

RCA Transmitting Tubes

RF POWER AMPLIFIER AND OSCILLATOR—Class C Telegraphy#

and

RF POWER AMPLIFIER—Class C FM Telephony

Maximum CCS Ratings:

DC PLATE VOLTAGE.....	4000 max	volts
DC GRID-No.2 (SCREEN-GRID) VOLTAGE.....	750 max	volts
DC GRID-No.1 (CONTROL-GRID) VOLTAGE.....	-500 max	volts
DC PLATE CURRENT.....	200 max	ma
GRID-No.3 (SUPPRESSOR-GRID) INPUT.....	20 max	watts
GRID-No.2 INPUT.....	20 max	watts
GRID-No.1 INPUT.....	5 max	watts
PLATE DISSIPATION.....	125 max	watts

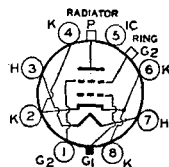
Key-down conditions per tube without amplitude modulation. Amplitude modulation essentially negative may be used if the positive peak of the audio-frequency envelope does not exceed 115 per cent of the carrier conditions.

4X150A 4X150D

BEAM POWER TUBE

Forced-air-cooled heater-cathode types having integral plate radiators used as af power amplifiers and modulators and as rf power amplifiers and oscillators. May be used with full

input up to 500 Mc. Class C Telegraphy maximum CCS plate dissipation, 150 watts.



	4X150A	4X150D	
HEATER VOLTAGE (AC/DC).....	6.0 ± 10%	26.5 ± 10%	volts
HEATER CURRENT.....	2.6	0.58	amperes
HEATING TIME (Minimum).....		30	seconds
MU-FACTOR, Grid No.2 to Grid No.1**.....		5	
DIRECT INTERELECTRODE CAPACITANCES:			
Grid No.1 to plate.....		0.06 max	μf
Grid No.1 to cathode, grid No.2, and heater.....		15.7	μf
Plate to cathode, grid No.2, and heater.....		4.3	μf

** Grid-No.2 volts, 300; grid-No.2 milliamperes, 50.

AF POWER AMPLIFIER AND MODULATOR—Class AB₂

Maximum CCS Ratings:

DC PLATE VOLTAGE.....	1250 max	volts
DC GRID-No.2 (SCREEN-GRID) VOLTAGE.....	400 max	volts
MAXIMUM-SIGNAL DC PLATE CURRENT♦.....	250 max	ma
GRID-No.2 INPUT♦.....	12 max	watts
GRID-No.1 (CONTROL-GRID) INPUT.....	2 max	watts
PLATE DISSIPATION♦.....	150 max	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode.....	150 max	volts
Heater positive with respect to cathode.....	150 max	volts

Typical Operation (Values are for 2 tubes):

DC Plate Voltage.....	600	800	1000	1250	volts
DC Grid-No.2 Voltage.....	300	300	300	300	volts
DC Grid-No.1 Voltage.....	-41	-43	-43	-44	volts
Peak AF Grid-No.1-to-Grid-No.1 Voltage.....	94	96	98	100	volts
Zero-Signal DC Plate Current.....	185	160	165	180	ma
Maximum-Signal DC Plate Current.....	485	490	495	475	ma
Zero-Signal DC Grid-No.2 Current.....	0	0	0	0	ma
Maximum-Signal DC Grid-No.2 Current.....	80	75	70	65	ma
Effective Load Resistance (Plate to plate).....	2600	3500	4600	5600	ohms
Maximum-Signal Driving Power (Approx.).....	0.15	0.15	0.15	0.15	watt
Maximum-Signal Power Output (Approx.).....	170	240	315	425	watts

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

PLATE-MODULATED RF POWER AMPLIFIER—Class C Telephony

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

Maximum CCS Ratings:

DC PLATE VOLTAGE.....	1000 max	volts
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RCA Transmitting Tubes

DC GRID-No.2 VOLTAGE	300 <i>max</i>	volts
DC GRID-No.1 VOLTAGE	-250 <i>max</i>	volts
DC PLATE CURRENT	200 <i>max</i>	ma
GRID-No.2 INPUT	12 <i>max</i>	watts
GRID-No.1 INPUT	2 <i>max</i>	watts
PLATE DISSIPATION	100 <i>max</i>	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	150 <i>max</i>	volts
Heater positive with respect to cathode	150 <i>max</i>	volts

Typical Operation at 165 Mc:

DC Plate Voltage	400	600	800	1000	volts
DC Grid-No. 2 Voltage					
(Modulated approximately 55 per cent) $\odot$	250	250	250	250	volts
DC Grid-No.1 Voltage	-90	-95	-100	-105	volts
Peak AF Grid-No.2 Voltage (For 100-per-cent modulation)	140	150	160	170	volts
Peak RF Grid-No.1 Voltage	110	120	120	125	volts
DC Plate Current	200	200	200	200	ma
DC Grid-No.2 Current	40	35	25	20	ma
DC Grid-No.1 Current (Approx.)	7	8	10	15	ma
Driving Power (Approx.)	1	1	1.5	2	watts
Power Output (Approx.)	55	80	100	140	watts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance	25000 <i>max</i>	ohms
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$\odot$ DC grid-No.2 voltage must be modulated approximately 55 per cent in phase with the plate modulation in order to obtain 100-per-cent modulation of the 4X150A or 4X150D. The use of a series grid-No.2 resistor or reactor may not give satisfactory performance and is therefore not recommended.

RF POWER AMPLIFIER AND OSCILLATOR—Class C Telegraphy# and RF POWER AMPLIFIER—Class C FM Telephony

Maximum CCS Ratings:

DC PLATE VOLTAGE	1250 <i>max</i>	volts
DC GRID-No.2 VOLTAGE	300 <i>max</i>	volts
DC GRID-No.1 VOLTAGE	-250 <i>max</i>	volts
DC PLATE CURRENT	250 <i>max</i>	ma
GRID-No.2 INPUT	12 <i>max</i>	watts
GRID-No.1 INPUT	2 <i>max</i>	watts
PLATE DISSIPATION	150 <i>max</i>	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	150 <i>max</i>	volts
Heater positive with respect to cathode	150 <i>max</i>	volts

Typical Operation at 165 Mc:

DC Plate Voltage	600	750	1000	1250	volts
DC Grid-No.2 Voltage	250	250	250	250	volts
DC Grid-No.1 Voltage	-75	-80	-80	-90	volts
Peak RF Grid-No.1 Voltage	91	96	95	106	volts
DC Plate Current	200	200	200	200	ma
DC Grid-No.2 Current	37	37	31	20	ma
DC Grid-No.1 Current (Approx.)	11	11	10	11	ma
Driving Power (Approx.)	1	1.1	1	1.2	watts
Power Output (Approx.)	85	110	150	195	watts

Typical Operation at 500 Mc with Coaxial Cavity:

DC Plate Voltage	600	800	1000	1250	volts
DC Grid-No.2 Voltage	250	250	250	280	volts
DC Grid-No.1 Voltage	-110	-110	-110	-115	volts
DC Plate Current	170	200	200	200	ma
DC Grid-No.2 Current	6	7	7	5	ma
DC Grid-No.1 Current (Approx.)	6	10	10	10	ma
Driver Power Output (Approx.)	15	20	25	30	watts
Useful Power Output (Approx.)	50	95	120	140	watts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance	25000 <i>max</i>	ohms
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Key-down conditions without amplitude modulation. Amplitude 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.

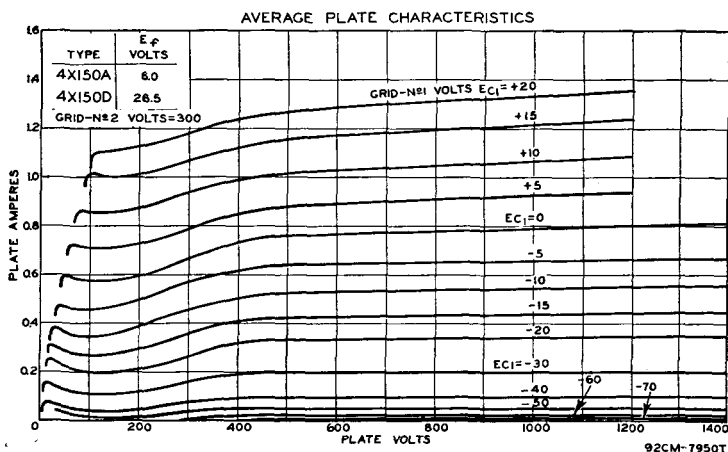
OPERATING CONSIDERATIONS

Types 4X150A and 4X150D require Eimac 4X150A Air-System eight-contact socket, or equivalent, and may be mounted in any position. OUTLINE 70, *Outlines Section*.

Terminal arrangement facilitates use of these tubes in circuits of the coaxial-cavity type. Grid-No.2 contact ring provides effective isolation of output from input at higher frequencies.

Adequate forced-air cooling must be provided to limit the temperature of the radiator, as measured on metal surface between radiator core and glass envelope, and that of the envelope and base seals to 150°C. The air flow must be applied before or simultaneously with electrode voltages and may be removed simultaneously with them. A minimum air flow of 7.5 cubic feet per minute is required through socket and radiator when tube is operated at maximum CCS ratings.

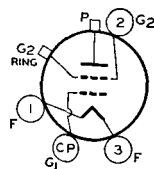
Because the cathode is subjected to considerable back bombardment as the frequency is increased with resultant increase in temperature, the heater voltage should be reduced depending on operating conditions and frequency to prevent overheating of the cathode and resultant short life.



BEAM POWER TUBE

Forced-air-cooled type having integral plate radiator and thoriated-tungsten filament used as rf power amplifier and oscillator. May be used with full input up to 120 Mc. Class C Telegraphy maximum CCS plate dissipation, 500 watts.

4X500A



FILAMENT VOLTAGE (AC/DC).....	5.0	volts
FILAMENT CURRENT.....	13.5	amperes
TRANSCONDUCTANCE*.....	5200	μmhos
MU-FACTOR, Grid No.2 to Grid No.1.....	6.2	
DIRECT INTERELECTRODE CAPACITANCES:		
Grid No.1 to plate.....	0.05	μμf
Grid No.1 to filament and grid No.2.....	12.8	μμf
Plate to filament and grid No.2.....	5.6	μμf

* Plate volts, 2500; grid-No.2 volts, 500; plate milliamperes, 200.