

ITT ELECTRON
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F-889A

POWER TUBE

DESCRIPTION:

The F-889A is a three electrode tube designed for use as a radio-frequency amplifier, oscillator or Class B modulator. It is ruggedly constructed to meet the severe conditions of radio-frequency heating service. The anode is water-cooled and capable of dissipating 5 kw. The cathode is a pure tungsten filament. Maximum ratings of 8.5 kv dc plate voltage and 16 kw plate input apply up to 50 mc.

GENERAL CHARACTERISTICS:

Electrical

	<u>Nom.</u>	<u>Min.</u>	<u>Max.</u>	
Filament Voltage	11.0			volts
Filament Emission @ Nominal Voltage ..	9.4			ampere
Filament Current @ Nominal Voltage ...	120	110	128	ampere
Filament Starting Current			180	ampere
Filament Cold Resistance	0.008			ohms
Amplification Factor				
$I_b = 1.0$ amps, $E_c = .100$ volts	21	17	25	
Interelectrode Capacitance				
Grid-Plate	17.5	15.8	21.0	μf
Grid-Filament	23.3	19.2	27.4	μf
Plate-Filament	2.7	1.8	3.6	μf

Mechanical

Mounting Position	Vertical, anode down
Type of Cooling	Water and Forced Air
Water Flow on Anode	6 gpm
Maximum Water Pressure	80 psi
Maximum Outgoing Water Temperature .	70° Centigrade
Air Flow on Bulb*	30 cfm
Maximum Glass Temperature	160° Centigrade
Net Weight (Approximate)	2 Pounds

* Air to be directed at top of tube from a 3 inch diameter nozzle.

MAXIMUM RATINGS AND TYPICAL OPERATING CONDITIONSA-F Power Amplifier & Modulator - Class BMaximum Ratings, Absolute Values

DC Plate Voltage	8500	volts
Signal DC Plate Current*	2.0	amperes
Signal Plate Input*	12000	watts
Plate Dissipation*	5000	watts

* Averaged over any audio-frequency cycle of sine-wave form.

Typical Operation

(Unless otherwise specified, values are for two tubes)

DC Plate Voltage	5000	6000	7500	volts
DC Grid Voltage	-180	-230	-300	volts
Peak A-F Grid-to-Grid Voltage	1460	1680	1700	volts
Zero-Signal DC Plate Current	0.4	0.4	0.4	amperes
Max. Signal DC Plate Current	3.2	3.6	3.2	amperes
Effective Load Resistance (plate-to-plate)	2320	3680	5000	ohms
Max. Signal Driving Power (Approx) .	170	180	150	watts
Max. Signal Power Output (Approx) ..	8800	12000	15000	watts

R-F Power Amplifier - Class B Telephony

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

Maximum Ratings, Absolute Values

DC Plate Voltage	8500	volts
DC Plate Current	1.0	amperes
Plate Input	7500	watts
Plate Dissipation	5000	watts

Typical Operation

DC Plate Voltage	6000	7500	volts
DC Grid Voltage	-250	-300	volts
Peak R-F Grid Voltage	460	500	volts
DC Plate Current	0.9	0.9	amperes
Driving Power (Approximate)**	95	80	watts
Power Output (Approximate)	1500	2000	watts

** At crest of A-F cycle with modulation factor of 1.0.

Plate-Modulated R-F Power Amplifier - Class C Telephony

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

Maximum Ratings, Absolute Values

DC Plate Voltage	6000	volts
DC Grid Voltage	-1000	volts
DC Plate Current	1.0	amperes
DC Grid Current	0.25	amperes
Plate Input	6000	watts
Plate Dissipation	3000	watts

Typical Operation

DC Plate Voltage	5000	6000	volts
DC Grid Voltage	-800	-900	volts
Peak R-F Grid Voltage	1300	1420	volts
DC Plate Current	0.9	1.0	amperes
DC Grid Current (Approximate)	0.12	0.1	amperes
Driving Power (Approximate)	155	140	watts
Power Output (Approximate)	2750	4000	watts

R-F Power Amplifier & Oscillator - Class C Telegraphy

Key-down conditions per tube without amplitude modulation***

Maximum Ratings, Absolute Values

DC Plate Voltage	8500	volts
DC Grid Voltage	-1000	volts
DC Plate Current	2.0	amperes
DC Grid Current	0.25	amperes
Plate Input	16000	watts
Plate Dissipation	5000	watts

Typical Operation

DC Plate Voltage	5000	6000	7500	volts
DC Grid Voltage	-500	-600	-800	volts
Peak R-F Grid Voltage	1200	1460	1830	volts
DC Plate Current	1.5	1.8	2.0	amperes
DC Grid Current (Approximate)	0.19	0.21	0.24	amperes
Driving Power (Approximate)	220	290	400	watts
Power Output (Approximate)	5000	7000	10000	watts

*** Modulation essentially negative may be used if the positive peak of the audio-frequency envelope does not exceed 115% of carrier conditions.

MAXIMUM FREQUENCY RATINGS

The F-889A can be operated at full power at frequencies as high as 50 megacycles. It can be operated at higher frequencies provided the maximum values of plate voltage and plate input are reduced in accordance with table which shows the maximum permissible percentage of rated plate voltage and plate input for various frequencies.

<u>Mc</u>	<u>Class B</u>		<u>Plate Modulated</u>		<u>Class C</u>	
	volts	watts	volts	watts	volts	watts
50	100%	100%	100%	100%	100%	100%
100	83%	83%	75%	75%	78%	70%
150	72%	72%	60%	60%	65%	50%

CHARACTERISTIC RANGE VALUES FOR EQUIPMENT DESIGN

<u>Characteristics</u>	<u>Conditions</u>	<u>Min.</u>	<u>Nom.</u>	<u>Max.</u>	
Grid Voltage	ib=9 amps; eb=2000 v	ec: -	-	800	volts
Grid Current	ib=6 amps; eb=2000 v	ic: -	-	1.5	amps
Plate Voltage	Ib=1.0 Adc; Ec=0	Eb: 2.8	3.3	3.8	kVdc
Plate Voltage	Ib=1.0 Adc; Ec=-200 Vdc	Eb: 6.5	7.5	8.5	kVdc
Grid Voltage	Eb=7.5 kVdc; Ib=.020 Adc	Ec: -325	-370	-475	Vdc
Peak Cathode Current	Note 1	Ik: 7.5	-	-	amps
Power Output	Eb=8 kVdc; Ib=1.75 Adc; Ec=-750 Vdc; Ic=.23 Adc; F=50 Mc	Po: 9.0	-	-	kW

Note 1: Represents maximum usable cathode current for tube as plate current plus grid current for any condition of operation.



