak R-f Grid Input Voltage, approx	275	315	375		volts
Driving Power, approx	5	6	7		watts
Plate Power Output	65	100	130		watts

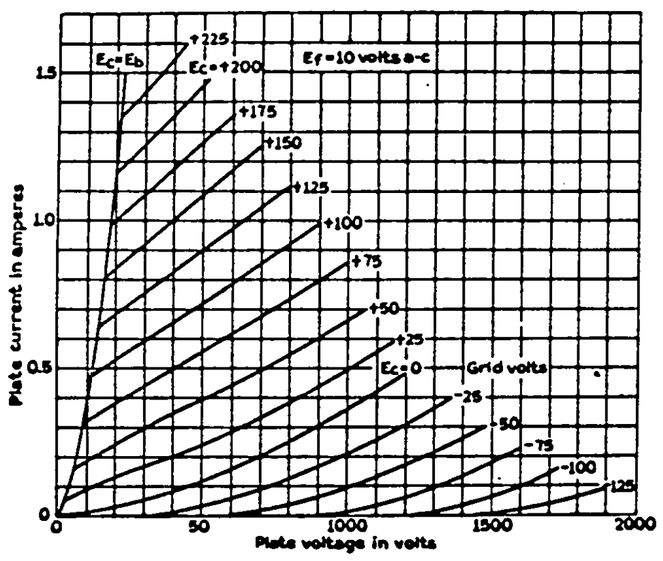
§ Averaged over any audio-frequency cycle.
† At crest of audio-frequency cycle.
‡ Modulation, essentially negative, may be used if the positive peak of the audio-frequency envelope does not exceed 115 per cent of the carrier conditions.

The normal value of grid leak, when the tube is used as an oscillator or r-f power amplifier (Class C), is in the neighborhood of 5000 ohms, although this may be replaced by a suitable fixed bias. If self-bias is used the cathode resistor should be approximately 1000 ohms.

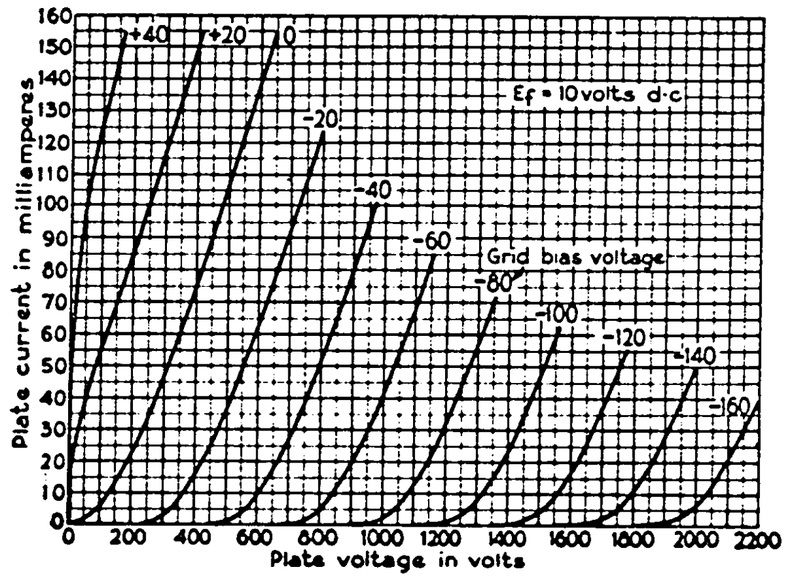
The 211 can be operated at frequencies as high as 15 megacycles. The tube may be operated at higher frequencies provided the maximum values of plate voltage and power input are reduced as the frequency is raised (other maximum ratings are the same as shown above). The tabulation below shows the highest percentage of maximum plate voltage and power input that can be used up to 80 megacycles for the various classes of service. Special attention should be given to adequate ventilation of the bulb at these frequencies.

FREQUENCY	15	30	80	megacycles
PERCENTAGE OF MAXIMUM RATED PLATE VOLTAGE AND PLATE INPUT				
Class B	100	88	70	per cent
Class C	100	80	50	per cent

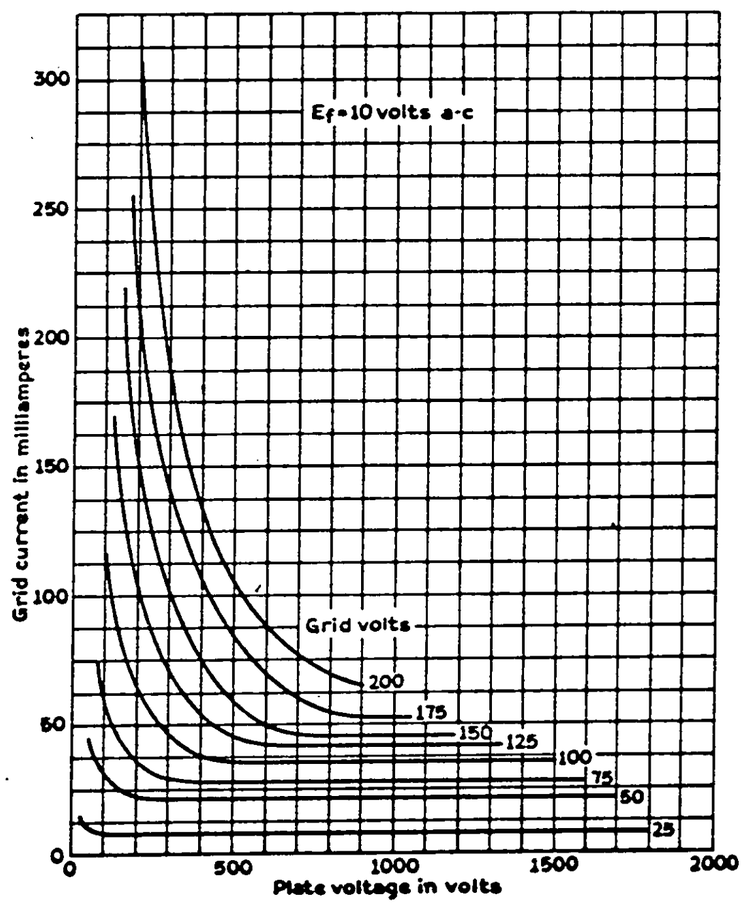
The resonant frequency of the grid-plate circuit is approximately 100 megacycles.



Average Plate Characteristic
K-6917437 11-6-39

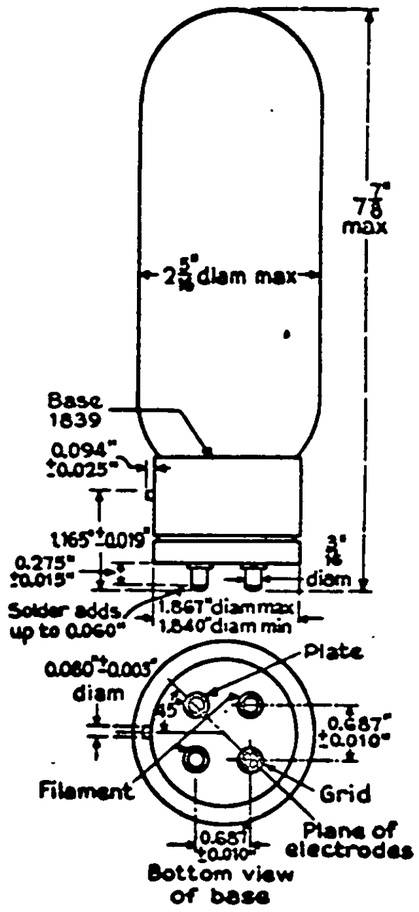


Average Plate Characteristic
K-6917423 10-3-39



Average Characteristic
K-6917435 11-6-39

Tube Mounting Position
Vertical: Base down



Outline Transmitting
Tube GL-211
K-4909036 9-20-39

GENERAL ELECTRIC

Transmitting Tube GL-843 - - Description and Rating

The 843 is a three-electrode power tube of the heater-cathode type. It is designed for use as an oscillator, a-f power amplifier, or r-f power amplifier.

CHARACTERISTICS

Heater Voltage (a-c or d-c)	2.5	Volts
Heater Current	2.5	Amperes
Amplification Factor	7.7	
Grid-plate Capacitance	6	μμf
Grid-cathode Capacitance	5	μμf
Plate-cathode Capacitance	5	μμf
Base	Medium 5-pin	

MAXIMUM RATINGS AND TYPICAL OPERATING CONDITIONS

AS A-F POWER AMPLIFIER - CLASS A

D-c Plate Voltage		425 max	Volts
Plate Dissipation		12 max	Watts
Typical Operation:			
D-c Plate Voltage	350	425	Volts
Grid Voltage (approx)	-25	-35	Volts
Peak Grid Swing (approx)	25	35	Volts
D-c Plate Current	25	25	Milliamperes
Amplification Factor	7.7	7.7	
Plate Resistance	4700	4800	Ohms
Mutual Conductance	1700	1600	Micromhos
Load Resistance	9500	12000	Ohms
Undistorted Power Output	0.95	1.6	Watts

AS R-F POWER AMPLIFIER - CLASS B TELEPHONY
Carrier conditions; for use with a modulation factor up to 1.0

D-c Plate Voltage		450 max	Volts
D-c Plate Current		30 max	Milliamperes
Plate Dissipation		15 max	Watts
R-f Grid Current		4 max	Amperes
Typical Operation:			
D-c Plate Voltage	350	450	Volts
Grid Voltage (approx)	-40	-50	Volts
D-c Plate Current	25	25	Milliamperes
Peak Power Output (approx)	8	12	Watts
Carrier Power Output (approx)	2	3	Watts

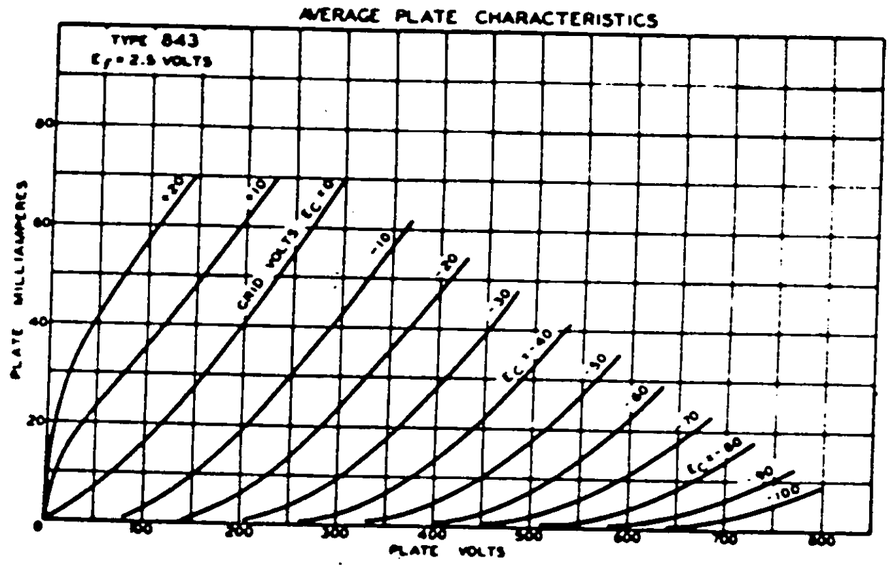
AS PLATE-MODULATED R-F POWER AMPLIFIER - CLASS C TELEPHONY
Carrier conditions; for use with a modulation factor up to 1.0

D-c Plate Voltage		350 max	Volts
D-c Plate Current		40 max	Milliamperes
Plate Dissipation		10 max	Watts
R-f Grid Current		4 max	Amperes
D-c Grid Current		7.5 max	Milliamperes
Typical Operation:			
D-c Plate Voltage	250	350	Volts
Grid Voltage (approx)	-100	-140	Volts
D-c Plate Current	30	30	Milliamperes
D-c Grid Current*	7	7	Milliamperes
Driving Power*	1.3	1.6	Watts
Power Output (approx)	3	5	Watts

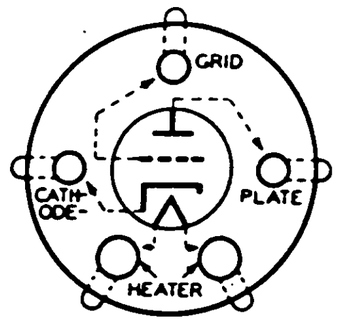
AS R-F POWER AMPLIFIER AND OSCILLATOR - CLASS C TELEGRAPHY
Key-down conditions

D-c Plate Voltage		450 max	Volts
D-c Plate Current		40 max	Milliamperes
Plate Dissipation		15 max	Watts
R-f Grid Current		5 max	Amperes
D-c Grid Current		7.5 max	Milliamperes
Typical Operation:			
D-c Plate Voltage	350	450	Volts
Grid Voltage (approx)	-100	-149	Volts
D-c Plate Current	30	30	Milliamperes
D-c Grid Current*	5	5	Milliamperes
Driving Power*	0.8	1.0	Watt
Power Output (approx)	5	7.5	Watts

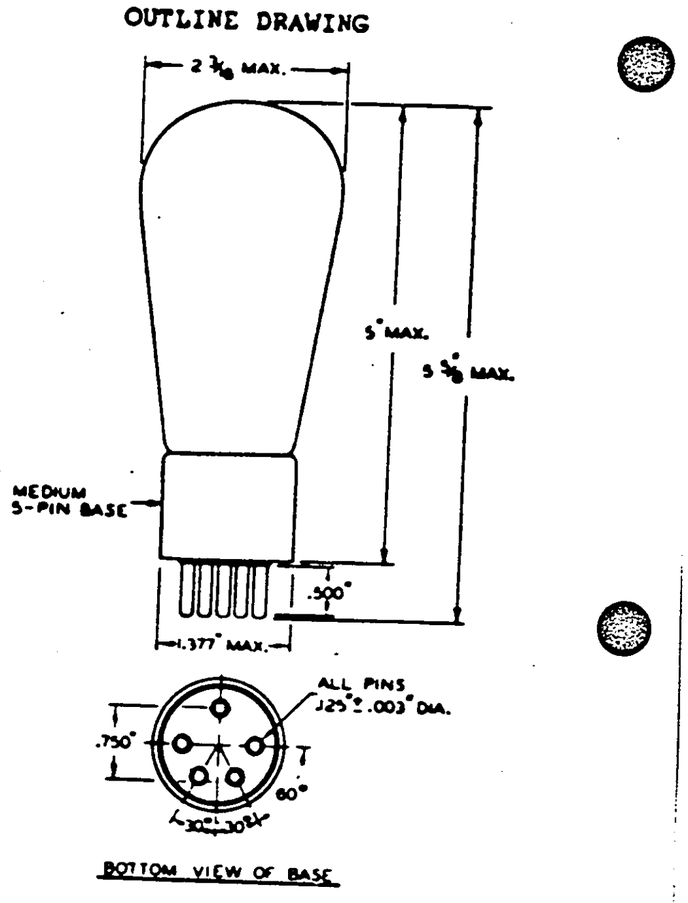
* Subject to wide variations depending on the impedance of the load circuit. High-impedance load circuits require more grid current and driving power to obtain the desired output. Low-impedance circuits need less grid current and driving power, but plate-circuit efficiency is sacrificed. The driving stage should have a tank circuit of good regulation and should be capable of delivering considerably more than the required driving power.



Tube Symbol and Top View of Socket Connections



OUTLINE DRAWING



GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y.

Returned Feb 1941 335

GET-505C

GENERAL ELECTRIC

Transmitting Tube GL-845 -- Description and Rating

The GL-845 is a three-electrode vacuum tube especially adapted to use as a Class A power amplifier or modulator.

Technical Information

These data are for reference only. For design information see the specifications.

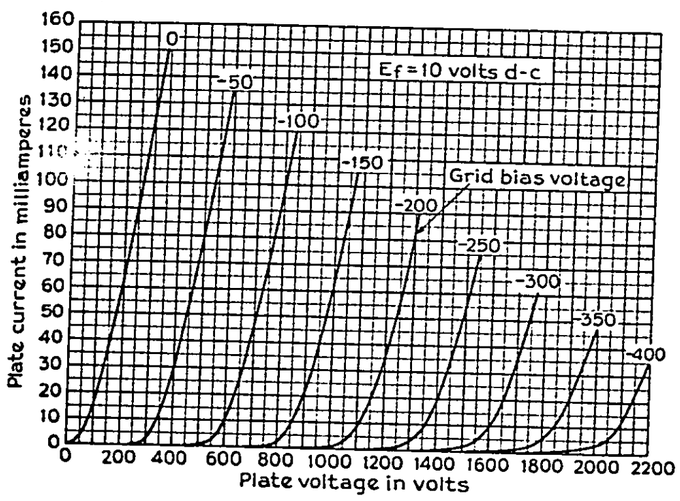
GENERAL CHARACTERISTICS:	
Filament Voltage, volts	10
Filament Current, amperes	3.25
Amplification Factor	5.3
Grid-plate Transconductance, mmhos Ib = 65	2800
Direct Interelectrode Capacitances, μμf	
Grid-plate	13.5
Input	6.0
Output	6.5
Base or Terminal Description	Jumbo, 4-Large Pin
Net Weight, oz approx	8
Shipping Weight, lb approx	7
Installation and Operation Instructions	GEH-980

MAXIMUM RATINGS AND TYPICAL OPERATING CONDITIONS

	Typical Operation			Max Ratings
CLASS A A-F AMPLIFIER AND MODULATOR:				
D-c Plate Voltage, v	750	1000	1250	1250
Plate Dissipation, w	---	---	---	100
D-c Grid Voltage, v	-98	-145	-195	---
Peak Grid Swing, approx v	93	140	190	---
D-c Plate Current, ma	95	90	80	---
Plate Resistance, ohms	1700	1700	1700	---
Load Resistance, ohms	3400	6000	11000	---
Plate Power Output (5% Second Harmonic), w	15	24	30	---

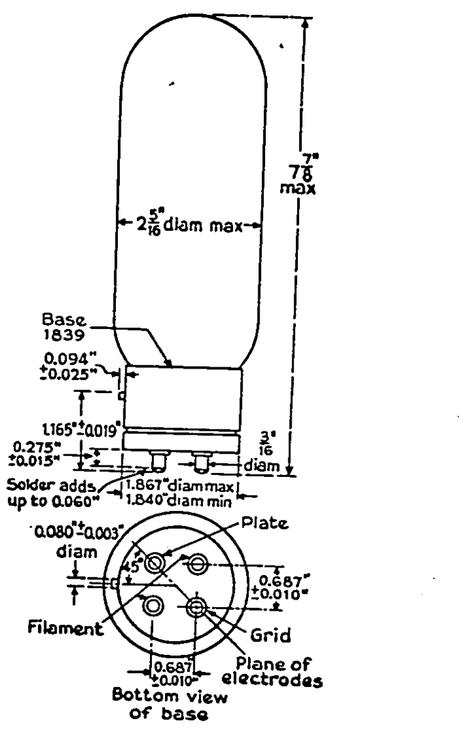
CLASS AB_1 A-F POWER AMPLIFIER AND MODULATOR

	Typical Operation		Max Ratings	
D-c Plate Voltage	1000	1250	1250	Volts
Plate Dissipation			100	Watts
D-c Grid Voltage	-175	-225	-400	Volts
D-c Plate Current			120	Ma
Peak A-F Grid-to-Grid Voltage	340	440		Volts
Zero Signal D-c Plate Current	40	40		Ma
Max Signal D-c Plate Current	230	240		Ma
Load Resistance	1150	1650		Ohms
Effective Load Resistance, plate-to-plate	4600	6600		Ohms
Plate Power Output, approx	75	115		Watts



Average Plate Characteristics for Transmitting Tube GL-845
K-6917425 10-3-39

Tube Mounting Position Vertical



Outline Transmitting Tube GL-845
K-4909036 4-4-40

GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y.

9-42 (5M)

Filing No. 8850

PRINTED IN U.S.A.

GENERAL ELECTRIC

Transmitting Tube GL-851 -- Description and Rating

The GL-851 is a three-electrode, general-purpose vacuum tube.

TECHNICAL INFORMATION

These data are for reference only. For design information see the specifications.

CHARACTERISTICS AND RATINGS

Filament Voltage	11 max	Volts
Filament Current	15.5 max	Amperes
Amplification Factor (I_b = 300 ma)	20.5 max	
Grid-plate Transconductance	15000 max	Micromhos
Direct Interelectrode Capacitances:		
Grid-plate	47 max	μμf
Input	25.5 max	μμf
Output	4.5 max	μμf
Base	3117	
Frequency for Max Ratings	3 max	Megacycles
Net Weight (approx)	3	Pounds
Shipping Weight (approx)	9	Pounds
Installation and Operation	GEH-980	

MAXIMUM RATING AT TYPICAL OPERATING CONDITIONS

CLASS A A-F AMPLIFIER AND MODULATOR

D-c Plate Voltage	1500	2000	2500	2500 max	Volts
Plate Dissipation				600 max	Watts
D-c Grid Voltage	-49	-65	-92		Volts
Peak Grid Swing (approx)	44	60	87		Volts
D-c Plate Current	0.175	0.270	0.240		Ampere
Plate Resistance	1800	1500	1600		Ohms
Load Resistance	3700	3100	5000		Ohms
Plate Power Output (5% second harmonic)	46	100	160		Watts

CLASS B A-F POWER AMPLIFIER (TWO TUBES)

D-c Plate Voltage	2000	2500	3000	3000 max	Volts
Max Signal Plate Current (per tube)*				1 max	Ampere
D-c Max Signal Plate Input (per tube)*				2250 max	Watts
Plate Dissipation (per tube)*				750 max	Watts
D-c Grid Voltage	-85	-111	-135		Volts
Peak A-f Grid Input Voltage	250	245	245		Volts
Zero Signal Plate Current	0.12	0.12	0.11		Ampere
Max Signal Plate Current	1.7	1.4	1.2		Ampere
Max Signal Plate Input*	3400	3500	3600		Watts
Max Signal Driving Power (approx)	20	12	6		Watts
Effective Load Resistance (plate-to-plate)	2600	4000	5600		Ohms
Max Signal Plate Power Output	2200	2300	2400		Watts

CLASS B R-F POWER AMPLIFIER

Carrier conditions per tube for use with a max modulation factor of 1.0

D-c Plate Voltage	1500	2000	2500	2500 max	Volts
D-c Grid Voltage	-60	-85	-110		Volts
D-c Plate Current	0.62	0.475	0.39	0.750 max	Ampere
Plate Input				1100 max	Watts
Plate Dissipation				750 max	Watts
Peak R-f Grid Input Voltage	300	280	270		Volts
Driving Power (approx)†	40	25	20		Watts
Plate Power Output	275	300	325		Watts

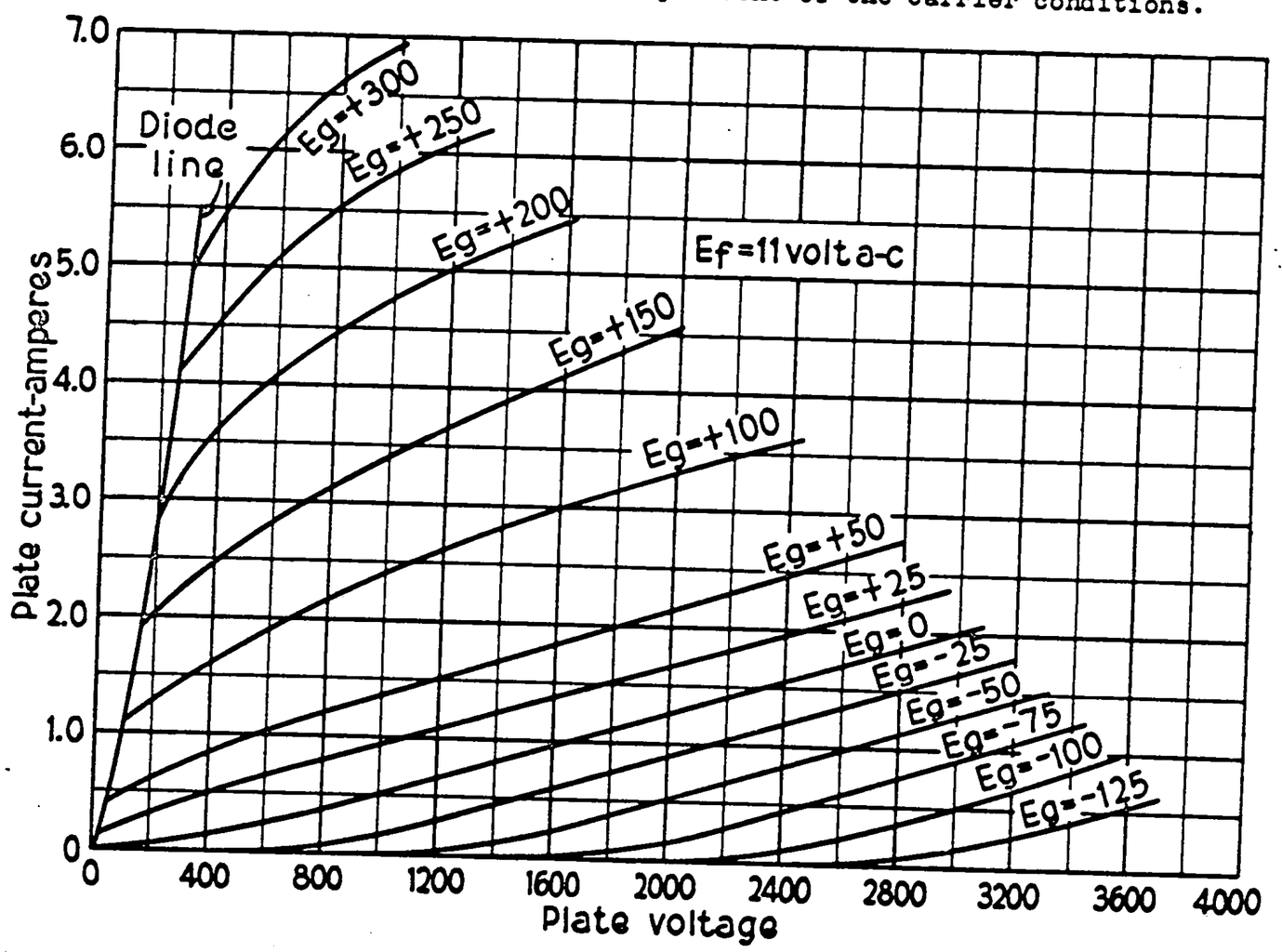
CLASS C R-F POWER AMPLIFIER AND OSCILLATOR - PLATE MODULATED
Carrier conditions per tube for use with a max modulation factor of 1.0

D-c Plate Voltage	1500	2000	2000 max	Volts
D-c Grid Voltage	-250	-300	-500 max	Volts
D-c Plate Current	0.9	0.85	1 max	Ampere
D-c Grid Current (approx)	0.15	0.125	0.200 max	Ampere
Plate Input			1800 max	Watts
Plate Dissipation			500 max	Watts
Peak R-f Grid Input Voltage (approx)	475	525		Volts
Driving Power (approx)	75	65		Watts
Plate Power Output	900	1250		Watts

CLASS C R-F POWER AMPLIFIER AND OSCILLATOR
Key-down conditions per tube without modulation‡

D-c Plate Voltage	1500	2000	2500	2500 max	Volts
D-c Grid Voltage	-150	-200	-250	-500 max	Volts
D-c Plate Current	0.9	0.9	0.9	1 max	Ampere
D-c Grid Current (approx)	0.15	0.12	0.1	0.200 max	Ampere
Plate Input				2500 max	Watts
Plate Dissipation				750 max	Watts
Peak R-f Grid Input Voltage (approx)	375	425	450		Volts
Driving Power (approx)	55	50	45		Watts
Plate Power Output	900	1250	1700		Watts

* Averaged over any audio-frequency cycle.
† At crest of audio-frequency cycle.
‡ Modulation, essentially negative, may be used if the positive peak of the audio-frequency envelope does not exceed 115 per cent of the carrier conditions.



K-6966442 Average Grid-plate Characteristics for Transmitting Tube GL-851

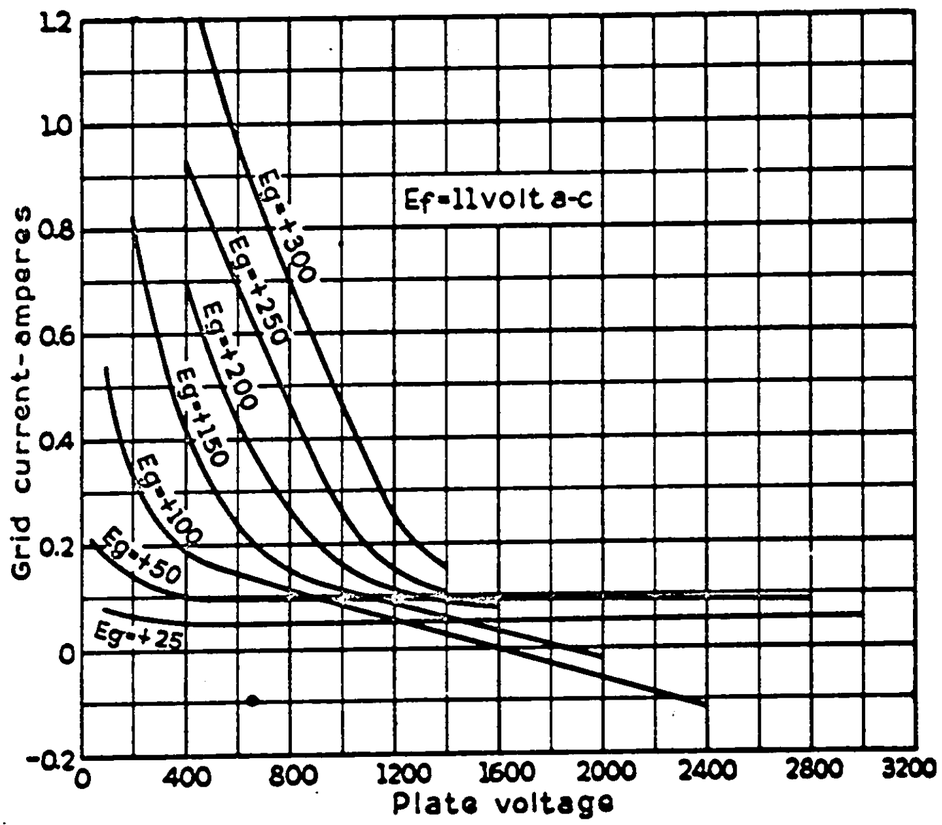
2-10-41

GL-851 can be operated at maximum ratings in all classes of service at frequencies as high as 3 megacycles. The tube may be operated at higher frequencies provided the maximum values of plate voltage and power input are reduced as the frequency is raised. (Other maximum ratings are the same as shown under TECHNICAL INFORMATION.) The tabulation below shows the highest percentage of maximum plate voltage and power input that can be used up to 15 mc for the various classes of service. Special attention should be given to adequate ventilation of the bulb at these frequencies.

FREQUENCY	3	7	15	Mc
MAXIMUM PERMISSIBLE PERCENTAGE OF MAXIMUM RATED PLATE VOLTAGE AND PLATE INPUT:				
Class B Telephony	100	88	76	Per Cent
Class C (Telephony, plate-modulated (Telegraphy	100	75	50	Per Cent

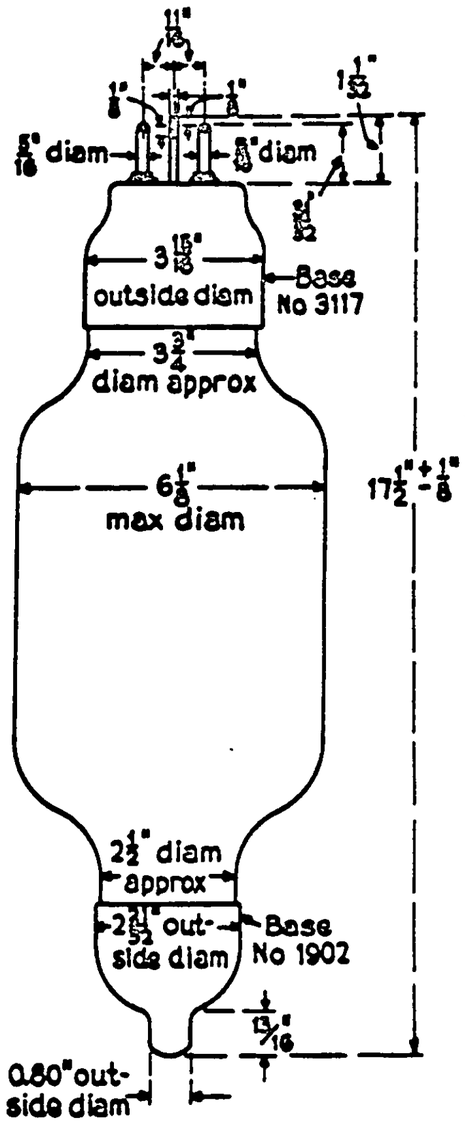
Tube Mounting Position

Vertical: Filament base (large) up
Horizontal: Filament in vertical plane (on edge)



Average Plate Characteristics for Transmitting Tube GL-851

K-6966441 2-10-41



Outline Transmitting Tube GL-851

K-2636625 3-27-34

GENERAL ELECTRIC

Transmitting Tube GL-858 - - Description and Rating

The GL-858 is a three-electrode, water-cooled vacuum tube designed for use as a radio-frequency power amplifier, oscillator, or Class B modulator.

CHARACTERISTICS AND RATINGS

Filament Voltage		22	Volts
Filament Current		52	Amperes
Amplification Factor	E_b = 18 kv, I_b = 75 ma	42	
Grid-plate Transconductance	E_c = -155, E_f = 22	4800	Micromhos
Direct Interelectrode Capacitances:			
Grid-plate		18	μμf
Input		16	μμf
Output		2	μμf
Frequency for Maximum Ratings		1.6	Megacycle
Type of Cooling			Water
Net Weight (approx)		8	Pounds

MAXIMUM RATINGS AND TYPICAL OPERATING CONDITIONS

CLASS B A-F POWER AMPLIFIER (TWO TUBES):

D-c Plate Voltage	12000	20000 max	Volts
Maximum Signal Plate Current (per tube)*		2.0 max	Amperes
D-c Maximum Signal Plate Input (per tube)*		40 max	Watts
Plate Dissipation (per tube)*		20 max	Kilowatts
D-c Grid Voltage	-140		Volts
Peak A-f Grid Input Voltage	2600		Volts
Zero Signal Plate Current	0.5		Ampere
Maximum Signal Plate Current	3.6		Amperes
Maximum Signal Plate Input*	43		Watts
Maximum Signal Driving Power (approx)	115		Watts
Effective Load (plate-to-plate)	7200		Ohms
Maximum Signal Plate Power Output	26.5		Kilowatts

CLASS B R-F POWER AMPLIFIER
Carrier conditions per tube for use with a max modulation factor of 1.0

D-c Plate Voltage	10000	14000	18000	20000 max	Volts
D-c Grid Voltage	-100	-200	-300		Volts
D-c Plate Current	0.5	0.7	0.9	1.0 max	Ampere
Plate Input				20 max	Kilowatts
Plate Dissipation				15 max	Kilowatts
Peak R-f Grid Input Voltage	400	575	725		Volts
Driving Power (approx)**	25	70	85		Kilowatts
Plate Power Output	1.5	3.3	5.6		Kilowatts

CLASS C R-F POWER AMPLIFIER AND OSCILLATOR - PLATE MODULATED
Carrier conditions per tube for use with a max modulation factor of 1.0

D-c Plate Voltage	8000	10000	12000	12000 max	Volts
D-c Grid Voltage	-900	-950	-1000	-3000 max	Volts
D-c Plate Current	0.9	0.9	0.95	1.0 max	Ampere
D-c Grid Current (approx)	0.10	0.09	0.08	0.25 max	Ampere
Plate Input				12 max	Kilowatts
Plate Dissipation				10 max	Kilowatts
Peak R-f Grid Input Voltage (approx)	1875	1950	1950		Volts
Driving Power (approx)	180	200	150		Watts
Plate Power Output	5	6	8		Kilowatts

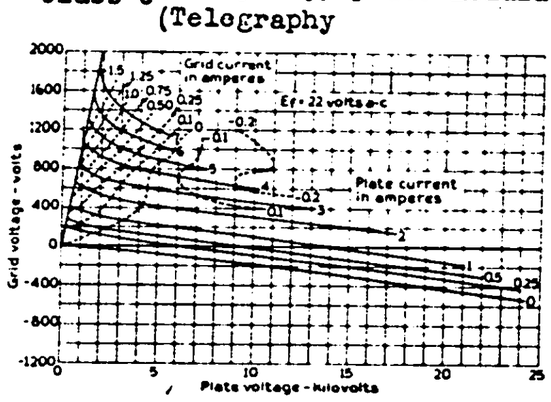
CLASS C R-F POWER AMPLIFIER AND OSCILLATOR
Key-down conditions per tube without modulation†

D-c Plate Voltage	10000	15000	18000	20000 max	Volts
D-c Grid Voltage	-1000	-1100	-1200	-3000 max	Volts
D-c Plate Current	1.4	1.8	1.8	2.0 max	Amperes
D-c Grid Current (approx)	0.13	0.1	0.1	0.25 max	Ampere
Plate Input				40 max	Kilowatts
Plate Dissipation				20 max	Kilowatts
Peak R-f Grid Input Voltage (approx)	2200	2500	2600		Volts
Driving Power (approx)	275	250	250		Watts
Plate Power Output	9	18	22.4		Kilowatts

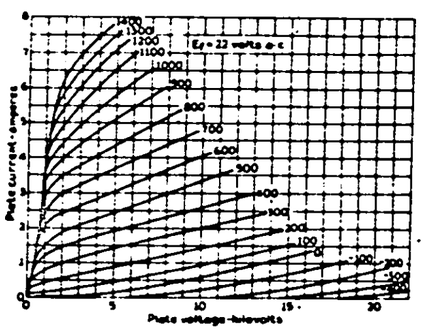
* Averaged over an audio-frequency cycle.
** At crest of audio-frequency cycle.
† Modulation, essentially negative, may be used if the positive peak of the audio-frequency envelope does not exceed 115 per cent of the carrier conditions.

GL-858 can be operated at maximum ratings in all classes of service at frequencies as high as 1.6 megacycle. The tube may be operated at higher frequencies provided the maximum values of plate voltage and power input are reduced as the frequency is raised (other maximum ratings are the same as shown under CHARACTERISTICS AND RATINGS). The tabulation below shows the highest percentage of maximum plate voltage and power input that can be used up to 40 megacycles for the various classes of service. Special attention should be given to adequate ventilation of the bulb at these frequencies.

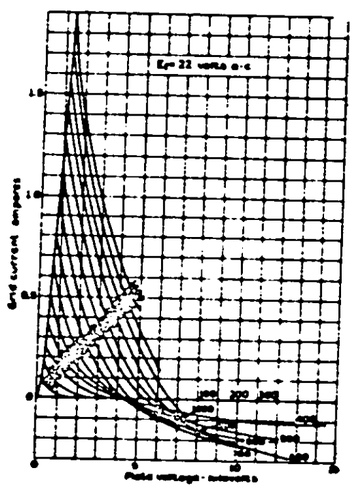
FREQUENCY			
Maximum Permissible Percentage of Maximum Rated Plate Voltage and Plate Input:			
1.5	20	40	Mc
Class B Telephony	100	82	57 Per Cent
Class C (Telephony, plate-modulated	100	75	50 Per Cent
Class C (Telegraphy			



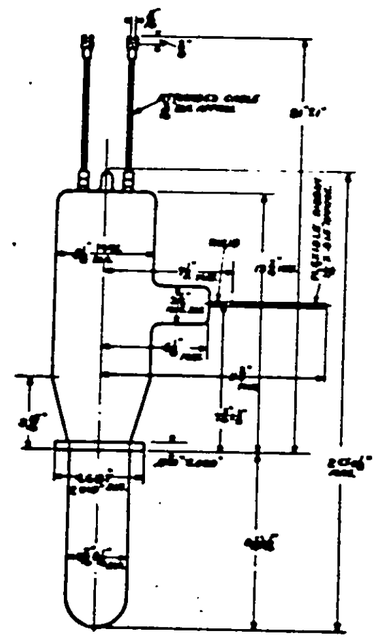
Characteristics for Transmitting Tube GL-858
K-7050625 6-21-39



Average Plate Characteristics for Transmitting Tube GL-858
K-7050446 6-1-34



Typical Grid-plate Transfer Characteristics for Transmitting Tube GL-858
K-7050585 6-4-34



Outline Transmitting Tube GL-858
K-7050445 4-24-39

GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y.

11-39 (2M)
Filing No. 8850

SUPPLEMENT TO GET-764 DESCRIPTION AND RATING SHEET FOR
TRANSMITTING TUBE GL-858

GENERAL CHARACTERISTICS

MECHANICAL

Gasket, Cat. No. 5182028P2	
Type of Cooling	Water
Water Flow, gallons per minute	8-15
Shipping Weight, lb approx	23
Installation and Operation	GEH-1152

APPLICATION NOTES

Plate Series Protective Resistors (see paragraph describing plate circuit under Installation in the Instructions).

Series Resistor, ohms	25	50	200	250	275	300
Maximum Power Output of Rectifier, kilowatts	16	40	100	250	640	1600

GENERAL ELECTRIC

Transmitting Tube GL-860 - - Description and Rating

The 860 is a four-electrode screen-grid tube designed for use as a Class B and C amplifier in high-frequency circuits.

TECHNICAL INFORMATION

These data are for reference only. For design information see the specifications.

GENERAL CHARACTERISTICS

Filament Voltage, volts	10
Filament Current, amperes	3.25
Amplification Factor, approx	200
Grid-plate Transconductance, mmhos I_b=50 ma	1100
Direct Interelectrode Capacitances, mmf	
Grid-plate*	0.08
Input	7.75
Output	7.5
Base or Terminal	
Description	Medium 4-pin Bayonet
Net Weight, ounces approx	8
Shipping Weight, pounds approx	3

MAXIMUM RATINGS AND TYPICAL OPERATING CONDITIONS

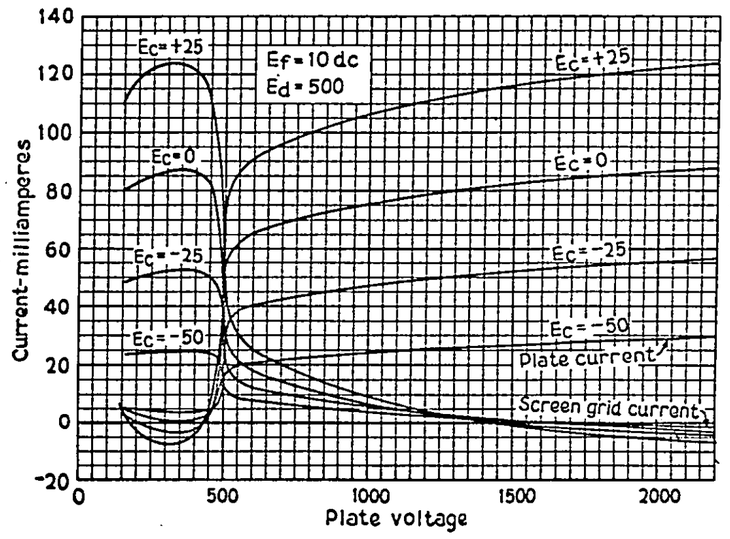
CLASS B RADIO-FREQUENCY POWER AMPLIFIER
(Carrier conditions per tube for use with a maximum modulation factor of 1.0)

	Typical Operation		Max Ratings	
D-c Plate Voltage	2000	3000	3000	volts
D-c Grid Voltage	-50	-50		volts
D-c Screen Voltage†	300	300	500	volts
D-c Plate Current	0.060	0.043	0.085	amp
Plate Input			150	watts
Screen Grid Input			10	watts
Plate Dissipation			100	watts
Plate Power Output	30	40		watts

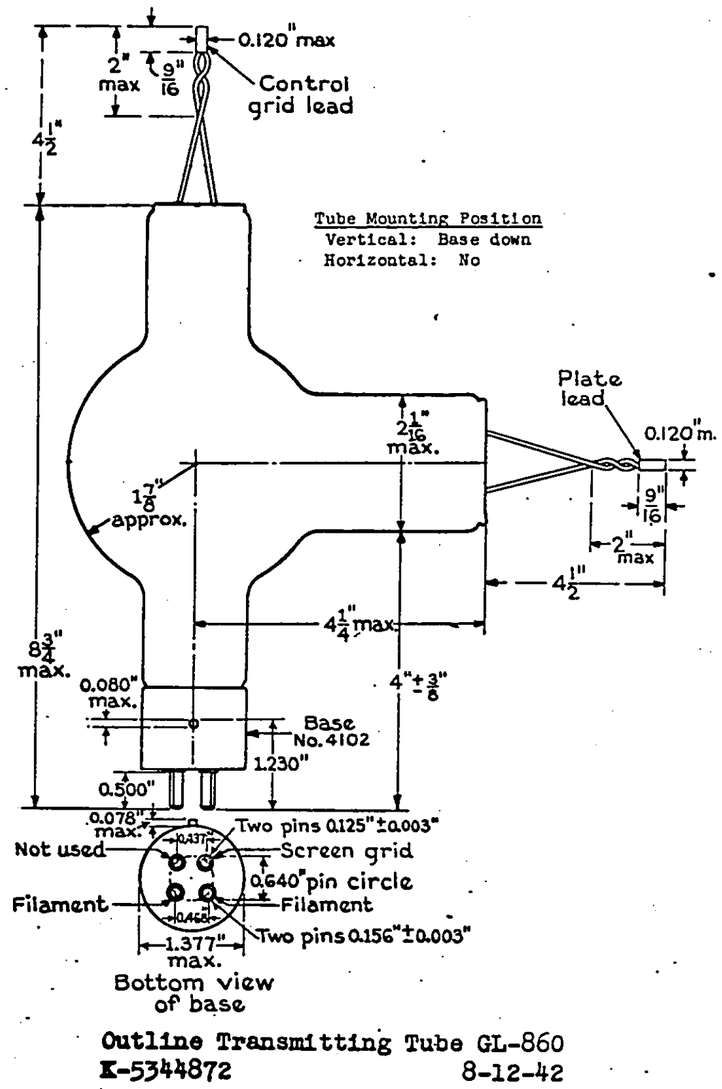
CLASS C RADIO-FREQUENCY POWER AMPLIFIER AND OSCILLATOR, PLATE MODULATED
(Carrier conditions per tube for use with a maximum modulation factor of 1.0)

D-c Plate Voltage	1500	1800	2000	2000	volts
D-c Grid Voltage	-225	-225	-200	-800	volts
D-c Screen Voltage	300	300	220	500	volts
D-c Plate Current	0.070	0.067	0.085	0.085	amp
D-c Grid Current, approx	0.030	0.030	0.038	0.040	amp
Plate Input				170	watts
Screen Grid Input				6.7	watts
Plate Dissipation				67	watts
Driving Power, approx	15	15	17		watts
Plate Power Output	45	60	105		watts

* With external shielding.
† Use of series resistor not recommended



Average Static Characteristics
Transmitting Tube GL-860
H-5178595 4-2-36



Outline Transmitting Tube GL-860
K-5344872 8-12-42

CLASS C RADIO-FREQUENCY POWER AMPLIFIER AND OSCILLATOR

(Key-down conditions per tube without modulation)‡

	Typical Operation				Max Ratings	
D-c Plate Voltage	1500	2000	2500	3000	3000	volts
D-c Grid Voltage	-150	-150	-150	-150	-800	volts
D-c Screen Voltage†	300	300	300	300	500	volts
D-c Plate Current	0.090	0.090	0.090	0.085	0.150	amp
D-c Grid Current, approx	0.015	0.015	0.015	0.015	0.040	amp
Plate Input	135	180	225	255	300	watts
Plate Dissipation	75	80	90	90	100	watts
Screen Grid Input					10	watts
Driving Power, approx	7	7	7	7		watts
Plate Power Output	60	100	135	165		watts

The normal value of grid leak when the tube is used as an oscillator or r-f power amplifier (Class C) is in the neighborhood of 10,000 ohms, although this may be replaced by a fixed bias. If self-bias is used the cathode resistor should be approximately 2000 ohms.

The maximum ratings apply only at frequencies below 30 megacycles. For operation at higher frequencies adequate ventilation and normal ambient temperatures must be maintained, and the plate voltage must be reduced as indicated.

Frequency Megacycles	30	60	120
Percentage of Maximum Rated Plate Voltage and Plate Input			
Class B	100	85	70
Class C	100	75	50

The resonant frequency of the grid-plate circuit is approximately 195 megacycles.

† Use of series resistor not recommended

‡ Modulation, essentially negative, may be used if the positive peak of the audio-frequency envelope does not exceed 115 per cent of the carrier conditions.

GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y.

10-42 (4M)
Filing No. 8850

Supersedes GET-500C

PRINTED IN U.S.A.

GENERAL ELECTRIC

Transmitting Tube GL-861 -- Description and Rating

The 861 is a four-electrode screen-grid tube designed for use as a Class B and C amplifier in high-frequency circuits.

Technical Information

These data are for reference only. For design information see the specifications.

ELECTRICAL

Number of Electrodes	4
Filament Voltage	11 Volts
Filament Current	10 Amperes
Amplification Factor	300
Grid-plate Transconductance, I_b = 130 ma	2400 Micromhos
Direct Interelectrode Capacitance	
Grid-plate, with external shielding	0.10 μμf
Input	14.5 μμf
Output	10.5 μμf

MECHANICAL

Base	3503, 3909
Cap	3910
Net Weight, approx	2 1/2 Pounds
Shipping Weight, approx	9 Pounds
Installation and Operation	GEH-980

MAXIMUM RATINGS AND TYPICAL OPERATING CONDITIONS

CLASS B RADIO-FREQUENCY POWER AMPLIFIER
(Carrier conditions per tube for use with a maximum modulation factor of 1.0)

	Typical Operation	Maximum Ratings*			
Filament Voltage			11		Volts
D-c Plate Voltage	2500	3000	3500	3500	Volts
D-c Grid Voltage	-60	-60	-60		Volts
D-c Screen Voltage ‡	500	500	500	750	Volts
D-c Plate Current	0.190	0.175	0.150	0.250	Amp
Plate Input				600	Watts
Screen Grid Input				35	Watts
Plate Dissipation				400	Watts
Peak R-f Grid Input Voltage	250	245	215		Volts
Driving Power†, approx	20	15	15		Watts
Plate Power Output	140	160	175		Watts

†At crest of audio-frequency cycle.
‡Use of series resistor not recommended.

	Typical Operation		Maximum Ratings*		
CLASS C RADIO-FREQUENCY POWER AMPLIFIER AND OSCILLATOR, PLATE-MODULATED (Carrier conditions per tube for use with a maximum modulation factor of 1.0)					
Filament Voltage				11	Volts
D-c Plate Voltage	2000	2500	3000	3000	Volts
D-c Grid Voltage	-250	-225	-200	-800	Volts
D-c Screen Voltage	400	400	375	750	Volts
D-c Plate Current	0.250	0.220	0.200	0.300	Amp
D-c Grid Current, approx	0.065	0.060	0.055	0.075	Amp
Plate Input				650	Watts
Screen Grid Input				30	Watts
Plate Dissipation				270	Watts
Peak R-f Grid Input Voltage, approx	675	625	575		Volts
Driving Power, approx	0.045	0.040	0.035		Watts
Plate Power Output	285	340	400		Watts

CLASS C RADIO-FREQUENCY POWER AMPLIFIER AND OSCILLATOR (Key down conditions per tube without modulation) ø					
Filament Voltage				11	Volts
D-c Plate Voltage	2000	3000	3500	3500	Volts
D-c Grid Voltage	-250	-250	-250	-800	Volts
D-c Screen Voltage	500	500	500	750	Volts
D-c Plate Current	0.300	0.300	0.300	0.350	Amp
D-c Grid Current	0.040	0.040	0.040	0.075	Amp
Plate Input				1200	Watts
Plate Dissipation				400	Watts
Screen Grid Input				35	Watts
Peak R-f Grid Input Voltage, approx	725	725	725		Volts
Driving Power, approx	30	30	30		Watts
Plate Power Output	400	600	700		Watts

ø Modulation, essentially negative, may be used if the positive peak of the audio-frequency envelope does not exceed 115 per cent of the carrier conditions.

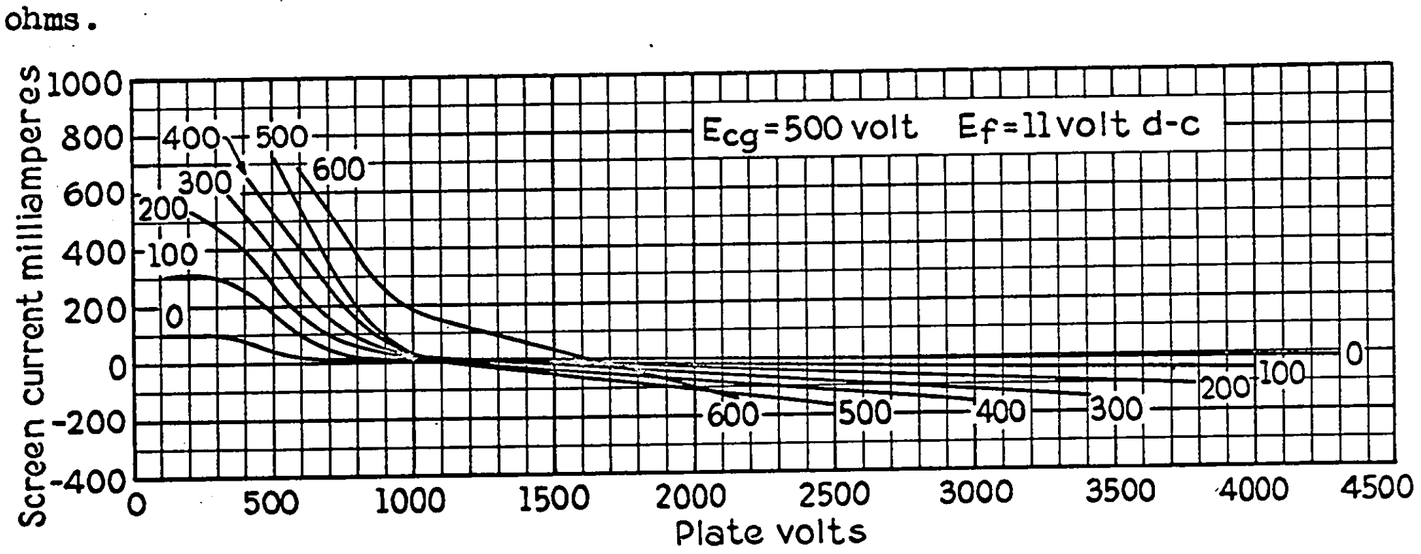
APPLICATION NOTES

*The GL-861 can be operated at frequencies as high as 20 megacycles. The tube may be operated at higher frequencies provided the maximum values of plate voltage and power input are reduced as the frequency is raised. (Other maximum ratings are the same as shown above.) The tabulation below shows the highest percentage of maximum plate voltage and power input that can be used up to 60 megacycles for the various classes of service. Special attention should be given to adequate ventilation of the bulb at these frequencies.

Frequency	20	30	60	Megacycles
Max Permissible Percentage of Max Rated Plate Voltage and Plate Input				
Class B, R-f	100	90	75	
Class C, Plate-modulated	100	82	53	
Telegraphy	100	82	53	

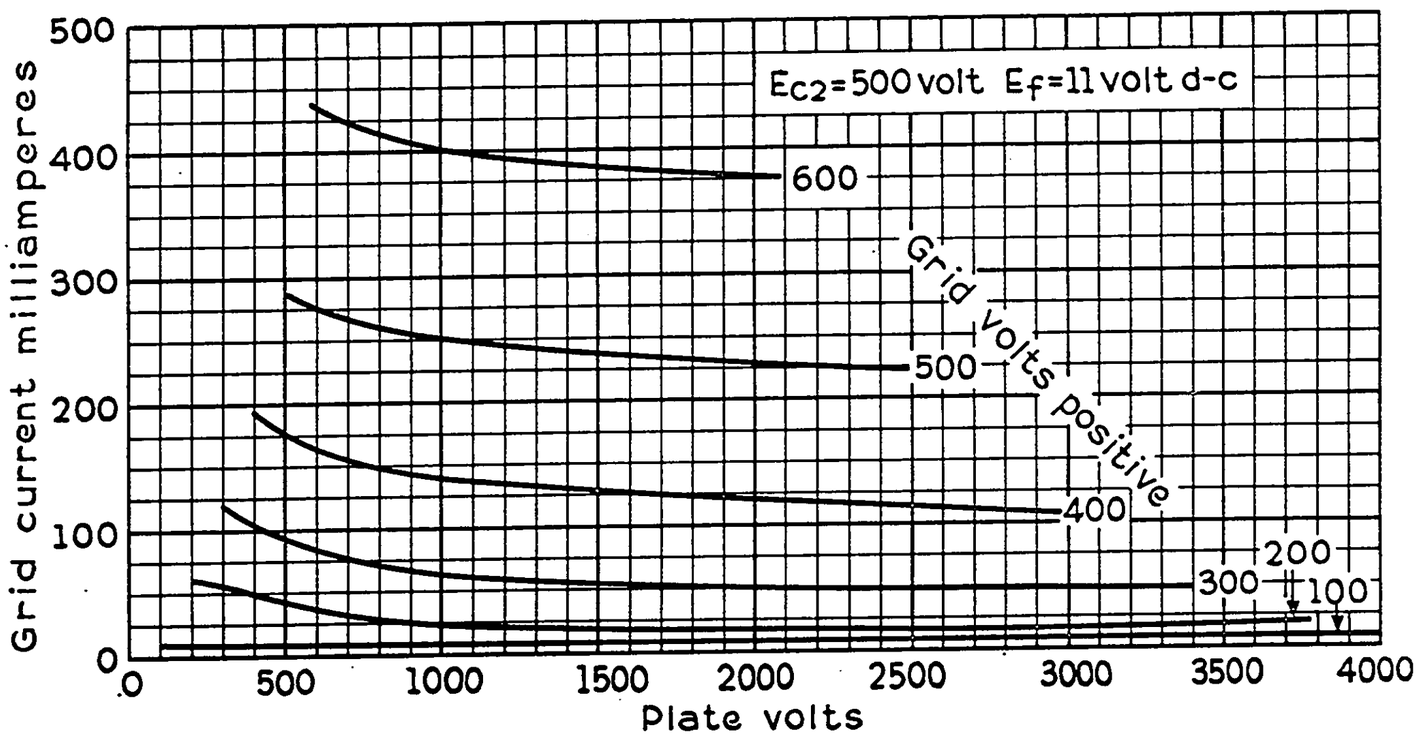
The resonant frequency of the grid-plate circuit is approximately 100 megacycles.

The normal value of grid leak, when the tube is used as an oscillator or r-f power amplifier (Class C), is in the neighborhood of 5000 ohms, although this may be replaced by a suitable fixed bias. If self-bias is used the cathode resistor should be approximately 500 ohms.



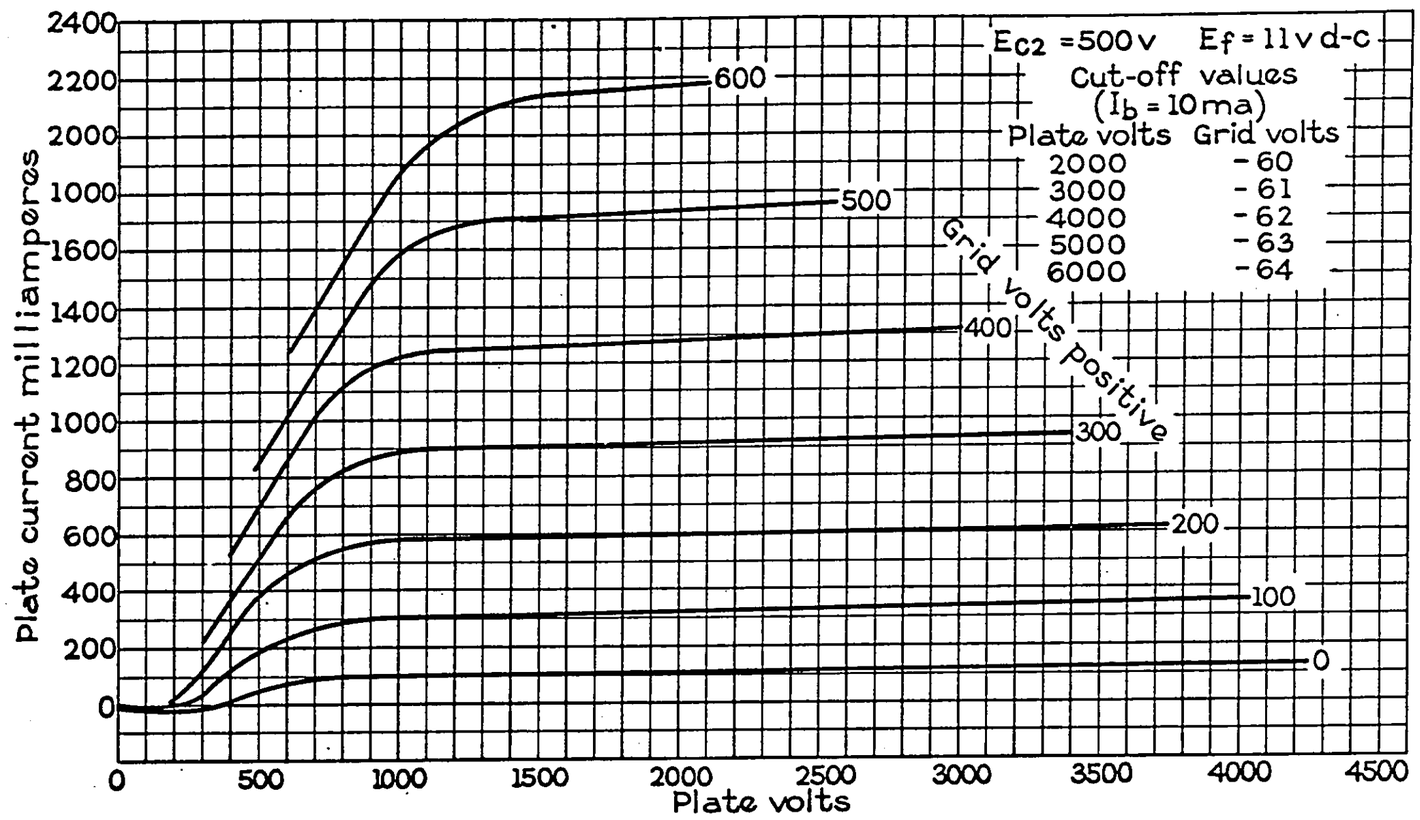
Average Plate-Screen-Grid Transfer Characteristics for Transmitting Tube GL-861

K-6917429 10-2-39

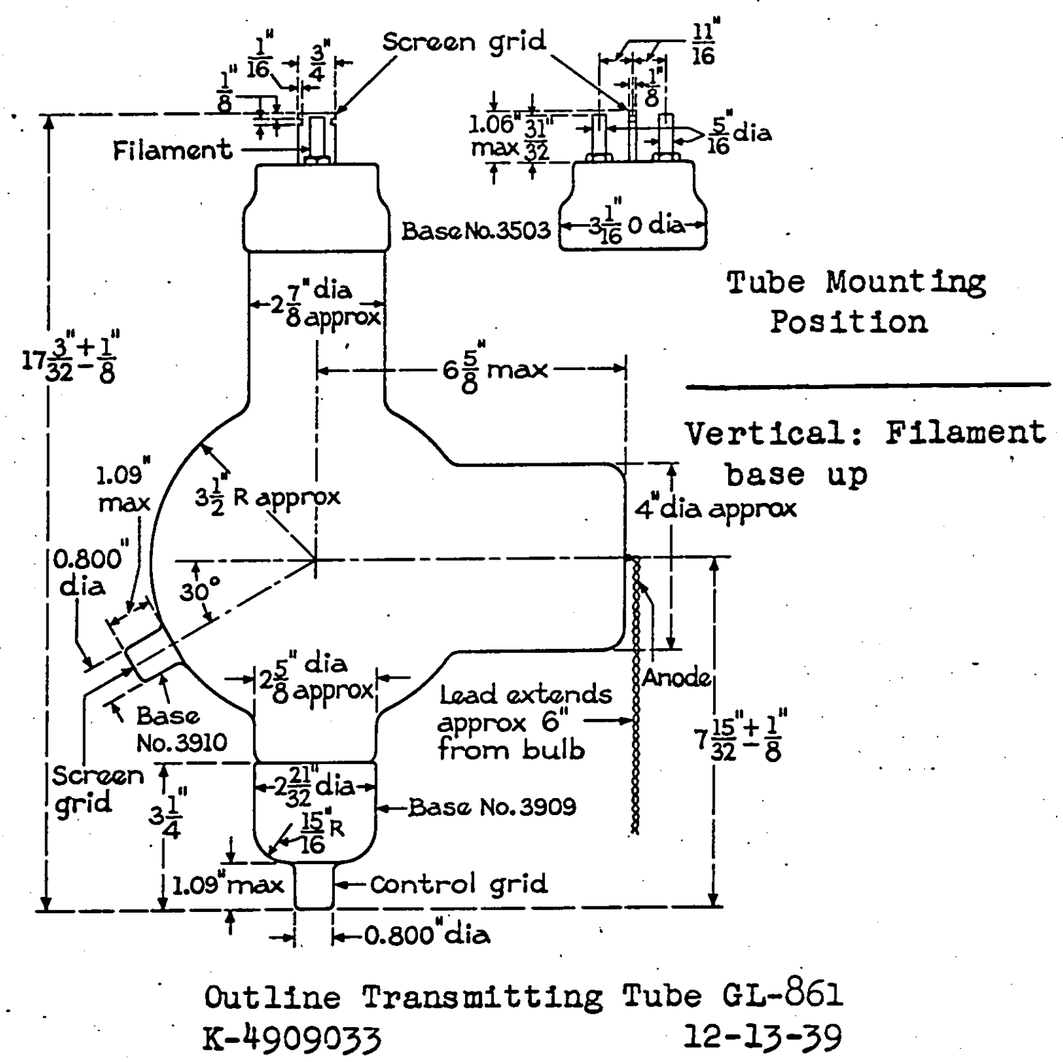


Average Plate-Grid Transfer Characteristics for Transmitting Tube GL-861

K-6917427 10-2-39



Average Plate Characteristics for Transmitting Tube GL-861
K-6917426 10-2-39



Outline Transmitting Tube GL-861
K-4909033 12-13-39

GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y.

7-42 (5M)
Filing No. 8850

Supersedes GET-506C

PRINTED IN U.S.A.

GENERAL ELECTRIC

Transmitting Tube GL-862 - - Description and Rating

TECHNICAL INFORMATION

The GL-862 is a three-electrode power tube designed for use as a radio-frequency amplifier, oscillator, or Class B modulator. The plate is water-cooled and is capable of dissipating 50 to 100 kw, depending upon the class of service in which the tube is operated.

CHARACTERISTICS AND RATINGS

Filament Voltage	33	Volts
Filament Current	207	Amperes
Amplification Factor	48	
Grid-plate Transconductance, I_b = 3.0	17200	Micromhos
Direct Interelectrode Capacitances:		
Grid-plate	75	μμf
Input	52	μμf
Output	2	μμf
Frequency for Maximum Ratings	1.6	Megacycle
Type of Cooling	Water	
Net Weight (approx)	30	Pounds

MAXIMUM RATINGS AND TYPICAL OPERATING CONDITIONS

CLASS B A-F POWER AMPLIFIER (TWO TUBES):

D-c Plate Voltage	12000	15000 max	Volts
Maximum Signal Plate Current (per tube)*		7.5 max	Amperes
D-c Maximum Signal Plate Input (per tube)*		100 max	Kilowatts
Plate Dissipation (per tube)*		50 max	Kilowatts
D-c Grid Voltage	0		Volts
Peak A-f Grid Input Voltage	2000		Volts
Zero Signal Plate Current	3		Amperes
Maximum Signal Plate Current	13		Amperes
Maximum Signal Plate Input*	156		Watts
Maximum Signal Driving Power (approx)	450		Watts
Effective Load Resistance (plate-to-plate)	1800		Ohms
Maximum Signal Plate Power Output	90		Kilowatts

CLASS B R-F POWER AMPLIFIER:
Carrier conditions per tube for use with a maximum modulation factor of 1.0

D-c Plate Voltage	12000	15000	18000	20000 max	Volts
D-c Grid Voltage	-100	-150	-200		Volts
D-c Plate Current	2.8	3.5	4.2	5.0	Amperes
Plate Input				100 max	Kilowatts
Plate Dissipation				75 max	Kilowatts
Peak R-f Grid Input Voltage	500	625	750		Volts
Driving Power (approx)**	0.5	0.75	1.1		Kilowatt
Plate Power Output	11	17.5	25		Kilowatts

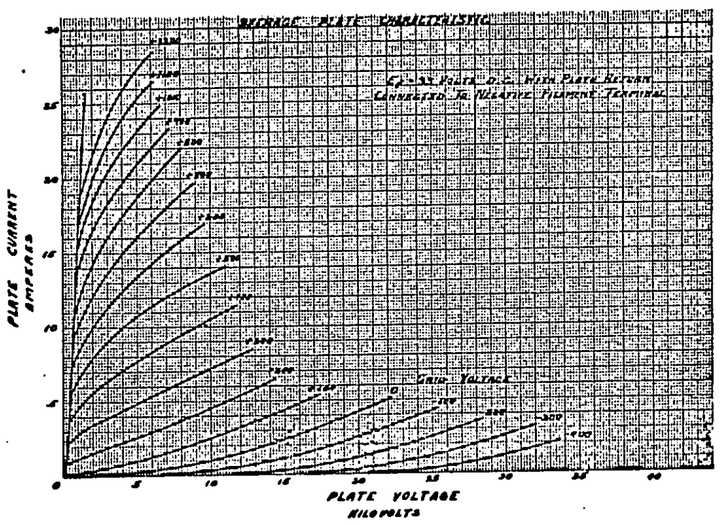
CLASS C R-F POWER AMPLIFIER AND OSCILLATOR - PLATE-MODULATED:
Carrier conditions per tube for use with a maximum modulation factor of 1.0

D-c Plate Voltage	8000	10000	12000	12000 max	Volts
D-c Grid Voltage	-700	-750	-800	-3000 max	Volts
D-c Plate Current	4	4.5	5	5.0 max	Amperes
D-c Grid Current (approx)	1	1	1	1.25 max	Ampere
Plate Input				60 max	Kilowatts
Plate Dissipation				50 max	Kilowatts
Peak R-f Grid Input Voltage(approx)	1700	1850	2000		Volts
Driving Power (approx)	1.7	1.85	2		Kilowatts
Plate Power Output	24	34	45		Kilowatts

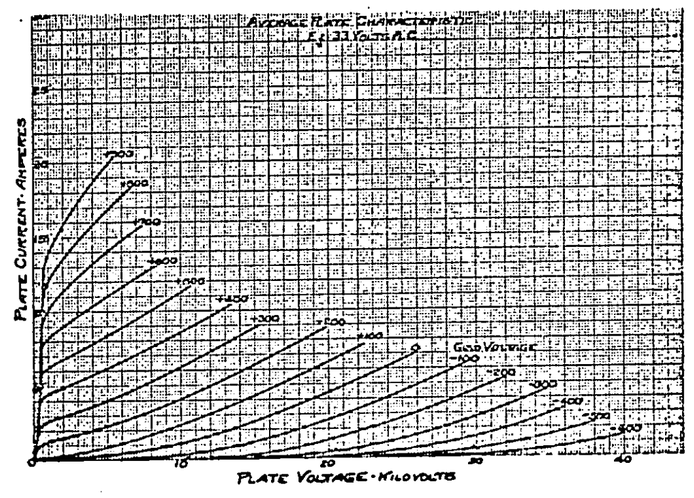
CLASS C R-F POWER AMPLIFIER AND OSCILLATOR:
Key-down conditions per tube without modulation #

D-c Plate Voltage	12000	15000	18000	20000 max	Volts
D-c Grid Voltage	-800	-900	-1000	-3000 max	Volts
D-c Plate Current (approx)	6.25	7.5	8.33	10 max	Amperes
D-c Grid Current (approx)	0.8	0.85	0.9	1.0 max	Ampere
Plate Input				200 max	Kilowatts
Plate Dissipation				100	Kilowatts
Peak R-f Grid Input Voltage(approx)	2050	2300	2550		Volts
Driving Power (approx)	1.6	2	2.4		Kilowatts
Plate Power Output	50	75	100		Kilowatts

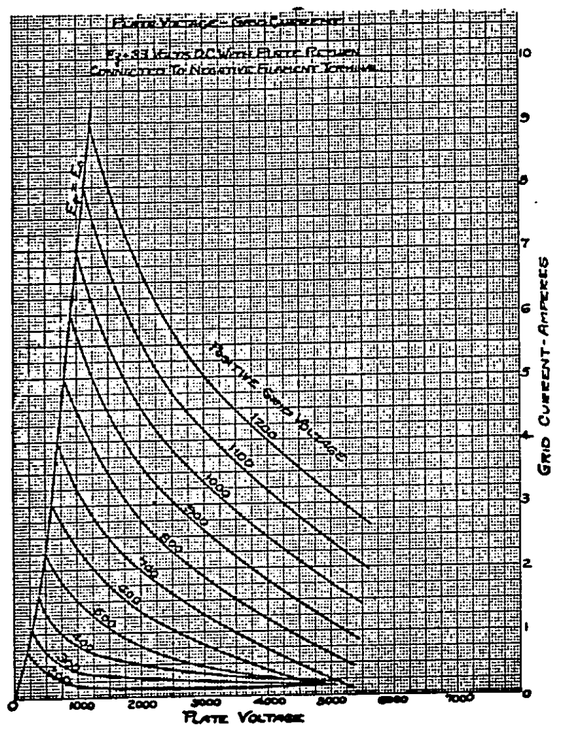
* Averaged over an audio-frequency cycle.
** At crest of audio-frequency cycle.
\# Modulation, essentially negative, may be used if the positive peak of the audio-frequency envelope does not exceed 115 per cent of the carrier conditions.



Average Plate Characteristics
for Transmitting Tube GL-862
K-7050573 4-26-33

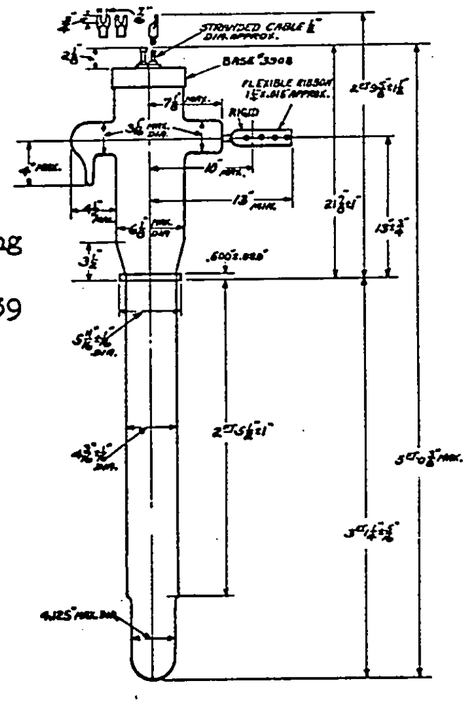


Average Plate Characteristics
for Transmitting Tube GL-862
K-7050415 2-14-33



Left--
Plate Voltage Grid-current for Trans-mitting Tube GL-862
K-7050575 5-9-33

Right--
Outline Transmitting
Tube GL-862
K-3846052 4-26-39



GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y.

11-39 (2M)
Filing No. 8850

SUPPLEMENT TO GET-919 DESCRIPTION AND RATING SHEET FOR TRANSMITTING TUBE GL-862

GENERAL CHARACTERISTICS

MECHANICAL

Gasket, Cat. No. 5182028P1	
Type of Cooling	Water and Forced Air
Water Flow, gallons per minute	15-25
Air Flow, cubic feet per minute	
To Bulb	15
To Stem	3
Shipping Weight, lb approx	175
Installation and Operation	GEH-1152

APPLICATION NOTES

Plate Series Protective Resistors (see paragraph describing plate circuit under Installation in the Instructions).

Series Resistor, ohms	10	20	40	50
Maximum Power Output of Rectifier, kilowatts	100	250	640	1600

May, 1940 (2M)
Filing No. 8850

GENERAL ELECTRIC

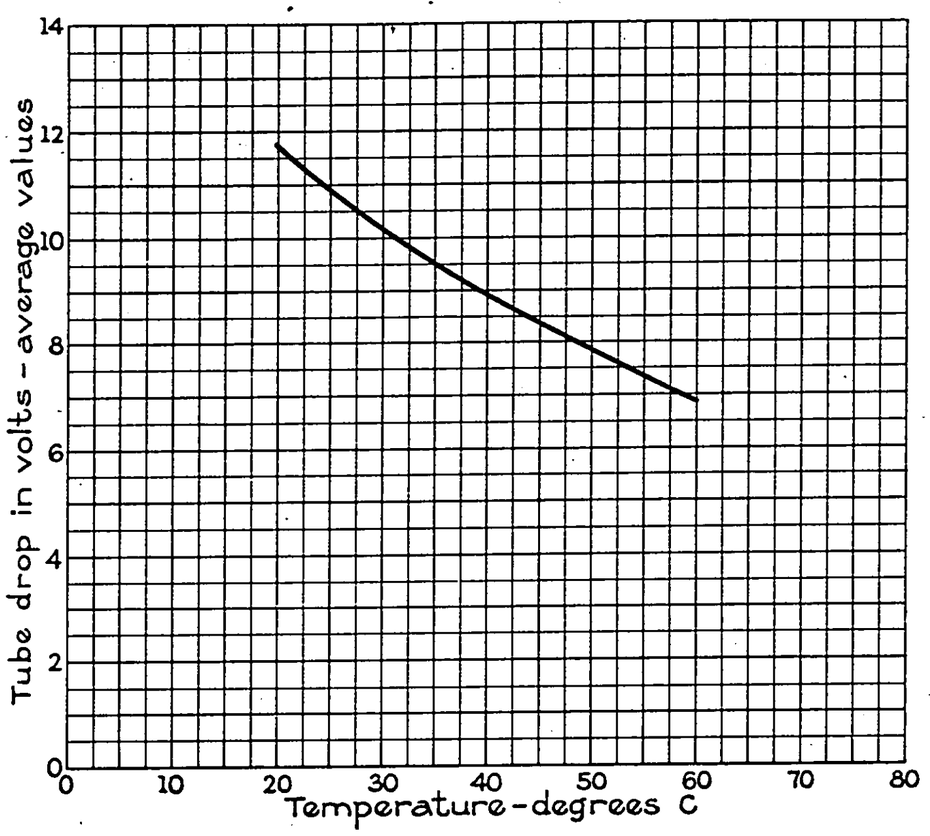
Transmitting Tube GL-869-B - - Description and Rating

The GL-869-B is a half-wave, mercury-vapor rectifier tube for use in broadcast transmitters and other applications where high d-c voltages are required. Economy of operation and high over-all efficiency result from several unique design features incorporated in this tube. The design of cathode used allows the further advantage of operation with both in-phase and quadrature filament excitation. In quadrature operation the filament and anode voltages are approximately ninety degrees out of phase with each other. Such an arrangement, allowing uniform utilization of the cathode, results in greater uniformity of characteristic than is possible with other methods, and in long tube life.

TECHNICAL INFORMATION

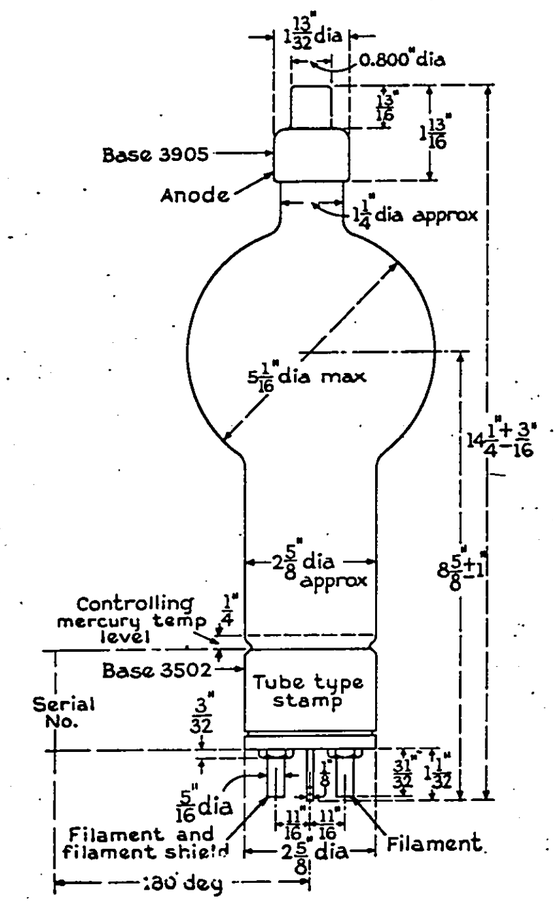
These data are for reference use only. For design information see the specifications.

GENERAL DESIGN	
Number of Electrodes	2
Cathode, Type	Filamentary
Voltage, volts	5.0
Current, amperes approx	18.0
Heating Time, typical	1 min
Tube Voltage Drop, volts	
Maximum	20
Minimum	5
Net Weight, pounds approx	1 1/2
Shipping Weight, pounds approx	6
Installation and Operation	GEH-977
MAXIMUM RATINGS	
In-phase Filament Excitation	
Maximum Peak Inverse Anode Voltage	
Volts, 150 cycles or less	20,000
Corresponding Mercury Temperature, C	30-40
Type of Cooling	Forced Ventilation
Volts, 150 cycles or less	10,000
Corresponding Mercury Temperature, C	30-60
Type of Cooling	Natural Ventilation
Maximum Anode Current, amperes	
Instantaneous, 25 to 150 cycles	10
Average	2.5
Quadrature Filament Excitation	
Maximum Peak Inverse Anode Voltage	
Volts, 150 cycles or less	15,000
Corresponding Mercury Temperature, C	30-40
Type of Cooling	Forced Ventilation
Maximum Anode Current, amperes	
Instantaneous, 25 to 150 cycles	15.0
Average	5.0
Maximum Surge Anode Current, amperes	100
Maximum Time of Averaging Current, seconds	30
Maximum Time of Surge Anode Current, seconds	0.1
Recommended Temperature, Condensed Mercury C	35±5



Typical Values of Peak Tube Voltage Drop at Rated Peak Current as a Function of Condensed-mercury Temperature

H-5172855 GL-869-B 5-7-37



Outline GL-869-B

K-4909011 11-26-40

GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y.

11-41 (3M)

Filing No. 8850

Supersedes GET-964

GENERAL ELECTRIC

Transmitting Tube GL-872 - - Description and Rating

The GL-872 is a half-wave, mercury-vapor rectifier tube.

Technical Information

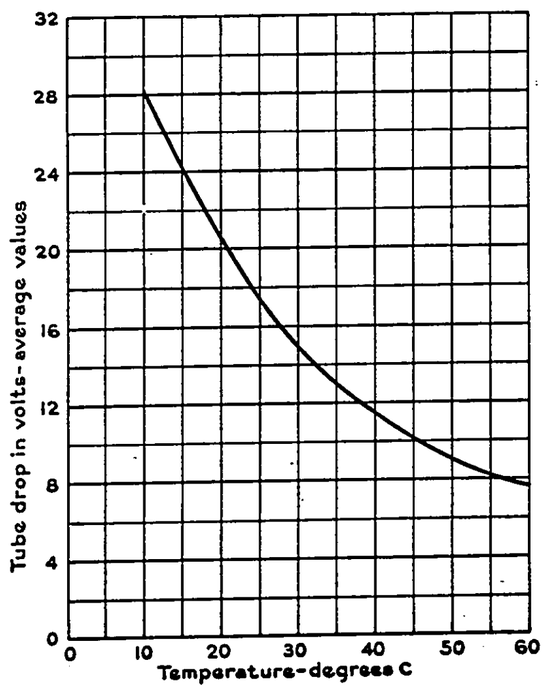
These data are for reference only. For design information see the specifications.

GENERAL DESIGN

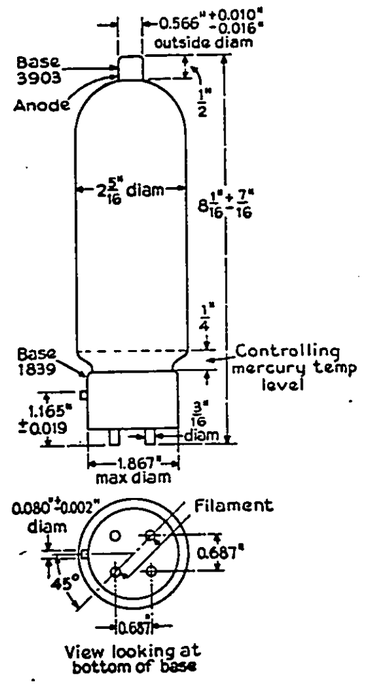
Number of Electrodes	2	
Cathode, Type	Shielded Filament	
Voltage	5.0	Volts
Current, approx	10.0	Amperes
Transformer Watts, for design purposes	50	Watts
Heating Time, typical	30	Seconds
Maximum Tube Voltage Drop	20	Volts
Minimum Tube Voltage Drop	5	Volts
Net Weight, approx	6	Ounces
Shipping Weight	3	Pounds
Installation and Operation	GEH-977	

MAXIMUM RATINGS

Maximum Peak Inverse Anode Voltage, 150 cycles or less	7500	Volts
Corresponding Cond-mercury Temperature Limits	10 C - 60 C	Degrees
Type of Cooling	Natural Ventilation	
Maximum Anode Current:		
Instantaneous, 25 cycles and above	5.0	Amperes
Instantaneous, below 25 cycles	2.5	Amperes
Average	1.25	Amperes
Surge, for design only	50	Amperes
Maximum Time of Averaging Current	15	Seconds
Maximum Time of Surge Anode Current	0.1	Seconds
Recommended Temperature, Cond-mercury C	40 ±5	Degrees



Left--
Tube Drop at Rated Current as a Function of Condensed-mercury Temperature for Transmitting Tube GL-872
K-4945898 4-13-36



Right--
Outline Transmitting Tube GL-872
K-4903594 9-17-40

GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y.

11-41 (3M)
Filing No. 8850

Supersedes GET-917

PRINTED IN U.S.A.

GENERAL ELECTRIC

Transmitting Tube GL-889-R - - Description and Rating

Description

The 889-R is a three-electrode power tube designed for use as a radio-frequency amplifier, oscillator, or Class B modulator. The plate is fitted with a special radiator and cooling is obtained by forced air. The design of the mount and terminal connections minimizes lead inductance and makes the tube particularly suitable for high-frequency applications.

Technical Information

These data are for reference only. For design information see the specifications.

GENERAL CHARACTERISTICS

ELECTRICAL	
Filament Voltage	11 Volts
Filament Current	125 Amperes
Amplification Factor, E_b = 5 kv, I_b = 1.0 amp, E_c = 75 v, E_f = 11 v a-c	21
Grid-plate Transconductance	9000 Micromhos
Direct Interelectrode Capacitances, mmfd	
Grid-plate	20.7
Grid-filament	19.5
Plate-filament	2.5
MECHANICAL	
Type of Cooling	Forced Air
Air Flow	
To Radiator	500 Cubic feet per minute
To Bulb, from a 3-inch diam nozzle	15 Cubic feet per minute
Net Weight, approx	35 Pounds
Shipping Weight, approx	52 Pounds
Instructions	GEH-1172

MAXIMUM RATINGS AND TYPICAL OPERATING CONDITIONS

CLASS B A-F POWER AMPLIFIER (TWO TUBES):

	Typical Operation			Maximum* Ratings	
D-c Plate Voltage	5000	6000	7500	8500	Volts
Maximum Signal Plate Current, per tube†				2.0	Amperes
D-c Maximum Signal Plate Input, per tube†				12	Kilowatts
Plate Dissipation, per tube†				5.0	Kilowatts
Radiator Temperature‡				180	C
D-c Grid voltage	-180	-230	-300		Volts
Peak A-f Grid Input Voltage	1460	1680	1700		Volts
Zero Signal Plate Current	0.4	0.4	0.4		Ampere
Maximum Signal Plate Current	3.2	3.6	3.2		Amperes
Maximum Signal Plate Input†	16	21.6	24		Kilowatts
Maximum Signal Driving Power, approx	170	180	150		Watts
Effective Load, plate-to-plate	2520	3680	5000		Ohms
Maximum Signal Plate Power Output	8.8	12	15		Kilowatts

CLASS B R-F POWER AMPLIFIER
Carrier conditions per tube for use with a max modulation factor of 1.0

	Typical Operation		Maximum* Ratings	
D-c Plate Voltage	6000	7500	8500	Volts
D-c Grid Voltage	-250	-300		Volts
D-c Plate Current	0.9	0.9	1.0	Ampere
Plate Input			7.5	Kilowatts
Plate Dissipation			5.0	Kilowatts
Radiator Temperature‡			180	C
Peak R-f Grid Input Voltage	920	1000		Volts
Driving Power, approx§	95	80		Watts
Plate Power Output	1.5	2		Kilowatts

CLASS C R-F POWER AMPLIFIER AND OSCILLATOR - PLATE-MODULATED
Carrier conditions per tube for use with a max modulation factor of 1.0

D-c Plate Voltage	5000	6000	6000	Volts
D-c Grid Voltage	-800	-900	-1000	Volts
D-c Plate Current	0.9	1.0	1.0	Ampere
D-c Grid Current, approx	0.12	0.1	0.25	Ampere
Plate Input			6.0	Kilowatts
Plate Dissipation			3.0	Kilowatts
Radiator Temperature‡ (modulation factor m = 1.0)			180	C
Peak R-f Grid Input Voltage, approx	1300	1420		Volts
Driving Power, approx	155	140		Watts
Plate Power Output	2.75	4.0		Kilowatts

CLASS C R-F POWER AMPLIFIER AND OSCILLATOR
Key-down conditions per tube without modulationπ

D-c Plate Voltage	5000	6000	7500	8500	Volts
D-c Grid Voltage	-500	-600	-800	-1000	Volts
D-c Plate Current	1.5	1.8	2.0	2.0	Amperes
D-c Grid Current, approx	0.19	0.21	0.24	0.25	Ampere
Plate Input				16	Kilowatts
Plate Dissipation				5	Kilowatts
Radiator Temperature‡				180	C
Peak R-f Grid Input Voltage, approx	1200	1460	1830		Volts
Driving Power, approx	220	290	400		Watts
Plate Power Output	5	7	10		Kilowatts

† Averaged over any audio-frequency cycle.
‡ Measured in the thermometer well. This temperature corresponds to the maximum ratings when the air flow is 500 cubic feet per minute and the temperature of the incoming air does not exceed 45 C. The glass temperature must not be allowed to exceed 150 C.
§ At crest of audio-frequency cycle.
π Modulation, essentially negative, may be used if the positive peak of the audio-frequency envelope does not exceed 115 per cent of the carrier conditions.

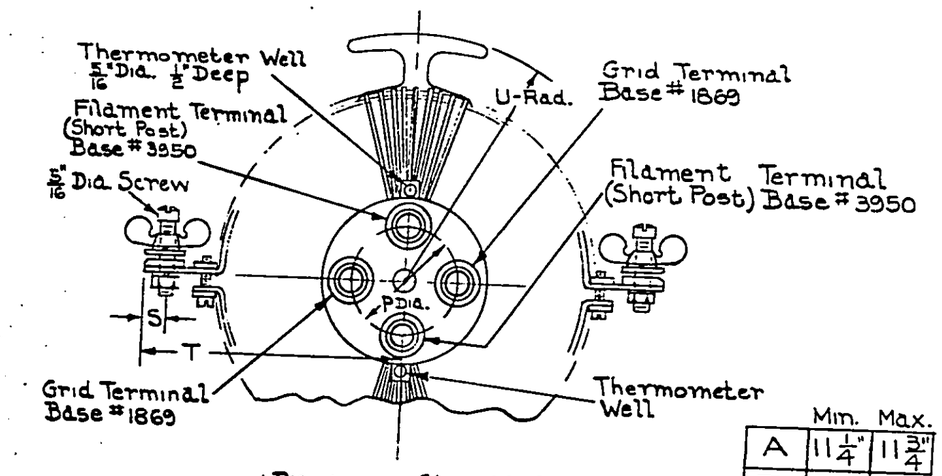
APPLICATION NOTES

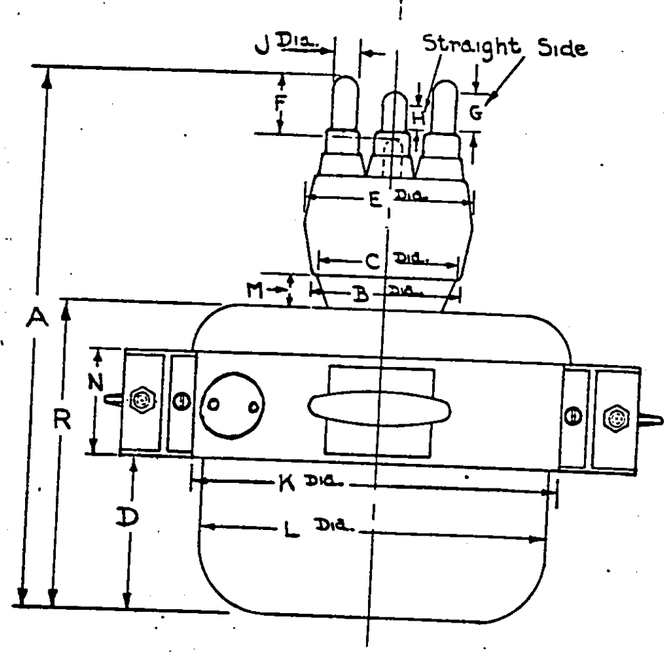
* GL-889-R can be operated at maximum ratings in all classes of service at frequencies as high as 25 megacycles. The tube may be operated at higher frequencies provided the maximum values of plate voltage and power input are reduced as the frequency is raised. (Other maximum ratings are the same as shown under TECHNICAL INFORMATION.) The tabulation below shows the highest percentage of maximum plate voltage and power input that can be used up to 100 megacycles for the various classes of service. Special attention should be given to adequate ventilation of the bulb at these frequencies.

Frequency - Mc	25	50	75	100
Class B R-f				
Per Cent Max Plate Voltage and Plate Input	100	87	80	74
Class C Plate-modulated				
Per Cent Max Plate Voltage and Plate Input	100	80	68	60
Class C				
Per Cent Max Plate Voltage	100	85	76	70
Per Cent Max Plate Input	100	75	60	50

Plate Series Protective Resistors (See paragraph describing plate circuit under Installation in the Instructions)

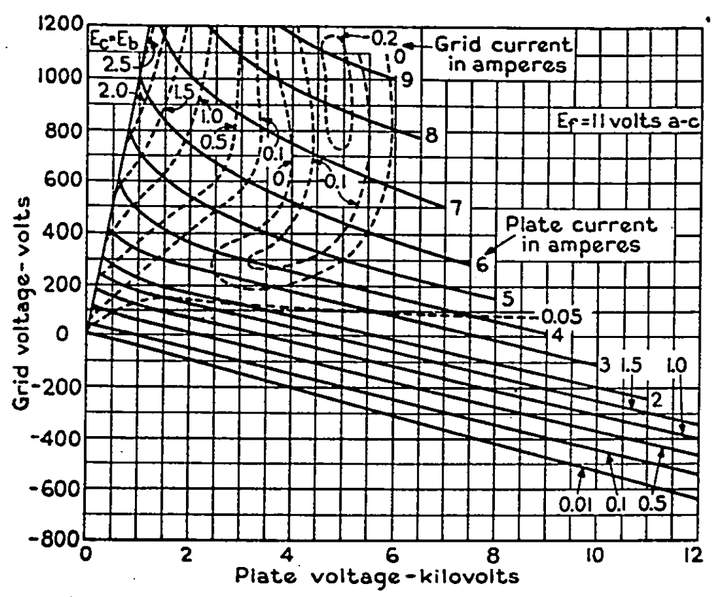
Series Resistor, ohms	25	50	100	150
Maximum Power Output of Rectifier, kilowatts	16	40	100	250





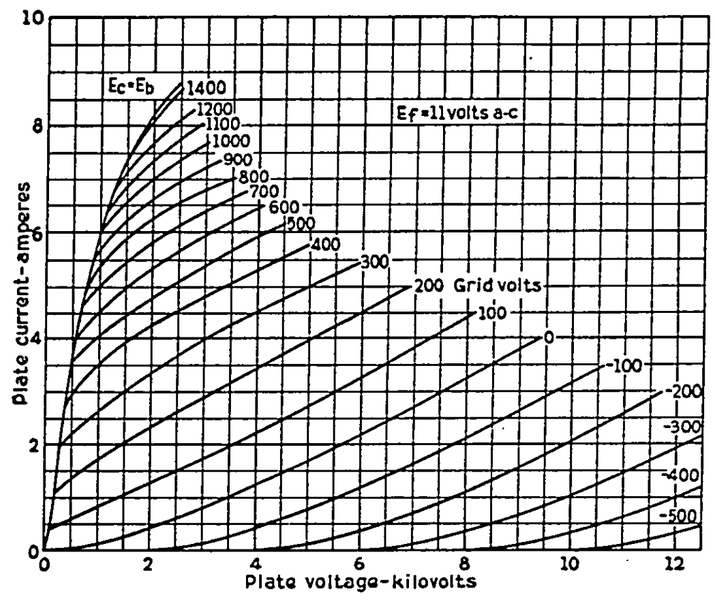
	Min.	Max.
A	11 1/4"	11 3/4"
B		3 1/4"
C		2 7/8"
D	3 3/16"	3 5/16"
E		3 5/8"
F	3/4"	
G	.650"	
H	.465"	
J	.432"	.442"
K	7 15/16"	8 1/16"
L	7 15/32"	7 9/16"
M	1/4"	
N	2 3/16"	2 5/16"
P	2 3/32"	2 5/32"
R	6 7/16"	6 9/16"
S	13/32"	15/32"
T	5 3/8"	5 1/2"
U	5 5/16"	5 7/16"

Outline Transmitting Tube GL-889-R
K-6966908
6-25-40



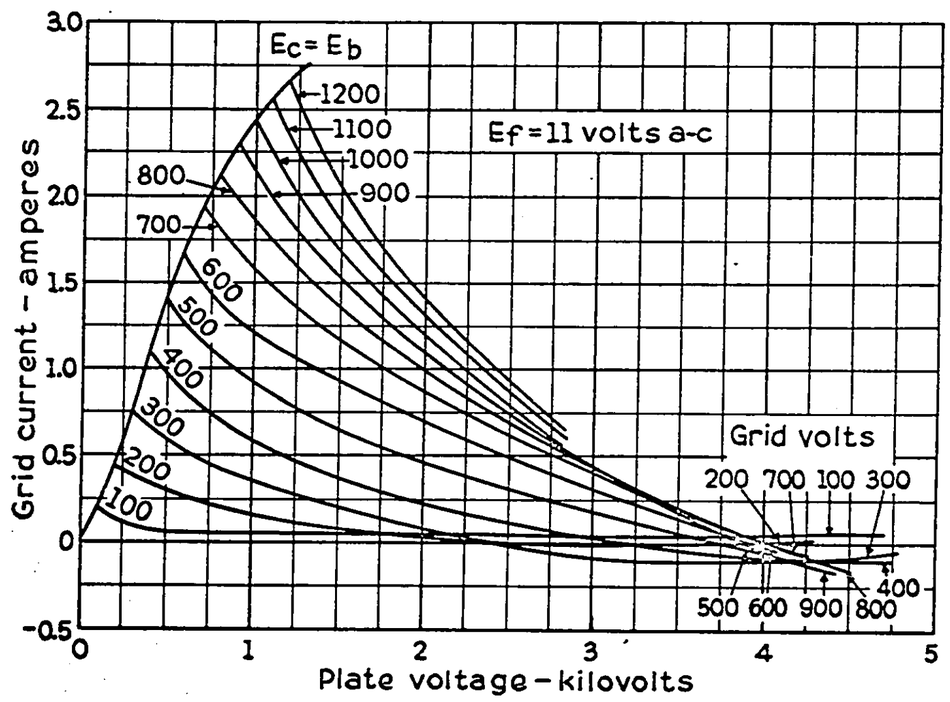
Characteristics for Transmitting Tube GL-889-R

K-7050612 5-22-39



Average Plate Characteristics for Transmitting Tube GL-889-R

K-7050616 5-22-39



Typical Grid Plate Transfer Characteristics for Transmitting Tube GL-889-R

K-7050617 5-22-39

GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y.

9-41(2M)

Filing No. 8850

GENERAL ELECTRIC

Transmitting Tube GL-893 - - Description and Rating

Technical Information

The GL-893 is a three-electrode, water-cooled vacuum tube designed for use as a radio-frequency amplifier, oscillator, or Class B modulator. A particular advantage of this tube is the unique construction of the filament which permits operation from single-phase, three-phase, or six-phase alternating current, or from direct current, for all classes of service.

CHARACTERISTICS AND RATINGS

ELECTRICAL

Filament Voltage, per strand		10	Volts
Filament Current, per terminal		61	Amperes
Amplification Factor	E_b = 15 kv, I_b = 1.0 amp	36	
Grid-plate Transconductance	E_c = -300, E_f = 20 a-c	16000	Micromhos
Direct Interelectrode Capacitances:			
Grid-plate		33	μμf
Input		48	μμf
Output		3.2	μμf
Frequency for Maximum Ratings		5	Megacycles

MECHANICAL

Gasket, Cat. No. 5182028P2	
Type of Cooling	Water and Forced Air
Water Flow, gallons per minute	8-15
Air Flow, cubic feet per minute	
To Stem	2
Net Weight, approx	12 lb
Shipping Weight, approx	27 lb
Installation and Operation	GEH-1152

MAXIMUM RATINGS AND TYPICAL OPERATING CONDITIONS

CLASS B A-F POWER AMPLIFIER (TWO TUBES)

D-c Plate Voltage	12000	15000	18000	20000 max	Volts
Max Signal Plate Current, per tube*				4.0 max	Amperes
D-c Max Signal Plate Input, per tube*				60 max	Kilowatts
Plate Dissipation, per tube*				20 max	Kilowatts
D-c Grid Voltage	-260	-350	-450		Volts
Peak A-f Grid Input Voltage	1480	1560	1720		Volts
Zero Signal Plate Current	0.8	0.8	0.8		Ampere
Max Signal Plate Current	7.0	6.0	5.5		Amperes
Max Signal Plate Input*	84.0	90.0	99.0		Kilowatts
Max Signal Driving Power, approx	220	190	140		Watts
Effective Load Resistance, Plate-to-plate	4000	6000	8000		Ohms
Max Signal Plate Power Output	52.0	60.0	70.0		Kilowatts

CLASS B R-F POWER AMPLIFIER

Carrier conditions per tube for use with a max modulation factor 1.0

D-c Plate Voltage	12000	15000	15000	20000 max	Volts
D-c Grid Voltage	-250	-340	-340		Volts
D-c Plate Current	1.5	1.5	2.0	2.0 max	Amperes
Plate Input				32 max	Kilowatts
Plate Dissipation				20 max	Kilowatts
Peak R-f Grid Input Voltage	700	790	900		Volts
Driving Power, approx **	130	150	200		Watts
Plate Power Output	6	7.5	10		Kilowatts

CLASS C R-F POWER AMPLIFIER AND OSCILLATOR - PLATE-MODULATED
Carrier conditions per tube for use with a max modulation factor of 1.0

D-c Plate Voltage	10000	10000	12000	12000 max	Volts
D-c Grid Voltage	-800	-800	-1000	-3000 max	Volts
D-c Plate Current	1.5	2.0	2.0	2.0 max	Amperes
D-c Grid Current, approx	0.10	0.16	0.14	0.4 max	Amperes
Plate Input				24 max	Kilowatts
Plate Dissipation				12	Kilowatts
Peak R-f Grid Input Voltage, approx	1200	1280	1500		Volts
Driving Power, approx	120	210	210		Watts
Plate Power Output	11	15	18		Kilowatts

CLASS C R-F POWER AMPLIFIER AND OSCILLATOR
Key-down conditions per tube without modulation #

D-c Plate Voltage	12000	15000	18000	20000 max	Volts
D-c Grid Voltage	-800	-900	-1000	-3000 max	Volts.
D-c Plate Current	3.5	3.6	3.6	4.0 max	Amperes
D-c Grid Current, approx	0.26	0.25	0.21	0.4 max	Amperes
Plate Input				70 max	Kilowatts
Plate Dissipation				20 max	Kilowatts
Peak R-f Grid Input Voltage, approx	1430	1520	1630		Volts
Driving Power, approx	360	370	340		Watts
Plate Power Output	30	40	50		Kilowatts

* Averaged over any audio-frequency cycle.
** At crest of audio-frequency cycle.
\# Modulation, essentially negative, may be used if the positive peak of the audio-frequency envelope does not exceed 115 per cent of the carrier conditions.

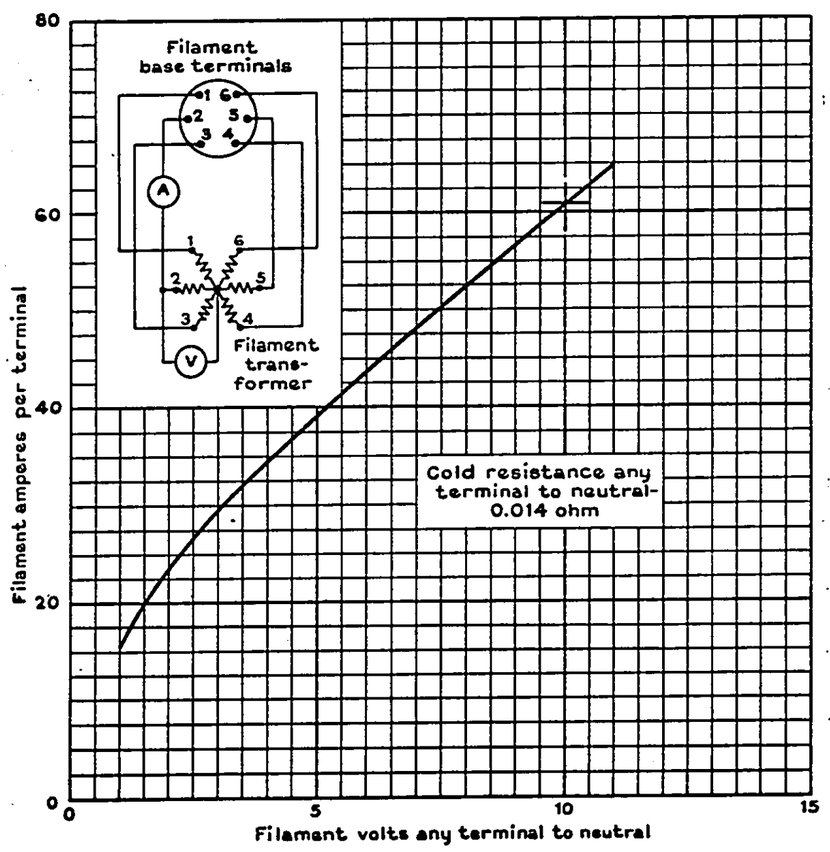
GL-893 can be operated at maximum ratings in all classes of service at frequencies as high as 5 megacycles. The tube may be operated at higher frequencies provided the maximum values of plate voltage and power input are reduced as the frequency is raised (Other maximum ratings are the same as shown under CHARACTERISTICS and RATINGS.) The tabulation below shows the highest percentage of maximum plate voltage and power input that can be used up to 40 mc for the various classes of service. Special attention should be given to adequate ventilation of the bulb at these frequencies.

FREQUENCY	5	20	40	Mc
MAXIMUM PERMISSIBLE PERCENTAGE OF MAXIMUM RATED PLATE VOLTAGE AND PLATE INPUT:				
Class B R-f				
Percentage Plate Voltage	100	85	65	
Percentage Plate Input	100	82	73	
Class C Plate Modulated				
Percentage Plate Voltage	100	80	64	
Percentage Plate Input	100	75	64	
Class C				
Percentage Plate Voltage	100	80	60	
Percentage Plate Input	100	66	50	

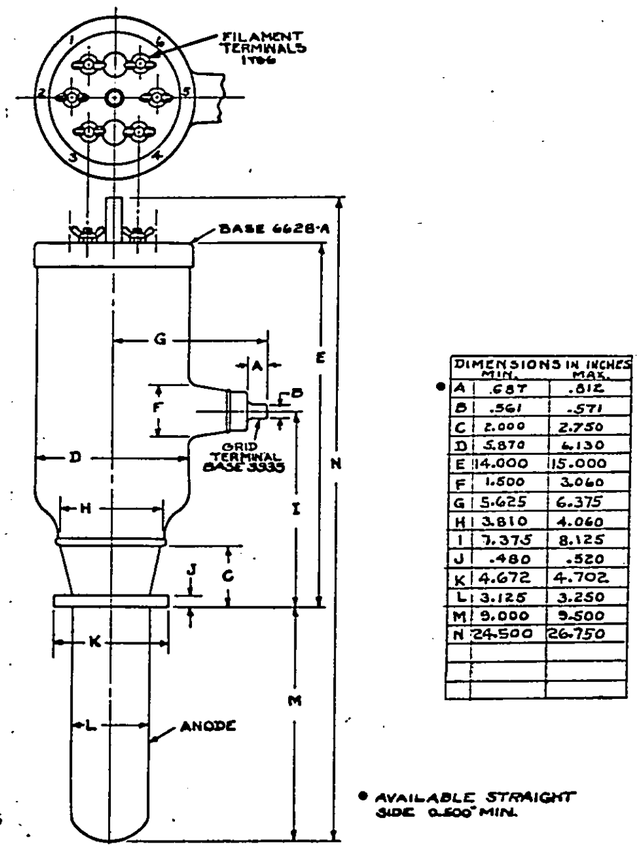
APPLICATION NOTES

Plate Series Protective Resistors (see paragraph describing plate circuit under Installation in the Instructions).

Series Resistor, ohms	10	20	40	80	100
Maximum Power Output of Rectifier, kilowatts	40	100	250	640	1600



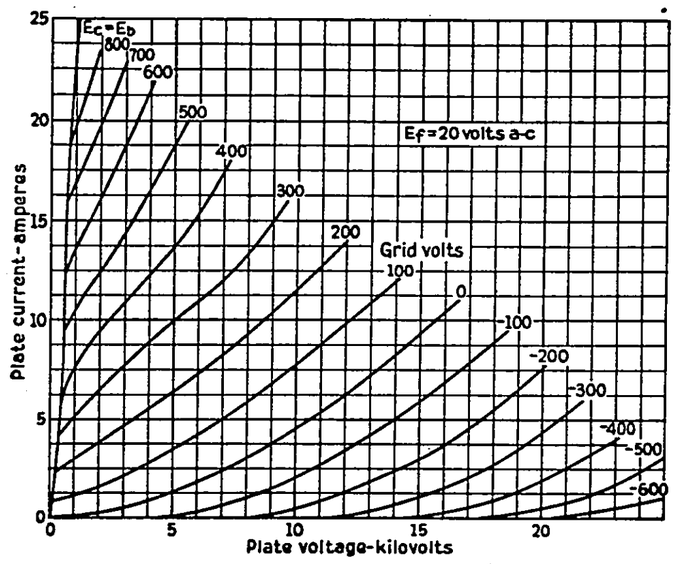
Average Filament Characteristic
K-7050605 5-22-39



DIMENSIONS IN INCHES	MIN.	MAX.
A	.687	.812
B	.561	.571
C	2.000	2.750
D	5.870	6.130
E	14.000	15.000
F	1.500	3.060
G	5.625	6.375
H	3.810	4.060
I	7.375	8.125
J	.480	.520
K	4.672	4.702
L	3.125	3.250
M	9.000	9.500
N	24.500	26.750

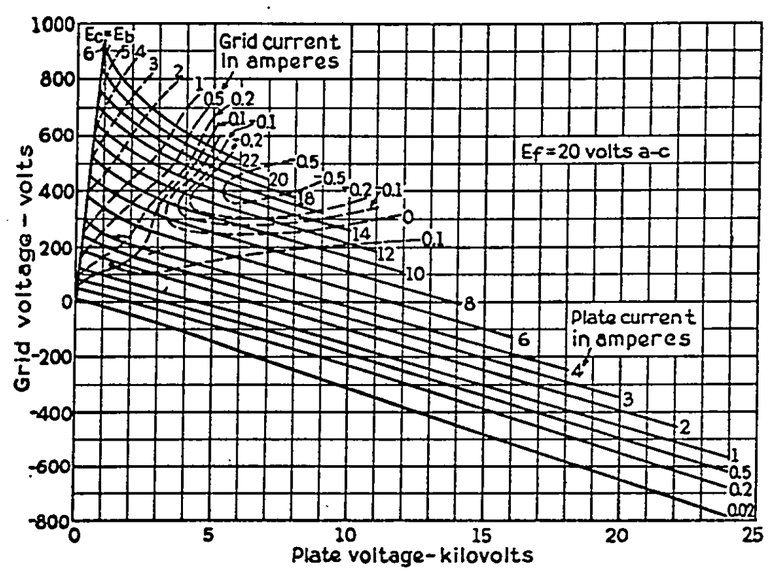
• AVAILABLE STRAIGHT SIDE 0.500" MIN.

Outline Transmitting Tube
GL-893
K-5344783 2-11-42



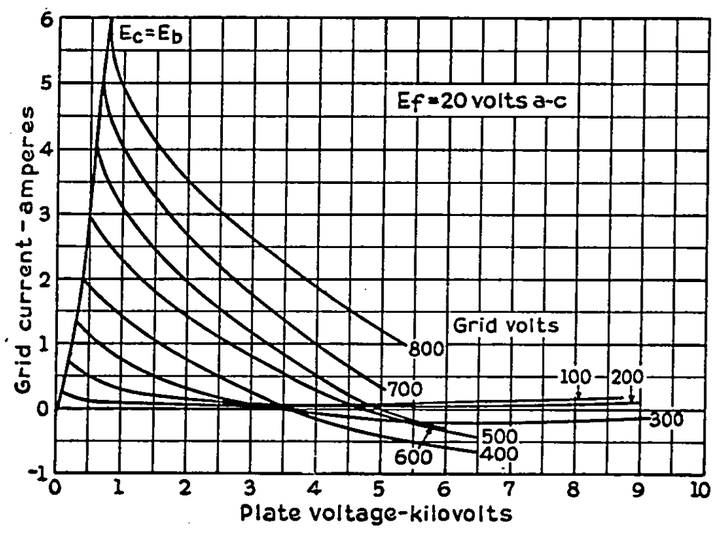
Average Plate Characteristics for Transmitting Tube GL-893

K-7050615 5-22-39



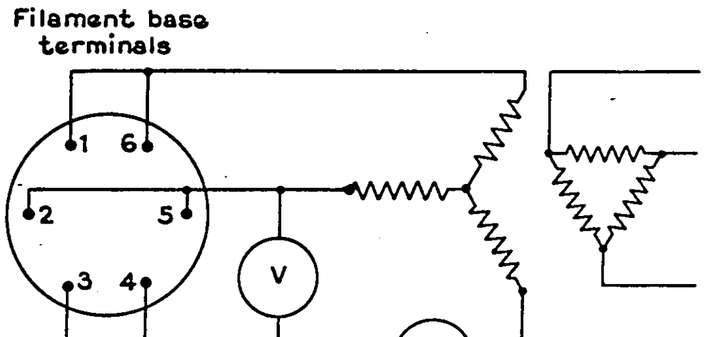
Characteristics for Transmitting Tube GL-893

K-7050611 5-22-39

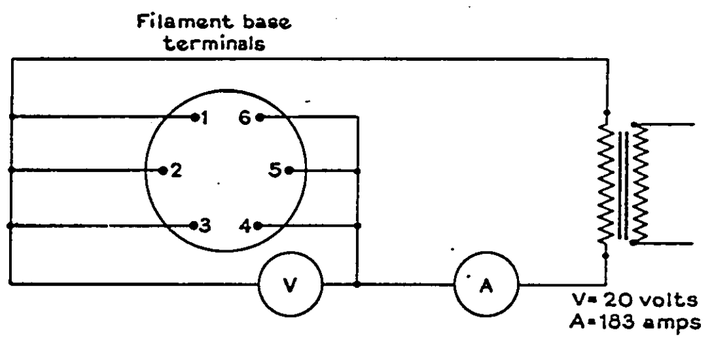


Typical Grid-plate Transfer Characteristics for Transmitting Tube GL-893

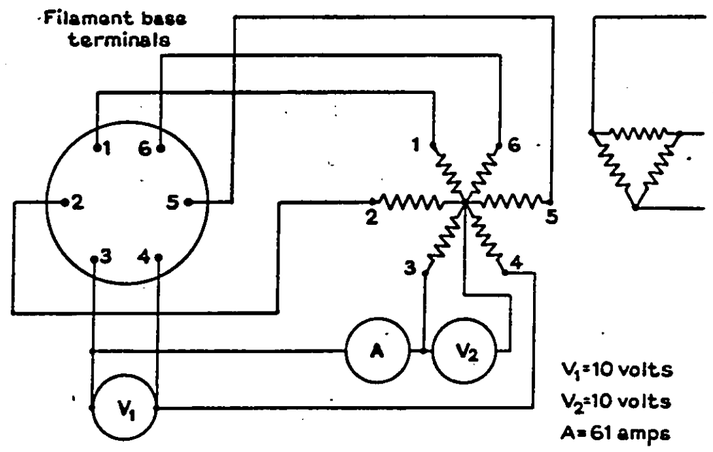
K-7050618 4-25-39



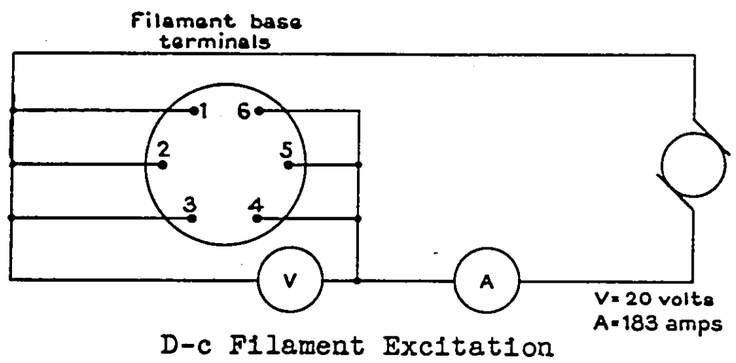
Three-phase A-c Filament Excitation



Single-phase A-c Filament Excitation



Six-phase A-c Filament Excitation



D-c Filament Excitation

NOTE: Terminals must be connected in correct phase relation as shown.

K-7050604 Filament Connections and Excitation Circuits 5-22-39

GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y.

3-42 (3M)

Filing No. 8850

GENERAL ELECTRIC

Transmitting Tube GL-893-R -- Description and Rating

Description

The GL-893-R is a three-electrode, forced air-cooled vacuum tube designed for use as a radio-frequency amplifier, oscillator, or Class B modulator. A particular advantage of this tube is the unique construction of the filament which permits operation from single-phase, three-phase, or six-phase alternating current, or from direct current, for all classes of service.

Technical Information

These data are for reference only. For design information see the specifications.

GENERAL CHARACTERISTICS

ELECTRICAL		
Filament Voltage (per strand)	10	Volts
Filament Current (per terminal)	61	Amperes
Amplification Factor, E_b = 15 kv, I_b = 1.0 amp, E_c = -300, E_f = 20 a-c	36	
Grid-plate Transconductance	16000	Micromhos
Direct Interelectrode Capacitances, μμf		
Grid-plate	33	
Grid-filament	48	
Plate-filament	3.2	
MECHANICAL		
Type of Cooling	Forced Air	
Air Flow		
To radiator	1800	Cu ft per minute
To stem	2	Cu ft per minute
Net Weight (approx)	230	Pounds
Shipping Weight (approx)	290	Pounds
Installation and Operation	GEH-1198	

MAXIMUM RATINGS AND TYPICAL OPERATING CONDITIONS

	Typical Operation			Maximum* Ratings	
CLASS B A-F POWER AMPLIFIER (TWO TUBES)					
D-c Plate Voltage	12000	15000	18000	20000	Volts
Max Signal Plate Current (per tube)†				4.0	Amperes
D-c Max Signal Plate Input (per tube)†				60	Kilowatts
Plate Dissipation (per tube)†				20	Kilowatts
Radiator Temperature‡				180	C
D-c Grid Voltage	-260	-350	-450		Volts
Peak A-f Grid Input Voltage	1480	1560	1720		Volts
Zero Signal Plate Current	0.8	0.8	0.8		Amperes
Max Signal Plate Current	7.0	6.0	5.5		Amperes
Max Signal Plate Input†	84	90	99		Kilowatts
Max Signal Driving Power (approx)	220	190	140		Watts
Effective Load Resistance (plate-to-plate)	4000	6000	8000		Ohms
Max Signal Plate Power Output	52	60	70		Kilowatts
CLASS B R-F POWER AMPLIFIER					
Carrier conditions per tube for use with a max modulation factor of 1.0					
D-c Plate Voltage	12000	15000	15000	20000	Volts
D-c Grid Voltage	-250	-340	-340		Volts
D-c Plate Current	1.5	1.5	2.0	2.0	Amperes

	Typical Operation			Maximum* Ratings	
Plate Input				32	Kilowatts
Plate Dissipation				20	Kilowatts
Radiator Temperature‡				180	C
Peak R-f Grid Input Voltage§	700	790	900		Volts
Driving Power (approx)§	130	150	200		Watts
Plate Power Output	6	7.5	10		Kilowatts

CLASS C R-F POWER AMPLIFIER AND OSCILLATOR - PLATE-MODULATED
Carrier conditions per tube for use with a max modulation factor of 1.0

D-c Plate Voltage	10000	10000	12000	12000	Volts
D-c Grid Voltage	-800	-800	-1000	-3000	Volts
D-c Plate Current	1.5	2.0	2.0	2.0	Amperes
D-c Grid Current (approx)	0.10	0.16	0.14	0.4	Ampere
Plate Input				24	Kilowatts
Plate Dissipation				12	Kilowatts
Radiator Temperature‡				180	C
(Modulation Factor = 1.0)					
Peak R-f Grid Input Voltage (approx)	1200	1280	1500		Volts
Driving Power (approx)	120	210	210		Watts
Plate Power Output	11	15	18		Kilowatts

CLASS C R-F POWER AMPLIFIER AND OSCILLATOR
Key-down conditions per tube without modulation¶

D-c Plate Voltage	12000	15000	18000	20000	Volts
D-c Grid Voltage	-800	-900	-1000	-3000	Volts
D-c Plate Current	3.5	3.6	3.6	4.0	Amperes
D-c Grid Current (approx)	0.26	0.25	0.21	0.4	Ampere
Plate Input				70	Kilowatts
Plate Dissipation				20	Kilowatts
Radiator Temperature‡				180	C
Peak R-f Grid Input Voltage (approx)	1430	1520	1630		Volts
Driving Power (approx)	360	370	340		Watts
Plate Power Output	30	40	50		Kilowatts

† Averaged over any audio-frequency cycle.
‡ Measured in the thermometer well. This temperature corresponds to the maximum ratings when the air-flow is 1800 cubic feet per minute and the temperature of the incoming air does not exceed 45 C. The glass temperature must not be allowed to exceed 150 C.
§ At crest of audio-frequency cycle.
¶ Modulation, essentially negative, may be used if the positive peak of the audio-frequency envelope does not exceed 115 per cent of the carrier conditions.

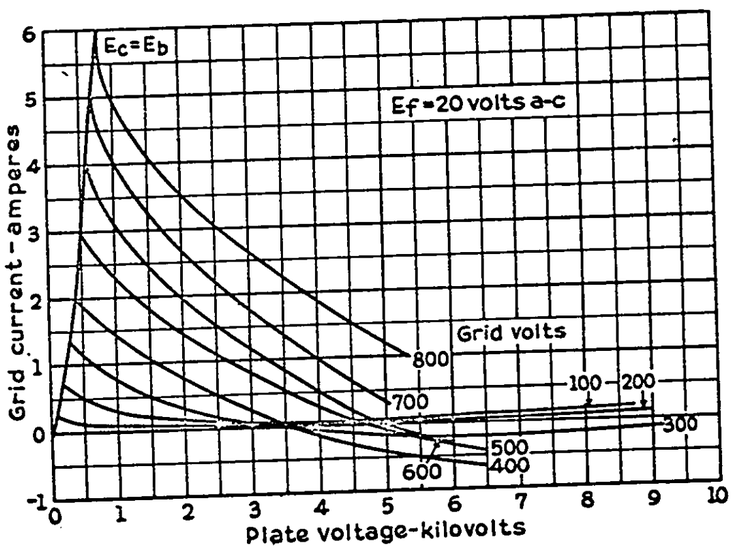
APPLICATION NOTES

* The GL-893-R can be operated at frequencies as high as 5 megacycles. The tube may be operated at higher frequencies provided the maximum values of plate voltage and power input are reduced as the frequency is raised (other maximum ratings are the same as shown above). The tabulation below shows the highest percentage of maximum plate voltage and power input that can be used up to 25 megacycles for the various classes of service. Special attention should be given to adequate ventilation of the bulb at these frequencies.

Frequency - Mc	5	12	25
Class B R-f			
Per Cent Max Plate Voltage and Plate Input	100	86	74
Class C Plate-modulated			
Per Cent Max Plate Voltage and Plate Input	100	81	65
Class C			
Per Cent Max Plate Voltage	100	81	65
Per Cent Max Plate Input	100	75	50

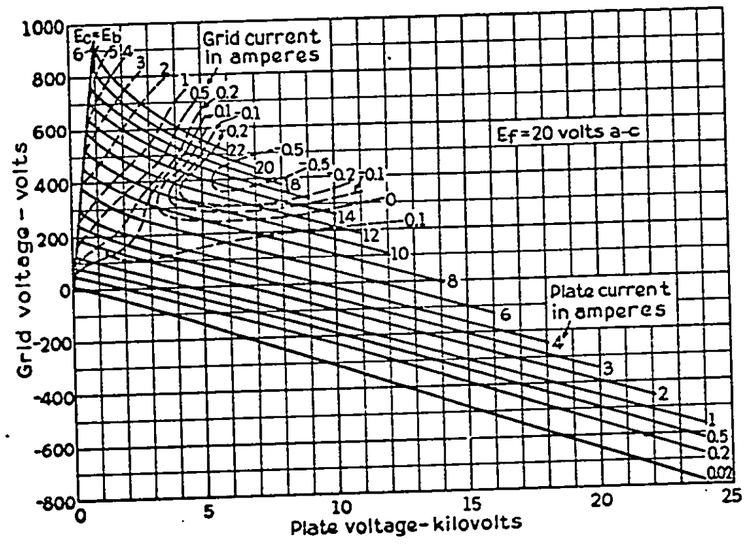
Plate Series Protective Resistors (see paragraph describing plate circuit under Installation in the Instructions).

Series Resistor, ohms	10	20	40	80	100
Maximum Power Output of Rectifier, kw	40	100	250	640	1600



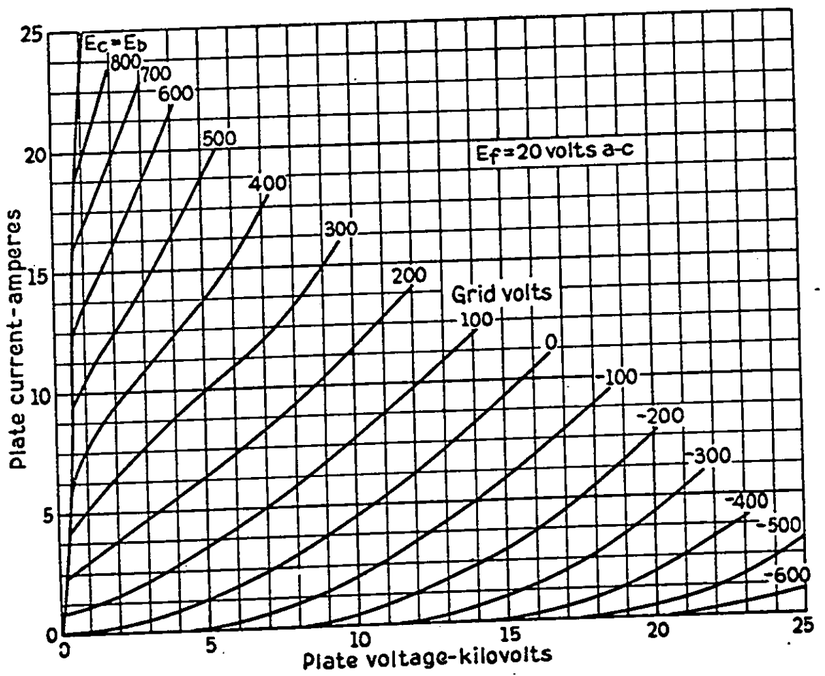
Typical Grid-plate Transfer Characteristics for Transmitting Tube GL-893-R

K-7050618 5-22-39



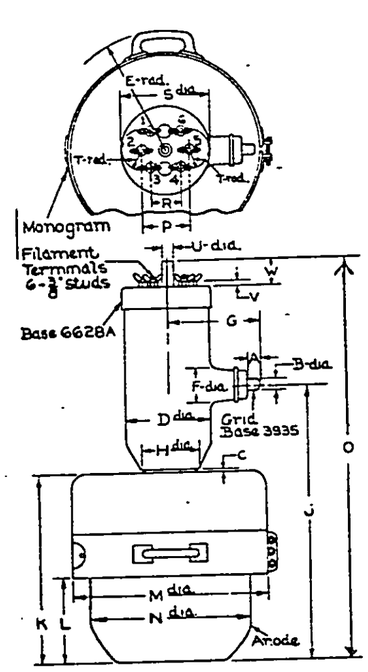
Characteristics for Transmitting Tube GL-893-R

K-7050611 5-22-39



Average Plate Characteristics for Transmitting Tube GL-893-R

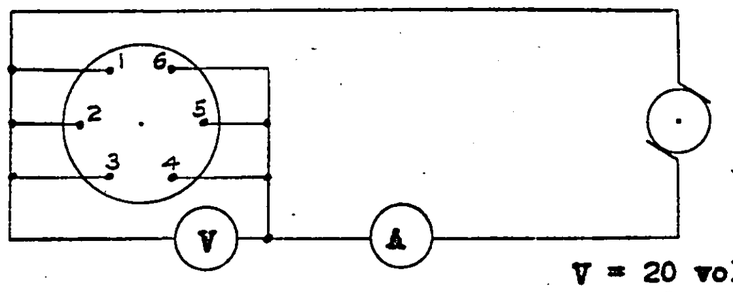
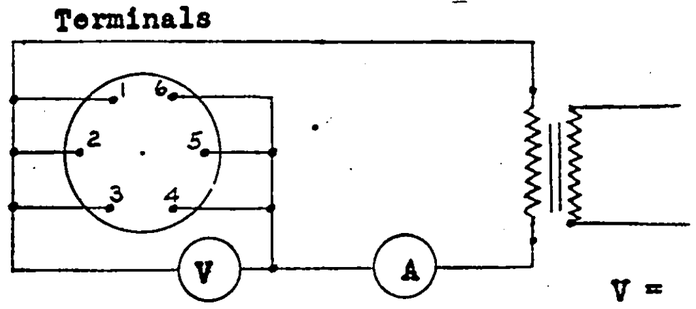
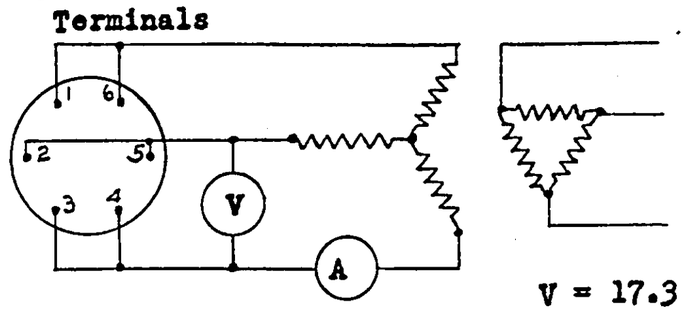
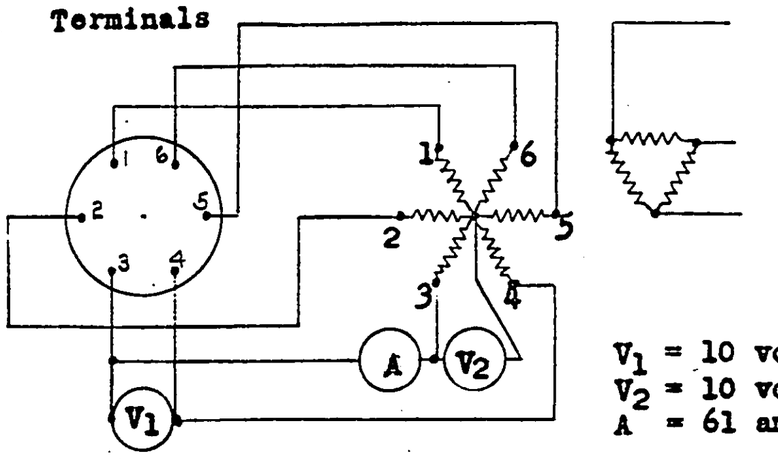
K-7050615 5-22-39



	Max.	Min.
A	8 1/2"	6 7/8"
B	5 7/16"	5 1/16"
C	2 1/16"	
D	6.130"	5.870
E	8 1/16"	8 1/16"
F	3 1/16"	1 1/2"
G	6 1/4"	5 3/4"
H	4 1/16"	3 1/16"
J	18 1/2"	17 1/2"
K	12 1/16"	12 1/16"
L	6 1/16"	5 1/16"
M	14 1/4"	13 1/4"
N	11 1/2"	11 3/8"
O	28"	25 1/4"
P	3.410"	3.340
R	2.035"	1.965"
S	6 1/4"	6 1/2"
T	1.535"	1.465"
U	.660"	.590"
V	.285"	.215"
W	2 1/4"	1 7/8"

Outline Transmitting Tube GL-893-R

K-6966982 12-26-40

D-C Filament Excitation	**Filament Base Terminals**  V = 20 volts A = 183 amps.
Single-Phase A-C Filament Excitation	**Filament Base Terminals**  V = 20 volts A = 183 amps.
Three-Phase A-C Filament Excitation	**Filament Base Terminals**  V = 17.3 volts A = 122 amps.
Six-Phase A-C Filament Excitation **NOTE: Terminals must be connected in correct phase relation as shown**	**Filament Base Terminals**  V_1 = 10 volts V_2 = 10 volts A = 61 amps.

Filament Connections and Excitation Circuits
K-7050604 5-22-39

GENERAL ELECTRIC COMPANY
SCHENECTADY, N. Y.

1-42 (2500)
Filing No. 8850

Supersedes GET-959

PRINTED IN U.S.A.

RADIO MANUFACTURERS ASSOCIATION
ENGINEERING DEPARTMENT

RMA DATA BUREAU
90 WEST STREET
NEW YORK, N. Y.

Release No. 335A

May 12, 1943.

To
Tube Engineers:

There goes forward herewith data sheets descriptive of the 893 as distributed with Release No. 335 on April 16, 1943.

Re-distribution is now being made in the event all copies of the initial distribution did not include this sheet.

Respectfully yours,

RMA DATA BUREAU

By

LCFHorle/CP

GENERAL ELECTRIC

Transmitting Tube GL-893 - - Description and Rating

Technical Information

The GL-893 is a three-electrode, water-cooled vacuum tube designed for use as a radio-frequency amplifier, oscillator, or Class B modulator. A particular advantage of this tube is the unique construction of the filament which permits operation from single-phase, three-phase, or six-phase alternating current, or from direct current, for all classes of service.

CHARACTERISTICS AND RATINGS

ELECTRICAL

Filament Voltage, per strand		10	Volts
Filament Current, per terminal		61	Amperes
Amplification Factor	E_b = 15 kv, I_b = 1.0 amp	36	
Grid-plate Transconductance	E_c = -300, E_f = 20 a-c	16000	Micromhos
Direct Interelectrode Capacitances:			
Grid-plate		33	μμf
Input		48	μμf
Output		3.2	μμf
Frequency for Maximum Ratings		5	Megacycles

MECHANICAL

Gasket, Cat. No. 5182028P2	
Type of Cooling	Water and Forced Air
Water Flow, gallons per minute	8-15
Air Flow, cubic feet per minute	
To Stem	2
Net Weight, approx	12 lb
Shipping Weight, approx	27 lb
Installation and Operation	GEH-1152

MAXIMUM RATINGS AND TYPICAL OPERATING CONDITIONS

CLASS B A-F POWER AMPLIFIER (TWO TUBES)

D-c Plate Voltage	12000	15000	18000	20000 max	Volts
Max Signal Plate Current, per tube*				4.0 max	Amperes
D-c Max Signal Plate Input, per tube*				60 max	Kilowatts
Plate Dissipation, per tube*				20 max	Kilowatts
D-c Grid Voltage	-260	-350	-450		Volts
Peak A-f Grid Input Voltage	1480	1560	1720		Volts
Zero Signal Plate Current	0.8	0.8	0.8		Ampere
Max Signal Plate Current	7.0	6.0	5.5		Amperes
Max Signal Plate Input*	84.0	90.0	99.0		Kilowatts
Max Signal Driving Power, approx	220	190	140		Watts
Effective Load Resistance, Plate-to-plate	4000	6000	8000		Ohms
Max Signal Plate Power Output	52.0	60.0	70.0		Kilowatts

CLASS B R-F POWER AMPLIFIER

Carrier conditions per tube for use with a max modulation factor 1.0

D-c Plate Voltage	12000	15000	15000	20000 max	Volts
D-c Grid Voltage	-250	-340	-340		Volts
D-c Plate Current	1.5	1.5	2.0	2.0 max	Amperes
Plate Input				32 max	Kilowatts
Plate Dissipation				20 max	Kilowatts
Peak R-f Grid Input Voltage	700	790	900		Volts
Driving Power, approx **	130	150	200		Watts
Plate Power Output	6	7.5	10		Kilowatts

CLASS C R-F POWER AMPLIFIER AND OSCILLATOR - PLATE-MODULATED

Carrier conditions per tube for use with a max modulation factor of 1.0

D-c Plate Voltage	10000	10000	12000	12000 max	Volts
D-c Grid Voltage	-800	-800	-1000	-3000 max	Volts
D-c Plate Current	1.5	2.0	2.0	2.0 max	Amperes
D-c Grid Current, approx	0.10	0.16	0.14	0.4 max	Amperes
Plate Input				24 max	Kilowatts
Plate Dissipation				12	Kilowatts
Peak R-f Grid Input Voltage, approx	1200	1280	1500		Volts
Driving Power, approx	120	210	210		Watts
Plate Power Output	11	15	18		Kilowatts

CLASS C R-F POWER AMPLIFIER AND OSCILLATOR

Key-down conditions per tube without modulation #

D-c Plate Voltage	12000	15000	18000	20000 max	Volts
D-c Grid Voltage	-800	-900	-1000	-3000 max	Volts
D-c Plate Current	3.5	3.6	3.6	4.0 max	Amperes
D-c Grid Current, approx	0.26	0.25	0.21	0.4 max	Amperes
Plate Input				70 max	Kilowatts
Plate Dissipation				20 max	Kilowatts
Peak R-f Grid Input Voltage, approx	1430	1520	1630		Volts
Driving Power, approx	360	370	340		Watts
Plate Power Output	30	40	50		Kilowatts

* Averaged over any audio-frequency cycle.
** At crest of audio-frequency cycle.
\# Modulation, essentially negative, may be used if the positive peak of the audio-frequency envelope does not exceed 115 per cent of the carrier conditions.

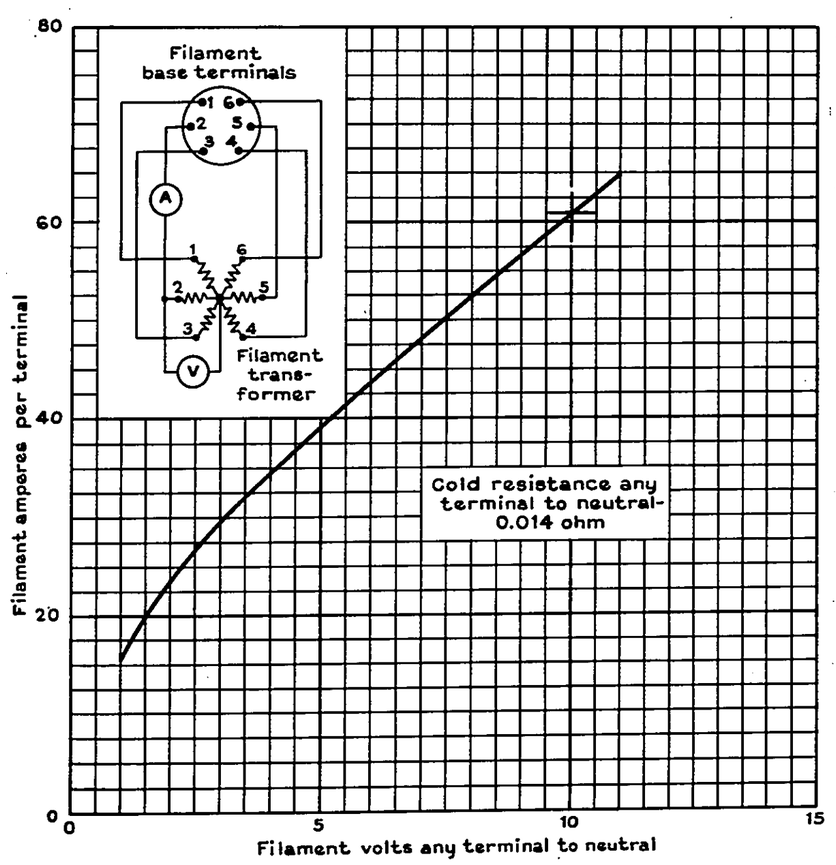
GL-893 can be operated at maximum ratings in all classes of service at frequencies as high as 5 megacycles. The tube may be operated at higher frequencies provided the maximum values of plate voltage and power input are reduced as the frequency is raised (Other maximum ratings are the same as shown under CHARACTERISTICS and RATINGS.) The tabulation below shows the highest percentage of maximum plate voltage and power input that can be used up to 40 mc for the various classes of service. Special attention should be given to adequate ventilation of the bulb at these frequencies.

FREQUENCY	5	20	40	Mc
MAXIMUM PERMISSIBLE PERCENTAGE OF MAXIMUM RATED PLATE VOLTAGE AND PLATE INPUT:				
Class B R-f				
Percentage Plate Voltage	100	85	65	
Percentage Plate Input	100	82	73	
Class C Plate Modulated				
Percentage Plate Voltage	100	80	64	
Percentage Plate Input	100	75	64	
Class C				
Percentage Plate Voltage	100	80	60	
Percentage Plate Input	100	66	50	

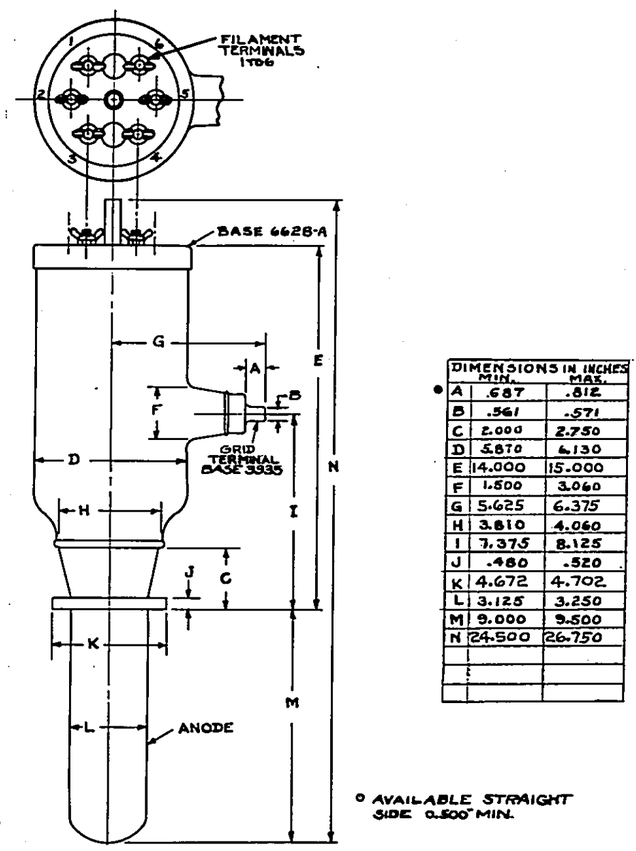
APPLICATION NOTES

Plate Series Protective Resistors (see paragraph describing plate circuit under Installation in the Instructions).

Series Resistor, ohms	10	20	40	80	100
Maximum Power Output of Rectifier, kilowatts	40	100	250	640	1600

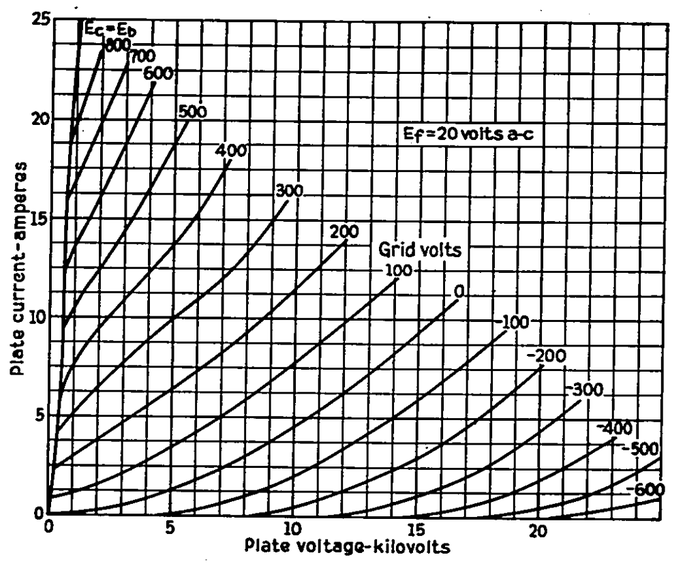


Average Filament Characteristic
K-7050605 5-22-39



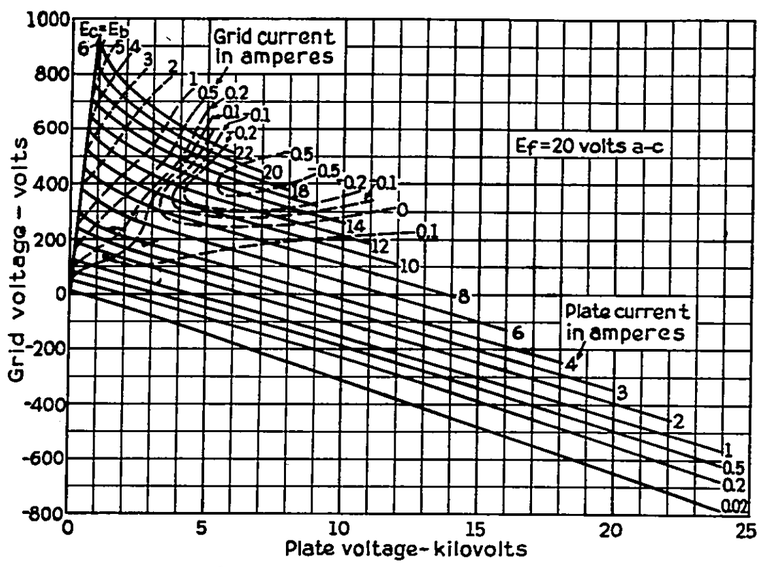
DIMENSIONS IN INCHES	MIN.	MAX.
A	.687	.812
B	.561	.571
C	2.000	2.750
D	5.870	6.130
E	14.000	15.000
F	1.500	3.060
G	5.625	6.375
H	3.810	4.060
I	7.375	8.125
J	.480	.520
K	4.672	4.702
L	3.125	3.250
M	9.000	9.500
N	24.500	26.750

Outline Transmitting Tube
GL-893
K-5344783 2-11-42



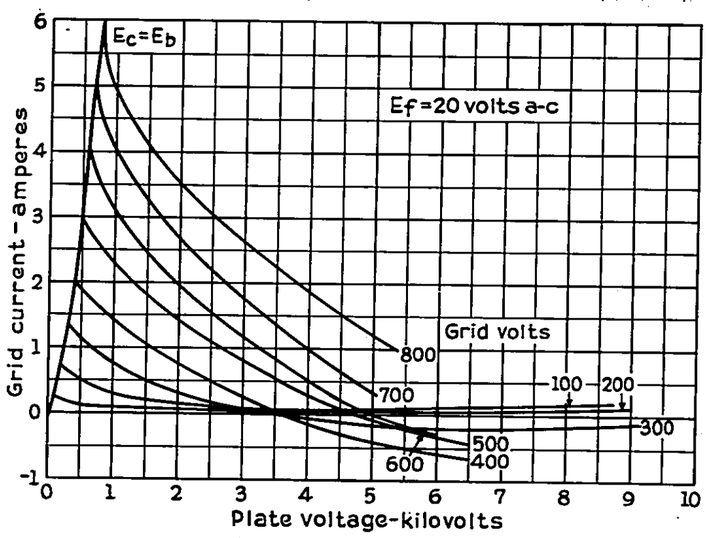
Average Plate Characteristics for Transmitting Tube GL-893

K-7050615 5-22-39



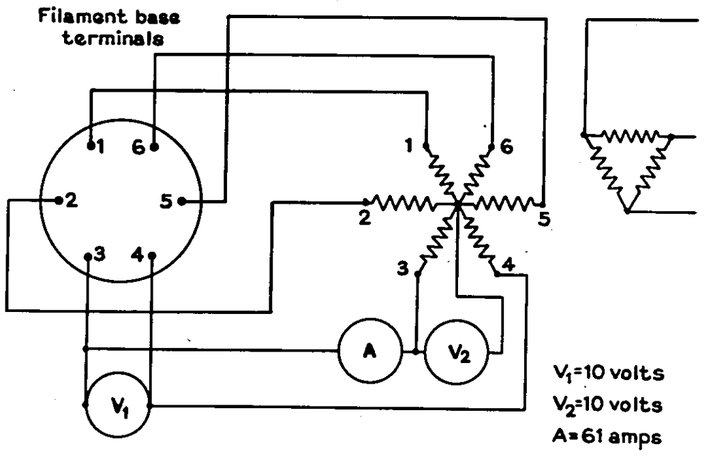
Characteristics for Transmitting Tube GL-893

K-7050611 5-22-39

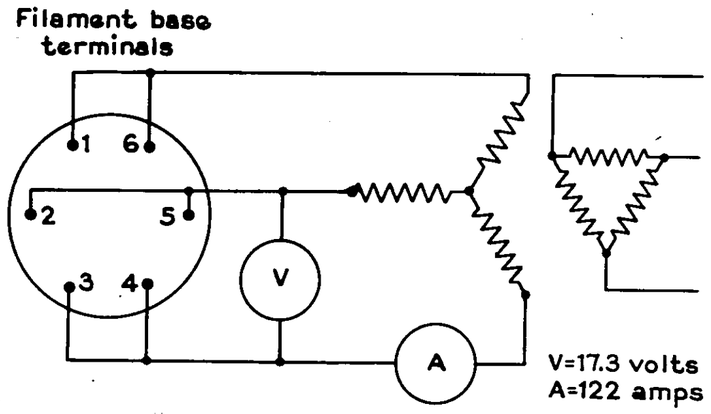


Typical Grid-plate Transfer Characteristics for Transmitting Tube GL-893

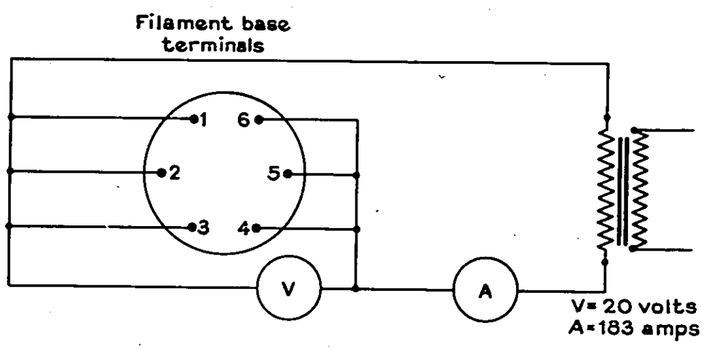
K-7050618 4-25-39



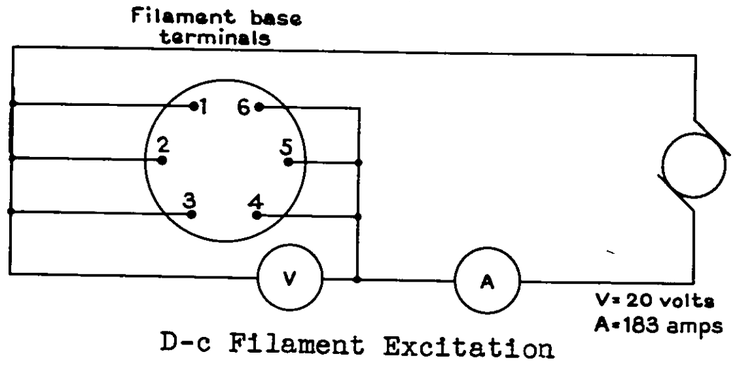
Six-phase A-c Filament Excitation



Three-phase A-c Filament Excitation



Single-phase A-c Filament Excitation



D-c Filament Excitation

NOTE: Terminals must be connected in correct phase relation as shown.

K-7050604 Filament Connections and Excitation Circuits 5-22-39

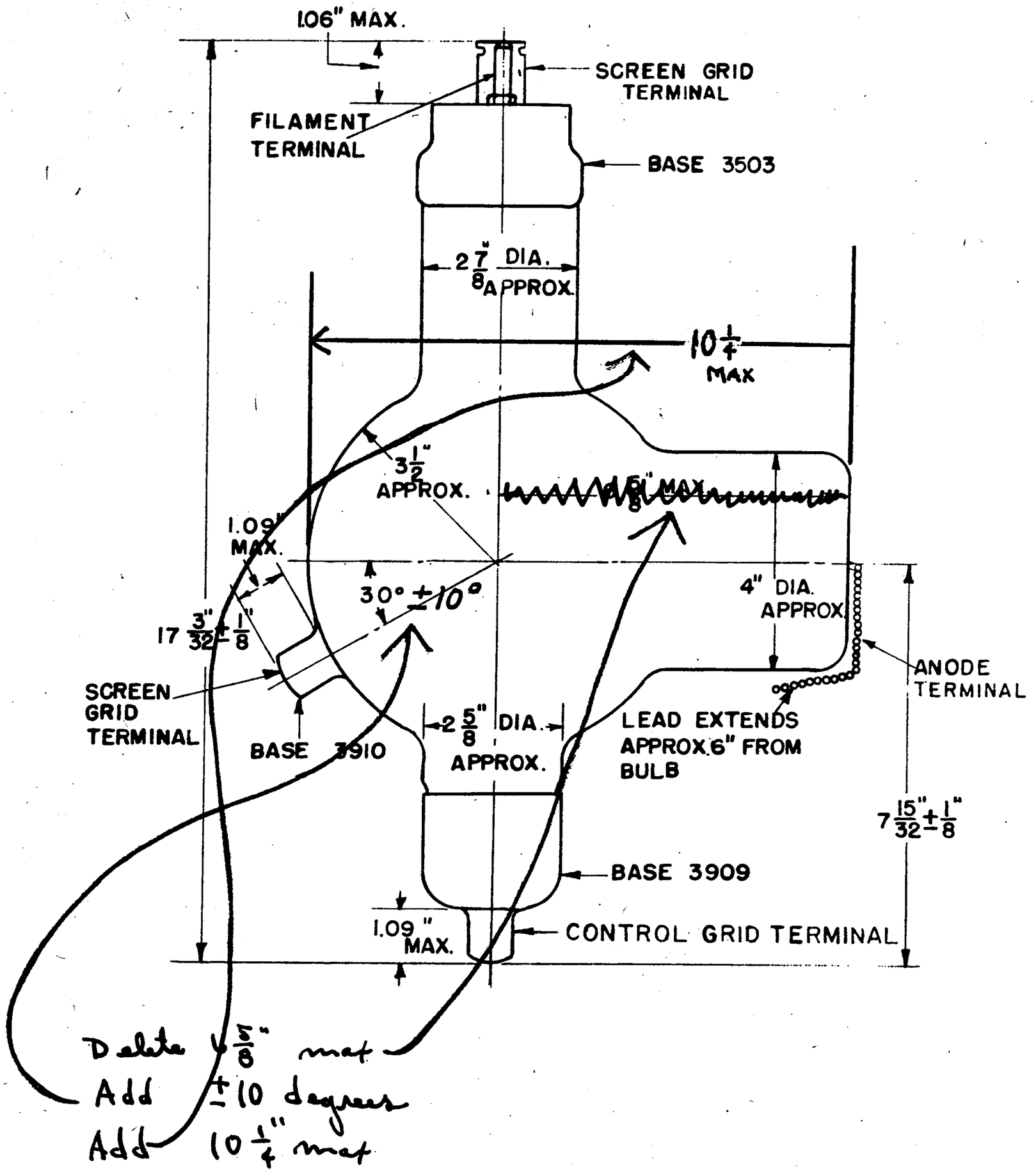
GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y.

3-42- (3M)

Filing No. 8850

PRINTED IN U.S.A.

Release No. 335A



OUTLINE
GL-861 PLIOTRON

RADIO MANUFACTURERS ASSOCIATION

SUITE 701-4 AMERICAN BUILDING
1317 F STREET, N.W.
WASHINGTON, D. C.

R.M.A. DATA BUREAU
90 West Street
New York, N. Y.

Release No. 335B

September 24, 1946

To
Tube Engineers:

On April 26, 1943, in Release No. 335 the Data Bureau announced the registration of the tube type designations

211 and 861

under the sponsorship of General Electric Company, Schenectady, N.Y.

Sponsor now proposes modification of the data under which these types were registered, as follows.

"In the case of the 861 outline drawing we wish to delete the 6 5/8" maximum dimension shown from the center of the bulb to the end of the anode terminal portion. We wish to add a dimension of 10 1/4" maximum as indicated on the accompanying drawing. We also wish to add a tolerance of plus or minus 10 degrees to the 30 degree angle from the center of the cap to the center line of the bulb.

In the case of the 211 we wish to change the capacitance limits as follows:

	Old Value	Proposed New Value
Grid - plate	14.5	14.0
Grid - cathode	6	5.4
Plate - cathode	5.5	4.8

We also wish to change the D-c grid voltage at 1250 volts on the plate from minus 75 to minus 80 for class A - AF and modulator services."

Unless valid objection to this re-registration is submitted to the Data Bureau prior to October 24, 1946, the indicated re-registration will be made without further announcement.

Respectfully yours,

RMA DATA BUREAU

By [signature]

LCFHorle/CAP

RADIO MANUFACTURERS ASSOCIATION

SUITE 701-4 AMERICAN BUILDING
1317 F STREET, N.W.
WASHINGTON, D. C.

R.M.A. DATA BUREAU
90 West Street
New York, N. Y.

Release No. 335-C

December 11, 1946

To
Tube Engineers:

On April 26, 1943 in Release No. 529, the RMA Data Bureau announced the registration of the tube type designation

845

under the sponsorship of the General Electric Company Schenectady, New York.

The Sponsor now proposed reregistration on the basis of different and better defined values of direct inter-electrode capacitance as follows:

	AS REGISTERED	AS PROPOSED		
		Minimum	Bogie	Maximum
grid-filament	6.0	3.9	5.0	6.1 micromicrofarads
plate-filament	6.5	3.8	5.0	6.2 micromicrofarads
grid-plate	13.5	9.5	12.1	14.7 micromicrofarads

Unless valid objection to this reregistration is submitted to the Data Bureau prior to January 16, 1947 the indicated reregistration will be made without further announcement.

Respectfully yours,

RMA DATA BUREAU

By

LCFHorle/MJ