

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, μmf		
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 <u>Operation</u>			Maximum* <u>Ratings</u>	
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-t \bar{o} -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

	<u>Typical Operation</u>			<u>Maximum*</u> <u>Ratings</u>
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.

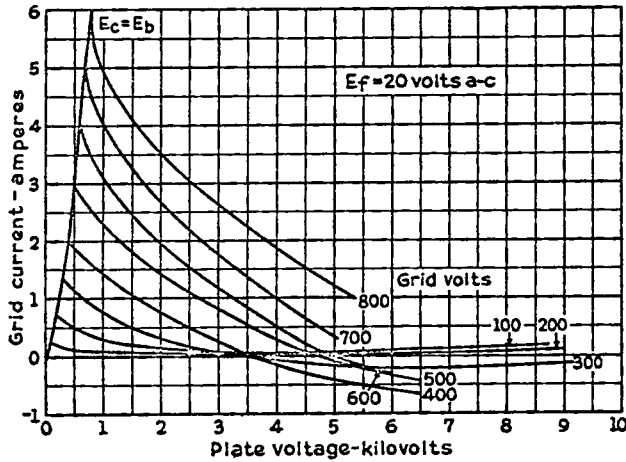
APPLICATION NOTES

* 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.

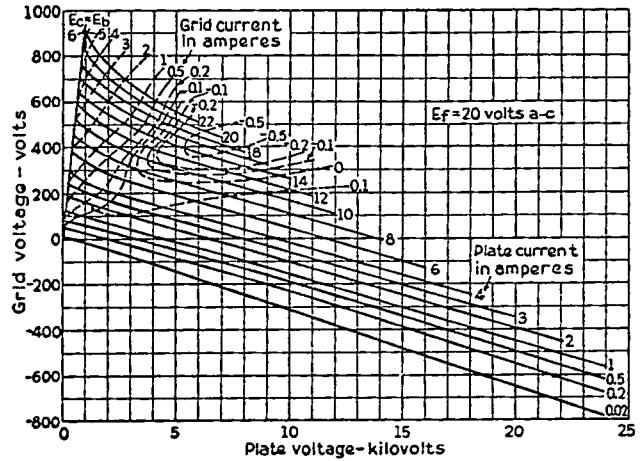
Frequency - Mc	5	12	25
Class B R-f			
Per Cent Max Plate Voltage and Plate Input	100	86	74
Class C Plate-modulated			
Per Cent Max Plate Voltage and Plate Input	100	81	65
Class C			
Per Cent Max Plate Voltage	100	81	65
Per Cent Max Plate Input	100	75	50

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

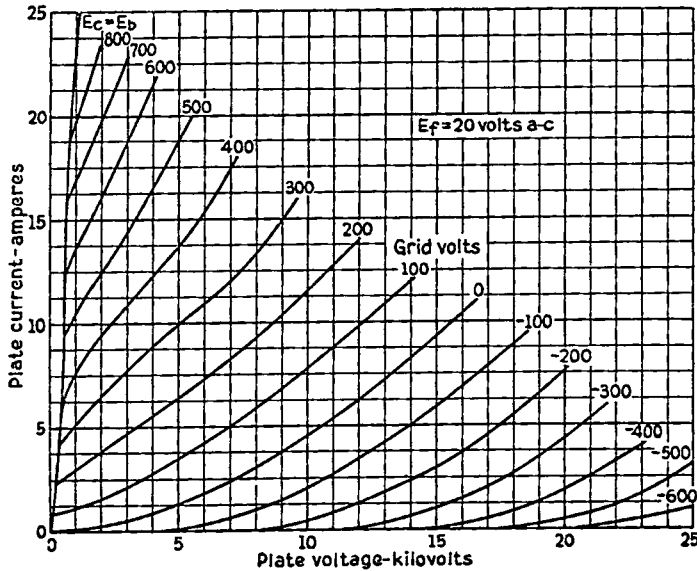
Series Resistor, ohms	10	20	40	80	100
Maximum Power Output of Rectifier, kw	40	100	250	640	1600



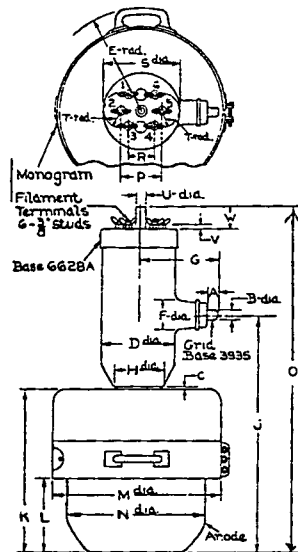
Typical Grid-plate Transfer Characteristics for Transmitting Tube GL-893-R
K-7050618 5-22-39



Characteristics for Transmitting Tube GL-893-R
K-7050611 5-22-39

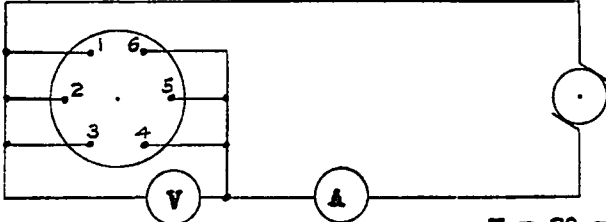
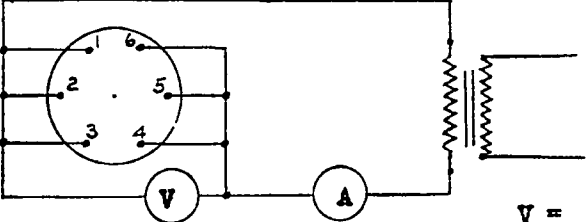
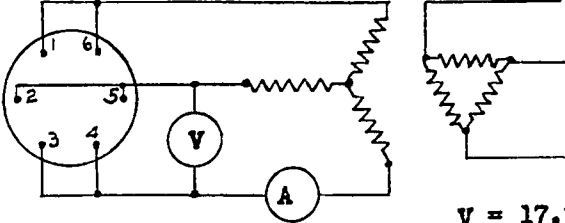
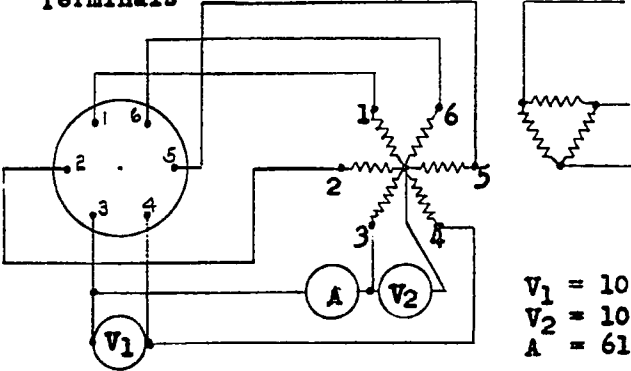


Average Plate Characteristics for Transmitting Tube GL-893-R
K-7050615 5-22-39



Max.	Min.
A 512	1687
B 571	561
C 3	
D 6130	5870
E 8 1/2	8 1/2
F 3 1/2	1 1/2
G 6 1/2	5 1/2
H 4 1/2	3 1/2
J 18 1/2	17 1/2
K 12 1/2	12 1/2
L 6 1/2	5 1/2
M 14 1/2	13 1/2
N 1 1/2	1 1/2
O 28	25 1/2
P 3.410	3.340
Q 2035	1965
R 6 1/2	6 1/2
T 1.535	1.465
U 660	590
V 285	215
W 1 1/2	1 1/2

Outline Transmitting Tube GL-893-R
K-6966982 12-26-40

<p>D-C Filament Excitation</p>	<p>Filament Base Terminals</p>  <p>V = 20 volts A = 183 amps.</p>
<p>Single-Phase A-C Filament Excitation</p>	<p>Filament Base Terminals</p>  <p>V = 20 volts A = 183 amps.</p>
<p>Three-Phase A-C Filament Excitation</p>	<p>Filament Base Terminals</p>  <p>V = 17.3 volts A = 122 amps.</p>
<p>Six-Phase A-C Filament Excitation</p> <p>NOTE: Terminals must be connect- ed in correct phase relation as shown</p>	<p>Filament Base Terminals</p>  <p>V₁ = 10 volts V₂ = 10 volts A = 61 amps.</p>

Filament Connections and Excitation Circuits
K-7057604 5-22-39

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