4604

Beam Power Tube

QUICK-HEATING FILAMENT
90 WATTS CW INPUT (ICAS) UP TO 60 Mc
60 WATTS CW INPUT (ICAS) AT 175 Mc

For Use in Push-to-Talk Mobile and Emergency-Communications Equipment as an RF Power-Amplifier Tube

GENERAL DATA

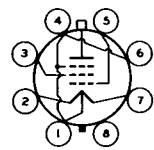
Electrical:

Filament, Coated:		
Voltage (AC or DC)	6.3 ± 10%	volts
Current at 6.3 volts	0.65	amp
Heating time	1	sec
Transconductance, for plate volts = 200, grid-No.2 volts = 200, and plate ma. = 100	6000	μmhos
Mu-Factor, Grid No.2 to Grid No.1 for plate volts = 200, grid-No.2 volts = 200, and plate ma. = 100.	4	
Direct Interelectrode Capacitances:		
Grid No.1 to plate	0.24 max.	μμf
Grid No.1 to filament & grid No.3 & internal shield, grid No.2, and base sleeve	11	μμf
Plate to filament & grid No.3 & internal shield, grid No.2, and base sleeve	8.5	μμf

Mechanical:

Operating Position	Vertical, base down or up, or Horizontal with pins 3 and 7 in vertical plane
Maximum Overall Length	3-13/16"
Seated Length	3-1/8" ± 1/8"
Maximum Diameter	1-21/32"
Bulb	T12
Cap	Small (JEDEC No.C1-1)
Socket	Standard Octal 8-Contact
Base	Small Wafer Octal 8-Pin with "770" Sleeve (JEDEC Group 1, No.B8-150)
Basing Designation for BOTTOM VIEW	7CL

Pin 1 - Filament Tap, Grid No.3, Internal Shield
Pin 2 - Filament
Pin 3 - Grid No.2



Pin 4 - Same as Pin 1
Pin 5 - Grid No.1
Pin 6 - Same as Pin 1
Pin 7 - Filament
Pin 8 - Base Sleeve
Cap - Plate

RF POWER AMPLIFIER & OSCILLATOR — Class C Telegraphy▲ and RF POWER AMPLIFIER — Class C FM Telephony

Maximum ICAS● Ratings, *Absolute-Maximum Values:*

	Up to 60 Mc	
DC PLATE VOLTAGE	750 max.	volts
DC GRID-No.2 VOLTAGE	250 max.	volts
DC GRID-No.1 VOLTAGE	-150 max.	volts
DC PLATE CURRENT	150 max.	ma
DC GRID-No.1 CURRENT	4 max.	ma
PLATE INPUT	90 max.	watts
GRID-No.2 INPUT	3 max.	watts
PLATE DISSIPATION	25 max.	watts
BULB TEMPERATURE (At hottest point on bulb surface)	220 max.	°C

Typical Operation:

	As amplifier at 175 Mc	
DC Plate Voltage	400	volts
DC Grid-No.2 Voltage★	190	volts
From a series resistor of	18000	ohms
DC Grid-No.1 Voltage♦	-60	volts
From a grid resistor of	30000	ohms
DC Plate Current	150	ma
DC Grid-No.2 Current	11	ma
DC Grid-No.1 Current (Approx.)	2	ma
Driving Power (Approx.)	4.5	watts
Power Output (Approx.)	30	watts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance♦	30000 max.	ohms

▲ 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.

● Intermittent Commercial and Amateur Service.

★ Obtained preferably from a separate source, or from the plate supply voltage with a voltage divider, or through a series resistor. A series grid-No.2 resistor should be used only when the 4604 is used in a circuit which is not keyed. Grid-No.2 voltage must not exceed 400 volts under key-up conditions.

♦ Obtained from fixed supply, by grid-No.1 resistor, or by combination methods.

♦ When grid No.1 is driven positive and the 4604 is operated at maximum ratings, the total dc grid-No.1-circuit resistance should not exceed the specified value of 30,000 ohms. If this value is insufficient to provide adequate bias, the additional required bias must be supplied by a fixed supply.

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN

	Min.	*Max.*	
Filament Current at 6.3 volts ac	0.59	0.71	amp

Direct Interelectrode Capacitances:			
Grid No.1 to plate	–	0.24	μμf
Grid No.1 to filament & grid No.3 & internal shield, grid No.2, and base sleeve	9.5	12.5	μμf
Plate to filament & grid No.3 & internal shield, grid No.2, and base sleeve	7.3	9.5	μμf
Plate Current♠	46	94	ma
Grid-No.2 Current♠	–	5.5	ma
Useful Power Output♣	47	–	watts

♠ With 6.3 volts ac on filament, dc plate voltage of 300 volts, dc grid-No.2 voltage of 200 volts, and dc grid-No.1 voltage of −29 volts. ◄

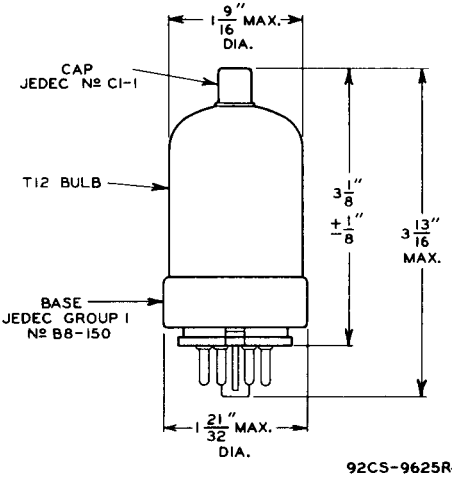
♣ In a single-tube, self-excited-oscillator circuit, and with 6.3 volts ac on filament, dc plate voltage of 600 volts, dc grid-No.2 voltage of 200 volts, grid-No.1 resistor of 30,000 ± 10% ohms, dc plate current of 100 to 112 ma., dc grid-No.1 current of 2 to 2.5 ma., and frequency of 15 Mc.

OPERATING CONSIDERATIONS

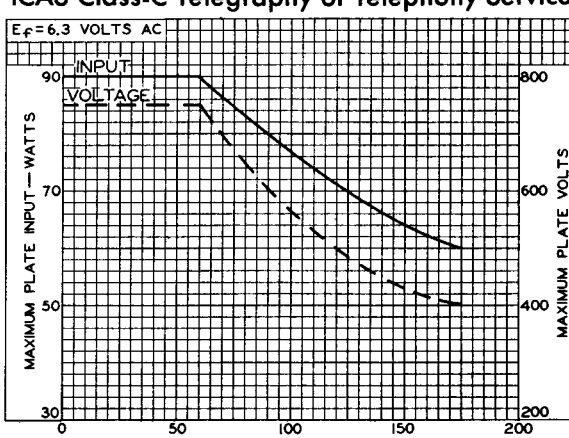
The *bulb* becomes hot during operation. To insure adequate cooling, therefore, it is essential that free circulation of air be provided around the 4604.

The *plate* shows no color when the 4604 is operated at full ratings under ICAS conditions. Connections to the plate should be made with a flexible lead to prevent any strain on the seal at the cap.

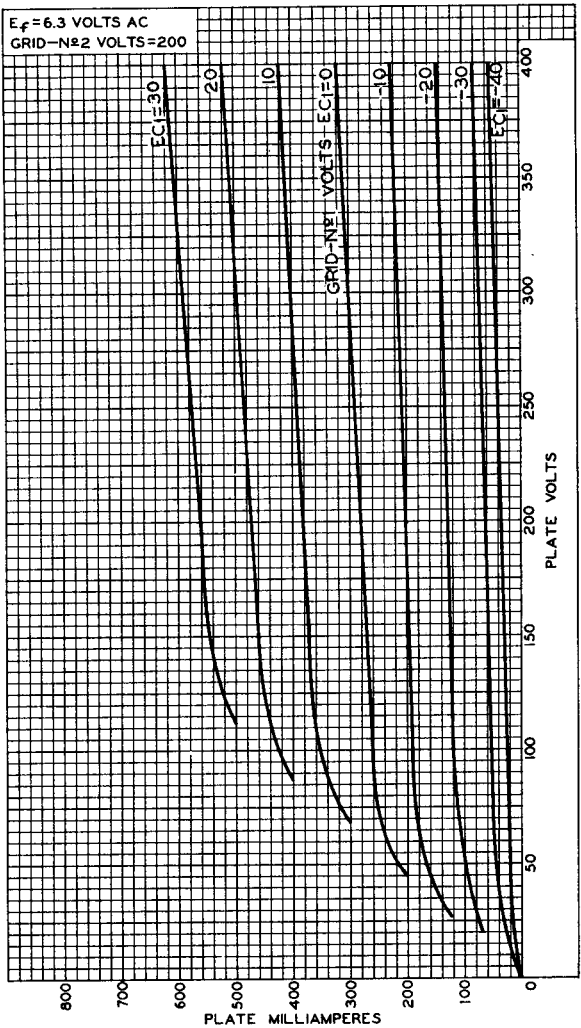
◄ Indicates a change.



RATING CHART
ICAS Class-C Telegraphy or Telephony Service



TYPICAL PLATE CHARACTERISTICS



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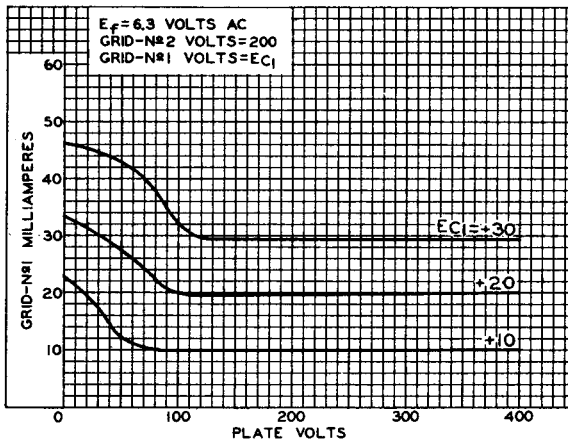

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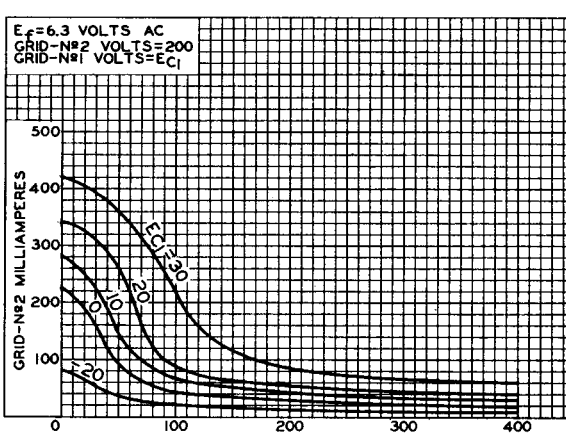

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