



EITEL-McCULLOUGH, INC.
SAN CARLOS, CALIFORNIA

TENTATIVE DATA
8349
4CX35,000C
RADIAL BEAM
POWER TETRODE

The Eimac 8349/4CX35,000C is a ceramic-metal, forced-air cooled power tetrode intended for use at the 50 to 150 kilowatt output power level. It is recommended for use as a Class-C rf amplifier or oscillator, a Class-AB, rf linear amplifier or a Class-AB, push-pull af amplifier or modulator. The 8349/4CX35,000C is also useful as a plate and screen modulated Class-C rf amplifier.

The forced air cooled anode is rated at 35 kilowatts of plate dissipation.



GENERAL CHARACTERISTICS

ELECTRICAL

Filament:	Thoriated Tungsten	
Voltage	- - - - -	10 volts
Current	- - - - -	300 amps
Amplification Factor (Grid-Screen) (average)	- - - - -	4.5
Direct Interelectrode Capacitances, Grounded Cathode:		
Input	- - - - -	430 uuf
Output	- - - - -	45 uuf
Feedback	- - - - -	2.3 uuf
Frequency for Maximum Ratings	- - - - -	30 Mc

MECHANICAL

Base	- - - - -	Special, graduated rings
Maximum Seal Temperature	- - - - -	250° C
Maximum Anode Core Temperature	- - - - -	250° C
Recommended Socket	- - - - -	Eimac, SK-1500
Operating Position	- - - - -	Vertical, base up or down
Maximum Dimensions:		
Height	- - - - -	15.0 inches
Diameter	- - - - -	9.75 inches
Cooling	- - - - -	Forced air
Net Weight	- - - - -	50 pounds
Shipping Weight (approximate)	- - - - -	80 pounds

**RADIO-FREQUENCY POWER AMPLIFIER
OR OSCILLATOR**

TYPICAL OPERATION
(Frequencies below 30 megacycles)

Class-C Telegraphy or FM Telephony (Key-down conditions)

DC Plate Voltage	- - -	10	15	20	kV
DC Screen Voltage	- - -	750	750	750	volts
DC Grid Voltage	- - -	-425	-480	-545	volts
DC Plate Current	- - -	6.70	6.45	6.35	amps
DC Screen Current	- - -	.925	.810	.895	amp
DC Grid Current	- - -	.320	.355	.335	amp
Peak RF Grid Voltage	- - -	575	640	695	volts
Driving Power	- - -	185	225	230	watts
Plate Dissipation	- - -	12.0	14.0	17.0	kW
Plate Output Power	- - -	55.0	82.5	110.0	kW

MAXIMUM RATINGS

DC PLATE VOLTAGE	- - -	20,000 MAX. VOLTS
DC SCREEN VOLTAGE	- - -	2500 MAX. VOLTS
DC PLATE CURRENT	- - -	15.0 MAX. AMPS
PLATE DISSIPATION	- - -	35,000 MAX. WATTS
SCREEN DISSIPATION	- - -	1750 MAX. WATTS
GRID DISSIPATION	- - -	500 MAX. WATTS

Note: Maximum plate voltage and plate current cannot be applied simultaneously without exceeding dissipation ratings.

K10YB



4CX35,000C

PLATE-MODULATED RADIO-FREQUENCY POWER AMPLIFIER

Class-C Telephony (Carrier conditions except where noted)

MAXIMUM RATINGS table with columns for parameter and value (e.g., DC PLATE VOLTAGE - 15,000 MAX. VOLTS)

* Corresponds to 35,000 watts at 100 percent sine-wave modulation

**Approximate value

TYPICAL OPERATION (Frequencies below 30 megacycles)

TYPICAL OPERATION table with columns for parameter and values (e.g., DC Plate Voltage - 7.5 10 15 kV)

AUDIO-FREQUENCY AMPLIFIER OR MODULATOR

Class-AB1

MAXIMUM RATINGS (Per Tube) table with columns for parameter and value (e.g., DC PLATE VOLTAGE - 20,000 MAX. VOLTS)

* Per Tube

**Approximate value

TYPICAL OPERATION (Two Tubes)

TYPICAL OPERATION table with columns for parameter and values (e.g., DC Plate Voltage - 10 15 20 kV)

RADIO-FREQUENCY LINEAR AMPLIFIER

Class-AB1

MAXIMUM RATINGS table with columns for parameter and value (e.g., DC PLATE VOLTAGE - 20,000 MAX. VOLTS)

*Approximate value

TYPICAL OPERATION, Peak-Envelope or Modulation-Crest Conditions, (Frequencies below 30 megacycles)

TYPICAL OPERATION table with columns for parameter and values (e.g., DC Plate Voltage - 10 15 20 kV)

NOTE: "TYPICAL OPERATION" data are obtained by calculation from published characteristic curves and confirmed by direct tests. Adjustment of the rf grid drive to obtain the specified plate current at the specified grid bias, screen voltage, and plate voltage is assumed. If this procedure is followed, there will be little variation in output power when tubes are changed, even though there may be some variations in grid and screen currents. The grid and screen currents which result when the desired plate current is obtained are incidental and vary from tube to tube. These current variations cause no difficulty so long as the circuit maintains the correct voltage in the presence of the variations in current. If grid bias is obtained principally by means of a grid resistor, the resistor must be adjustable to obtain the required bias voltage when the correct rf driving voltage is applied.



APPLICATION

MECHANICAL

MOUNTING — The 4CX35,000C must be operated with its axis vertical. The base of the tube may be down or up at the convenience of the circuit designer.

SOCKET — The Eimac Socket, Type SK-1500, has been designed especially for the concentric base terminals of the 4CX35,000C. The SK-1500 is not an Air System Socket. Separate base cooling is required and is accomplished by directing 60-100 CFM of air horizontally through the socket from the side.

COOLING — The maximum temperature rating for the external surfaces of the 4CX35,000C is 250°C. Sufficient forced-air circulation must be provided to keep the temperature of the anode at the base of the cooling fins and the temperature of the ceramic-metal seals below 250°C. Air-flow requirements to maintain seal temperatures at 225°C in 40°C ambient air are tabulated below (for operation below 30 megacycles). These data are for air flowing in the anode-to-base direction.

Plate Dissipation* (Watts)	SEA LEVEL		5000 FEET	
	Air Flow (CFM)	Pressure Drop (Inches of water)	Air Flow (CFM)	Pressure Drop (Inches of water)
15,000	600	1.6	720	1.95
25,000	1040	4.2	1250	5.1
35,000	1720	10	2060	12

*Since the power dissipated by the filament represents about 3000 watts and since grid-plus-screen dissipation can, under some conditions, represent another 2250 watts, allowance has been made in preparing this tabulation for an additional 5250 watts dissipation.

The blower selected in a given application must be capable of supplying the desired air flow at a back pressure equal to the pressure drop shown above plus any drop encountered in ducts and filters.

At other altitudes and ambient temperatures the flow rate must be modified to obtain equivalent cooling. The flow rate and corresponding pressure differential must be determined individually in such cases, using rated maximum temperatures as the criteria for satisfactory cooling.

ELECTRICAL

FILAMENT OPERATION — The rated filament voltage for the 4CX35,000C is 10.0 volts. Filament voltage, as measured at the socket, should be maintained at this value to obtain maximum tube life. In no case should it be allowed to deviate by more than plus or minus five percent from the rated value.

ELECTRODE DISSIPATION RATINGS — The maximum dissipation ratings for the 4CX35,000C must be respected to avoid damage to the tube. An exception is the plate dissipation, which may be permitted to rise above the rated maximum during brief periods, such as may occur during tuning.

CONTROL-GRID OPERATION — The 4CX35,000C control grid has a maximum dissipation rating of 500 watts. Precautions should be observed to avoid exceeding this rating. The grid bias and driving power should be kept near the values shown in the "Typical Operation" sections of the data sheet whenever possible. The maximum grid circuit resistance should not exceed 100,000 ohms per tube.

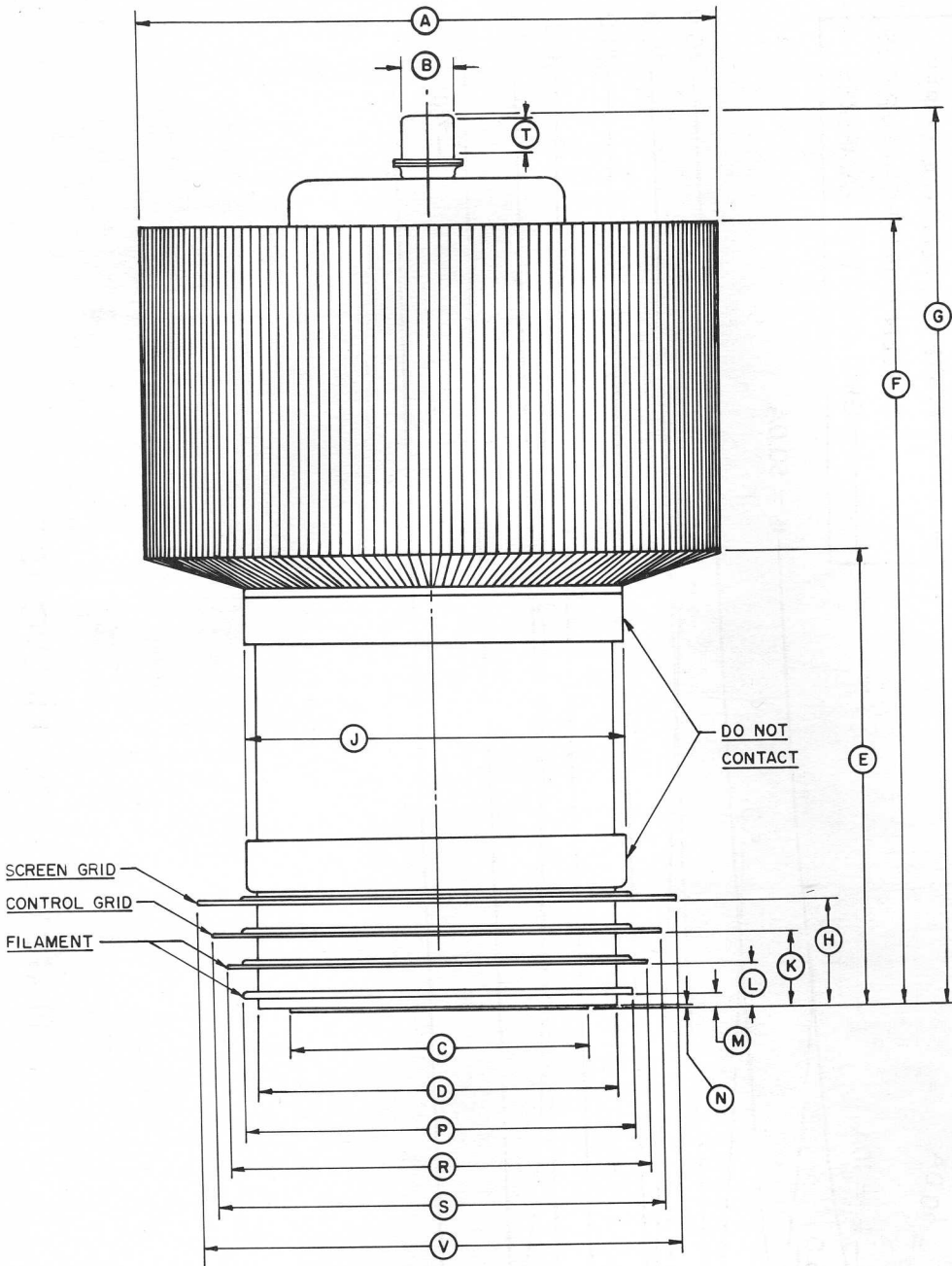
SCREEN-GRID OPERATION — The power dissipated by the screen of the 4CX35,000C must not exceed 1750 watts.

Screen dissipation, in cases where there is no ac applied to the screen, is the simple product of the screen voltage and the screen current. If the screen voltage is modulated, the screen dissipation will depend upon loading, driving power, and carrier screen voltage.

Screen dissipation is likely to rise to excessive values when the plate voltage, bias voltage, or plate load are removed with filament and screen voltages applied. Suitable protective means must be provided to limit the screen dissipation to 1750 watts in the event of circuit failure.

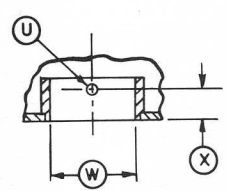
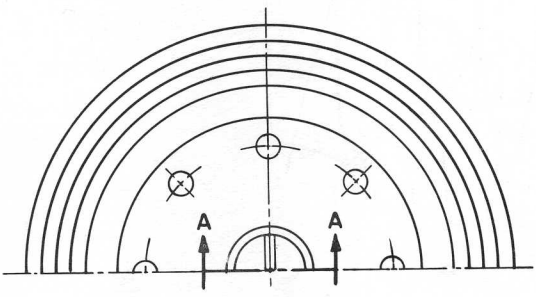
PLATE DISSIPATION — The plate-dissipation rating for the 4CX35,000C is 35,000 watts. When the 4CX35,000C is operated as a plate-modulated rf amplifier, the plate dissipation rating is reduced to 23,000 watts. In addition the plate voltage rating is reduced to 15,000 volts. Since the power input is limited by conditions other than plate efficiency, there is little possibility of exceeding the 23,000 watt dissipation rating except during tuning.

SPECIAL APPLICATIONS — If it is desired to operate this tube under conditions widely different from those given here, write to the Power Grid Tube Marketing Department, Eitel-McCullough, Inc., 301 Industrial Way, San Carlos, California for information and recommendations.



DIMENSIONS IN INCHES

DIMENSIONAL DATA			
REF.	MIN.	MAX.	NOM.
A	9.500	9.750	
B	.860	.890	
C	4.980	5.020	
D	5.980	6.020	
E	7.462	7.712	
F	13.000	13.250	
G	14.750	15.000	
H	1.750	1.800	
J	6.250	6.500	
K	1.220	1.270	
L	.690	.740	
M	.188	.228	
N	.045	.075	
P	6.510	6.560	
R	6.980	7.020	
S	7.480	7.520	
T	.485	.515	
U		.135	
V	7.975	8.015	
W	1.250	1.270	
X	.490	.530	



SECTION A-A



**EIMAC 4CX35,000C
TYPICAL CONSTANT
CURRENT**

CHARACTERISTICS

- SCREEN VOLTAGE = 750 VOLTS
 — PLATE CURRENT — AMPERES
 - - - SCREEN CURRENT — AMPERES
 - - - - GRID CURRENT — AMPERES

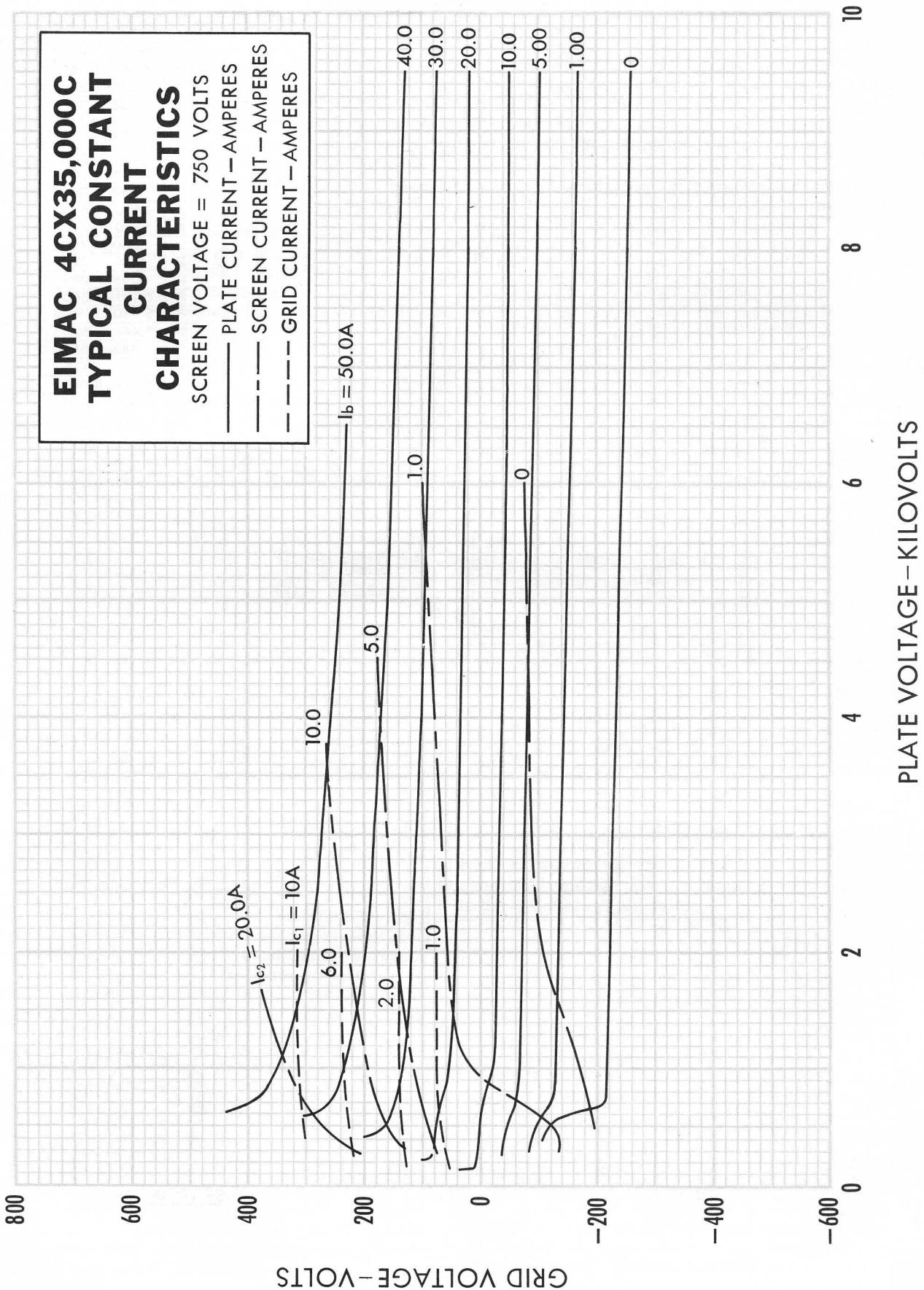


PLATE VOLTAGE — KILOVOLTS



4CX35,000C

EIMAC 4CX35,000C TYPICAL CONSTANT CURRENT CHARACTERISTICS

SCREEN VOLTAGE = 1500 VOLTS

— PLATE CURRENT — AMPERES

--- SCREEN CURRENT — AMPERES

--- GRID CURRENT — AMPERES

