

8161 3CX2500A3

> MEDIUM MU TRIODE

> > 3CX2500A3

The EIMAC 3CX2500A3 is an all ceramic and metal, medium-mu, forced-air cooled, external anode transmitting triode with a maximum plate dissipation rating of 2500 watts. Relatively high power output as an amplifier, oscillator, or modulator may be obtained from this tube at low plate voltages. The 3CX2500A3 is an exact replacement for the EIMAC 3X2500A3 and is suggested for use where higher ambient temperatures are to be expected or greater reliability is required. The all ceramic and metal construction allows a greater margin of safety with respect to tube operating temperatures while permitting higher processing temperatures to insure longer life.

The tube has a rugged, low-inductance cylindrical filament-stem structure, which readily becomes part of a linear filament tank circuit for VHF operation. The grid provides thorough shielding between the input and output circuits for grounded-grid applications and is conveniently terminated in a ring between the plate and filament terminals. The 3CX2500A3 may be installed or removed without the aid of tools.

#### GENERAL CHARACTERISTICS

ELECTRICAL											
Filament: Tho	riated	Tung	sten					$\underline{Min.}$	$\underline{Nom.}$	Max.	
Voltage		-	-	-	-	-	-		7.5		volts
Current		-	-	-	-	-		49		53	amperes
Amplification	Factor	: -	-	-	-	-	-	19		26	
Dirêct Interele	ctrode	Capa	cita	nces							
Grid-Plate	e -	-	-	-	-	-	-	16.8		23.2	pF
Grid-Filar	ment	-	-	-	-	-	-	29.2		40.2	pF
Plate-Fila			-	-	-	-	-	0.6		1.2	pF
Tranconductar	nce (It	088 = 6	ma	., Eb	=30	00 v	.) -		20,000		umhos
Highest Freque	ency f	or Ma	xim	um F	<b>Rati</b> r	ıgs	-			75	MHz
MECHANICAL											

MECHAINOAL																		
Base	-	-	-	-	-	-	-	-	-	-	-	-	_	-	-	-	See d	drawing
Mounting -	-	-	-	-	-	-	-	-	-	-	-	-	-	Ve	rtical	, ba	se dow	n or up
Cooling	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	For	ced Air
Maximum Anod					empe	eratu	ires	-	-	-	-	-	-	-	-	-	-	250°C
Maximum Over-	all Di	imer	ision	s:														
Length -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		inches
Diameter	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.16	inches
Net Weight -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.25	pounds
Shipping Weight	t (Ave	erage	e)	-	-	-	-	-	-	-	-	-	-	-	-	-	17	pounds

## RADIO-FREQUENCY POWER AMPLIFIER OR OSCILLATOR

Conventional Neutralized Amplifier, (Frequencies below 75 MHz.) Class-C FM or Telegraphy (Key-down

Class-C FM or Telegraphy (Key-down conditions, per tube)

#### MAXIMUM RATINGS

ELECTRICAL

DC PLATE VOLTAGE - 6000 VOLTS
DC PLATE CURRENT - 2.5 AMPS
PLATE DISSIPATION - 2500 WATTS
GRID DISSIPATION - 150 WATTS

TYPICAL OPERATION	(Frequencies l	below 75	MHz per tube)
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DC Plate Voltage	-	-	-	-	-	-	4000	5000	6000	volts
DC Plate Current	-	-	-	-	-	-	2.5	2.5	2.08	amps
DC Grid Voltage	-	-	-	-	-	-	300	450	<u>—500</u>	volts
DC Grid Current*	-	-	-	-	-	-	245	265	180	ma
Peak RF Grid Input	Volt	age	*	-	-	-	580	750	765	volts
Driving Power*	-	-	-	-	-	-	142	197	136	watts
Grid Dissipation*	-	-	-	-	-	-	68	78		watts
Plate Power Input	-	-	-	-	-	-	10,000	12,500	12,500	watts
Plate Dissipation	-	-	-	-	-	-	2500	2500	2500	watts
Plate Power Output	t	-	-	-	-	-	7500	10,000	10,000	watts

(Revised 3-1-67) © 1967 Varian

Printed in U.S.A.

\*Approximate values.

#### PLATE-MODULATED RADIO-FREQUENCY AMPLIFIER

Conventional Neutralized Amplifier, (Frequencies below 75 MHz.)

Class-C Telephony (Carrier conditions, per tube)

#### MAXIMUM RATINGS

DC PLATE VOLTAGE - 5000 VOLTS DC PLATE CURRENT - 2.0 AMPS PLATE DISSIPATION - 1670 VOLTS GRID DISSIPATION - 150 WATTS

#### TYPICAL OPERATION (Frequencies below 75 MHz per tube)

DC Plate Voltage	-	-	-	-	-	-	4000	4500	5000	volts
DC Plate Current	-	-	-	-	-	-	1.67	1.47	1.25	amps
DC Grid Voltage	-	-	-	-	-	-	<b>—450</b>	<u>—</u> 500	550	volts
DC Grid Current*	-	-	-	-	-	-	180	140	150	ma
Peak RF Grid Input	Vol	tage	*	-	-	-	<b>6</b> 85	715	760	volts
Driving Power*	-	-	_	-	-	-	125	100	115	watts
Grid Dissipation*	-	-	-	-	-	-	43	30	32	watts
Plate Power Input	-	-	-	-	-	-	6670	6615	6250	watts
Plate Dissipation	-	-	-	_	-	-	1670	1315	950	watts
Plate Power Output	t	-	-	-	-	-	5000	5300	5300	watts
*Approximate values.										

## AUDIO-FREQUENCY POWER AMPLIFIER OR MODULATOR

Class-AB or B

#### MAXIMUM RATINGS

DC PLATE VOLTAGE - 6000 VOLTS
DC PLATE CURRENT - 2.5 AMPS
PLATE DISSIPATION - 2500 WATTS
GRID DISSIPATION - 150 WATTS

TYPICAL OPERATION (Sinusoidal wave,	two t	ubes unles	s noted)	
DC Plate Voltage		4000	5000	6000 volts
DC Grid Voltage <sup>1</sup>	-	<u>—</u> 150	<del></del> 190	240 volts
Zero-Signal DC Plate Current		0.6	0.5	0.4 amps
Max-Signal DC Plate Current	<b>-</b>	4.0	3.2	3.0 amps
Effective Load, Plate to Plate	. <b>-</b>	2200	3600	4650 ohms
Peak AF Grid Input Voltage (per tube)*	٠ ـ	340	360	390 volts
Max-Signal Peak Driving Power*		340	230	225 watts
Max-Signal Nominal Driving Power* -	. <u>-</u>	170	115	113 watts
Max-Signal Plate Output Power	. <del>-</del>	11,000	11,000	13,000 watts

<sup>\*</sup>Approximate values.

IF IT IS DESIRED TO OPERATE THIS TUBE UNDER CONDITIONS WIDELY DIFFERENT FROM THOSE GIVEN UNDER "TYPICAL OPERATION," POSSIBLY EXCEEDING THE MAXIMUM RATINGS GIVEN FOR CW SERVICE, WRITE EIMAC DIVISION OF VARIAN, FOR INFORMATION AND RECOMMENDATIONS.

#### **APPLICATION**

Cooling—Forced-air cooling must be provided to hold the ceramic-to-metal seals and anode core temperature below the maximum rating of 250°C. At ambient temperatures above 50°C, at higher altitudes and at operating temperatures above 30 MHz, additional air flow must be provided. Sea level and 10,000 foot altitude air-flow requirements to maintain seal temperatures below 200°C in 50°C ambient air are tabulated below (for operation below 30 MHz).

	Anode-to-Base Air Flow <sup>1</sup>									
	Sea	10,000 Feet								
Anode Dissipation Watts	Air Flow CFM	Pressure Drop Inches Water	Air Flow CFM	Pressure Drop Inches Water						
1500 2500	33 66	.6 1.25	48 96	.9 1.82						

	Base-t	o-Anode Ai	r Flow	
	Sea	10,0	00 Feet	
Anode Dissipation Watts	Air Flow CFM	Pressure Drop Inches Water	Air Flow CFM	Pressure Drop Inches Water
1500 2500	32 57	.6 1.0	47 83	.9 1.5

<sup>\*</sup>Since the power dissipated by the filament represents about 400 watts and since grid dissipation can, under some conditions represent another 150 watts, allowance has been made in preparing this tabulation for an additional 550 watts.

Simultaneous removal of all power and air (as in the case of a power failure) will not

ordinarily injure the tube, but it is recommended that cooling airflow continue for at least three minutes after filament power has been removed.

Filament Voltage — The filament voltage, as measured directly at the tube, should be 7.5 volts with maximum allowable variations due to line fluctuation of from 7.12 to 7.87 volts.

Bias Voltage — There is little advantage in using bias voltages in excess of those given under "TYPICAL OPERATION" except in certain very specialized applications. Where bias is obtained from a grid resistor, suitable protective means must be provided to prevent excessive plate dissipation in the event of loss of excitation.

Plate Voltage — The plate-supply voltage for the 3CX2500A3 should not exceed 6000 volts. In most cases there is little advantage in using plate-supply voltages higher than those given under "TYPICAL OPERATION" for the power output desired.

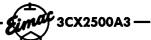
Grid Dissipation — The power dissipated by the grid of the 3CX2500A3 must never exceed 150 watts. Grid dissipation is the product of dc current and peak positive grid voltage.

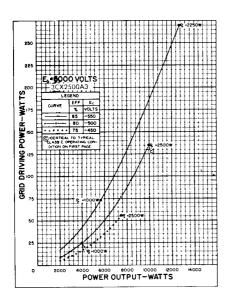
In equipment in which the plate loading varies widely, such as oscillators used for radio-frequency heating, care should be taken to make certain that the grid dissipation does not exceed the maximum rating under any condition of loading.

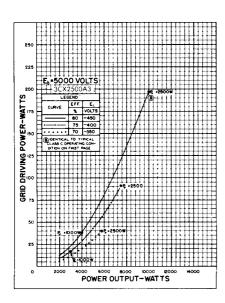
InVHF operation, particularly above 75 MHz the dc grid current must not exceed 200 ma under any conditions of plate loading. With lightly loaded conditions the grid driving power should be reduced so that the grid current does not exceed one-tenth of the plate current.

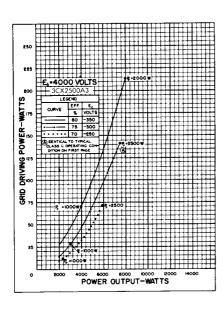
<sup>1</sup>Adjust to give listed zero-signal plate current.

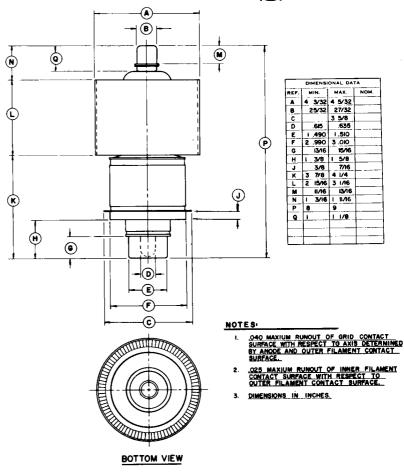
<sup>&</sup>lt;sup>1</sup> When air is supplied in the anode-to-base direction, a minimum of 3 cfm must be directed into the filament-stem structure between the inner and outer filament terminals to maintain the base seals below 250°C. No separate air is required with base-to-anode airflow.

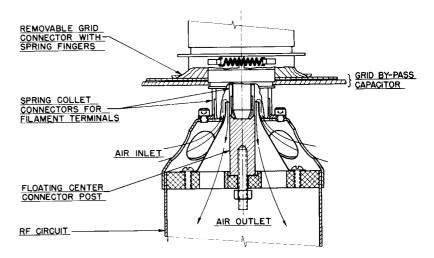












TYPICAL TUBE CONNECTORS AND STEM COOLING

#### DRIVING POWER vs. POWER OUTPUT

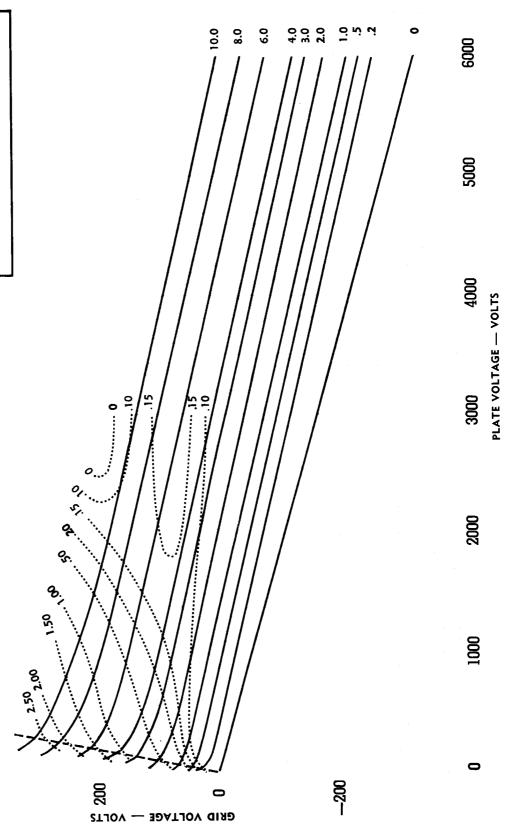
The three charts on this page show the relationship of plate efficiency, power output and approximate grid driving power at plate voltages of 4000, 5000 and 6000 volts. These charts show combined grid and bias losses only. The driving-power and power-output figures do not include circuit losses. The plate dissipation in watts is indicated by Pp. Points A, B, and C are identical to the typical Class C operating conditions shown on the first page under 4000, 5000 and 6000 volts respectively.

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# EIMAC 3CX2500A3 CONSTANT CURRENT CHARACTERISTICS

PLATE CURRENT — AMPERES GRID CURRENT — AMPERES

400





#### -McCULLOUGH, INC. CARLOS, CALIFORNIA

MEDIUM MU TRIODE

The Eimac 8161/3X2500A3 is a medium-mu, forced-air-cooled, external-anode transmitting triode with a maximum plate-dissipation rating of 2500 watts. Relatively high power output as an amplifier, oscillator or modulator may be obtained from this tube at low plate voltages. A single tube will deliver a radio-frequency output of 7500 watts at 4000 plate volts at frequencies up to 110 Mc., as well as at lower frequencies.

The tube has a rugged, low-inductance cylindrical filament-stem structure, which readily becomes part of a linear filament tank circuit for V.H.F. operation. The grid provides thorough shielding between the input and output circuits for grounded-grid applications and is conveniently terminated in a ring between the plate and filament terminals. The 8161/3X2500A3 may be installed or removed without the aid of tools.

The approved Federal Communications Commission rating for the 8161/3X2500A3 is 5000 watts of carrier power when used as a plate-modulated amplifier and 1250 watts of carrier power when used as a grid-modulated or linear amplifier

			GEN	NER.	AL C	CHA	RAC	TER	RISTI	CS							B	and its		
ELECTRIC	CAL		<b>-</b>																	
	t: Thoriated	Tunas	ten								Min	. Nom.	Max.					10.10		
	Voltage				•	•		-	-	•		7.5			olts					
	Current	•		•	•	•	-	•	•	•	49			ampe	eres				<b>RE</b>	
	ation Fact		· •	•	•	•	•	-	•	•	19		26							
Direct I	nterelectro		pacitan	Ces							16.8	,	23.2		uuf					
	Grid-Plat Grid-Fila		•	•	•	•	•	•	•	•	29.2		40.2		uuf					
	Plate-Fila			-					-		0.6		1.2		uuf					
Transco	nductance	(1 <sub>b</sub> == 83	0 ma	E <sub>b</sub> =	3000	v.)						20,000		um	hos		_			
	Frequency					٠.		•	•	•			75		mc					
MECHAI	NICAL																			
Base			-	-									-			•	•			ee drawi
Mountin	g -		•		•	•	•	-	•	•	•		-	•	•	•	١	/ertical,	base o	down or
Cooling				•	-	•	•	•	•	•	•		-	•	•	•	•	-	-	Forced
	m Anode (			and S	eal T	empe	rature	S .	•	•	-		•	•	•	-	-	•		175°
Maximu	m Over-All	Dimen	ions:																	8.6 inc
	Length Diameter		•	•	•	•	•	-	•	-	•		:	:	:	:	:	•		0.0 inc .16 inc
Net We			:	-		-	-	•		-	-		_		-		-	•		.15 nou
	Weight	Averag	ae l				-		-				-				•			17 pou
R OSC Conventiona lass-C FM   AXIMUM	REQUENTLLATOR ILLATOR IN Neutralize or Telegraph RATINGS	<b>R</b> d Ampl	ifier—F	reque	ncies :	below	75Mc. e)			! !	D-C Pla D-C Pla D-C Gr D-C Gr Peak R-	L OPERAT ite Voltag ite Currer id Voltag id Curre F Grid In	re - nt - je - nt* -	ltage <sup>1</sup>	:	: : : :	75 Me	4000 2.5 300 245 580	5000 2.5 450 265 750	2.08 at 500 v 180 m 765 ve
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R OSC Conventiona lass-C FM AXIMUM I C PLATE C PLATE C.ATE COOL RID DISSIF  ADIO-F rounded-Gr lass-C FM AXIMUM S C PLATE LATE COOL RID DISSIF	ILLATOI I Neutralize or Telegraph RATINGS VOLTAGE CURRENT IPATION	R d Ampl d Ampl d (Key-c	owe	iR A	MPL	JFIE	75Mc.  6000 h 2.5 h 2500 h 175 h 150 h  200 h 2500 h 175 h 150 h	MAX. MAX. MAX. MAX. MAX. MAX. MAX. MAX.	VOLTS AMPS MA		D-C Plate D-C Grid D-C Grid D-Plate D-Plate D-C Grid D-C Pl.	te Voltagite Currei did Currei Gurer F Grid In Power Inpuissipation ower Out  L OPERAT Voltagite Voltagite Currei did Currei Power Out  L OPERAT Voltagite Currei Power Out  L OPERAT Voltagite Currei Did Currei Power Out	Je - nnt - le - nnt - nn	iltage*	c., per	tube)		4000 2.5 —300 245 580 142 68 10,000 2500 7500	5000 2.5 -450 265 750 197 78 12,500 2500 10,000 -450 - 1.8 190 1600 6850	2.08 at -500 vi -180 m 765 vc 136 w 12,500 w 2500 w 10,000 v -500 v -500 v 7500 w 5000 v 5000
Conventional lass-C FM AXIMUM II-C PLATE COOL RID DISSIFUATE RID DISSIFUATE RID RID DISSIFUATE RID RID DISSIFUATE RID RID DISSIFUATE RID	ILLATOI I Neutralize or Telegraph RATINGS VOLTAGE CURRENT PATION	R d Ampl y (Key-c : : : : : : : : : : : : : : : : : : :	os between	ER A	MPI	LIFIE	75Mc.  6000 h 2.5 h 175 h 175 h 150 h  R  R  200 h 200 h 150 h	MAX. MAX. MAX. MAX. MAX. MAX. MAX.	VOLTS AMPS MA		D-C Plate D-C Pl	the Voltage the Current of Curren	rion (1 cm) (1 c	iltage*	c., per	tube)		4000 2.5 —300 245 580 142 68 10,000 2500 7500	5000 2.5 -450 750 197 78 12,500 2500 10,000 3700 -450 1.8 190 1600 6850 4500 1.47 -500	2.08 ar
Conventional lass-C FM AXIMUM I -C-PLATE COOL RID DISSIFUTOUN CONTROL OF LATE COOL RID DISSIFUTOUN CONTROL OF LATE COOL RID DISSIFUTOUN CONTROL DI	ILLATOI I Neutralize or Telegraph RATINGS VOLTAGE CURRENT PATION	R d Ampl d (Key-co  IMPERAT  ICY P  requencie  IMPERAT  TED R	OWE	FR A	MPL  And I	LIFIE	75Mc.  6000 h 2.5 h 175 h 175 h 150 h  R  R  200 h 200 h 150 h	MAX. MAX. MAX. MAX. MAX. MAX. MAX.	VOLTS AMPS MA		D-C Plate PPlate P TYPICA D-C GI D-C GI D-C GI D-C GI TYPICA D-C GI	te Voltagite Currei di Voltagi di Currei di Voltagi di Volt	rion (1 cm.	Ilo Mo	cc., per	tube)		4000 2.5 —300 245 580 142 68 10,000 2500 7500	5000 2.5 —450 750 17,70 12,500 2500 10,000 3700 —450 - 1.8 190 1600 6850 4500 1.47 —500 10,47 —500 10,47	2.08 ar -500 vi 180 m 765 vc 136 w 12,500 w 10,000 w 4000 vi -500 vi 1,85 ar 190 m 7500 w 1,25 av 5000 v
Conventional lass-C FM (AXIMUM I) (ATE COOL)	ILLATOI I Neutralize or Telegraph RATINGS VOLTAGE CURRENT IPATION	R d Ampl d (Key-co  IMPERAT  ICY P  requencie  IMPERAT  TED R	OWE	FR A	MPL  And I	LIFIE	75Mc.  6000 h 2.5 h 175 h 175 h 150 h  R  R  200 h 200 h 150 h	MAX. MAX. MAX. MAX. MAX. MAX. MAX.	VOLTS AMPS MA		D-C Plate PPlate PTYPICA D-C GIVING D-C GIVING D-C GIVING D-C Plate D-C GID-C G-C G-C G-C G-C G-C G-C G-C G-C Plate D-C G-C G-C G-C G-C G-C G-C Plate D-C G-C G-C G-C G-C G-C G-C G-C G-C G-C G	the Voltage the Current of Curren	rion (1 cm.	itage*	cc., per	tube)		4000 2.5 —300 245 580 142 68 10,000 2500 7500	5000 2.5 -450 750 197 78 12,500 2500 10,000 -450 - 1.8 190 1600 6850 4500 1,47 500 140 715	2.08 ar
CONVENTIONA  CONVE	ILLATOI I Neutralize or Telegraph RATINGS VOLTAGE CURRENT PATION ER CORE TE PATION TICLE TELEGRAPH TELEGRA	R d Ampl d (Key-co  IMPERAT  ICY P  requencie  IMPERAT  TED R	OWE	FR A	MPL  And I	LIFIE	75Mc.  6000 h 2.5 h 2500 h 150 h  R  R  2.0 h 5.0 h	MAX. MAX. MAX. MAX. MAX. MAX. MAX.	VOLTS AMPS MA WATTS WATTS		D-C Plate PPlate PTYPICA D-C Pl. D-C GI D-C GI D-C GI D-C Pl. D-C GI D-C	te Voltagite Currei did Currei F Grid Ir Powere F Grid Ir Power Inpi sissipation ower Out L OPERA ate Voltagit d Currei G Currei d Currei f Grid I f Powere	rion (1 cm) (1 c	itage*	cc., per	tube)		4000 2.5 -300 245 580 142 68 10,000 7500	5000 2.5 -450 750 197 78 12,500 2500 10,000 -450 - 1.8 190 1600 6850 4500 1,47 -500 1,47 -500 1,47 -500 1,47 -500 1,40 715 100 300 100 100 100 100 100 100	2.08 ar500 vc
Conventiona  Class-C FM  CALATE  CALATE  CALATE  CALATE  CALATE  COPLATE  CALATE  COPLATE  CALATE  COPLATE  CALATE  COPLATE  CALATE  COLATE  CALATE  CONVENTIONA  CONVENTIONA  CALATE  CONVENTIONA  CALATE  CALATE  CONVENTIONA  CALATE  CALATE  CALATE  CALATE  COPLATE  CALATE  CALA	ILLATOI I Neutralize or Telegraph RATINGS VOLTAGE CURRENT IPATION ER CORE TE PATION ICURENT CURRENT CURRENT CURRENT PATION LER CORE TE PATION LER CORE TE INEUTRALIZE PATION INEUTRALIZE PATION CURRENT CURRENT IPATION LER CORE TE PATION INEUTRALIZE PATION CURRENT CURRENT CURRENT CURRENT IPATION LER CORE TE RATINGS VOLTAGE CURRENT	R d Ampl d (Key-co  IMPERAT  ICY P  requencie  IMPERAT  TED R	OWE	FR A	MPL  And I	LIFIE	75Mc.  6000 h 2.5 h 2.5 h 2.5 h 175 h 150 h 2.0 h 2.0 h 175 h 150 h  CY	MAX. MAX. MAX. MAX. MAX. MAX. MAX. MAX.	VOLTS WATTS VOLTS MA WATTS VOLTS AMPS		D-C Plate PPlate PTYPICA D-C GIVING D-C GIVING D-C GIVING D-C Plate D-C GIVING D-C Plate D-C GIVING D-C GIVING D-C GIVING D-C GIVING GIVING D-C GROUNING GIVING D-C GROUNING GIVING D-C GROUNING GIVING D-C GIVING D-C GROUNING GIVING D-Plate Plate P	the Voltage the Current of Curren	rion (1	itage*	cc., per	tube)		4000 2.5 —300 245 580 142 68 10,000 2500 7500	5000 2.5 —450 750 177 78 12,500 2500 10,000 3700 —450 - 1.8 190 1600 6850 4500 1.47 —500 10,000 10,000	2.08 ar500 vc500 vc50
Conventiona Class-C FM MAXIMUM I D-C PLATE LATE COOL GRID DISSIF  RADIO-F Grounded-Gri MAXIMUM F D-C PLATE D-C PLATE D-C PLATE D-C PLATE COL GRID DISSIF  PLATE-M AMPLIFI Conventiona Class-C Tale MAXIMUM D-C PLATE D-C	ILLATOI I Neutralize or Telegraph RATINGS VOLTAGE CURRENT IPATION	R d Ampl y (Key-c : :MPERAT ICY P  requencie : :MPERAT TED R d Ampli er condi	OWE  URE  URE  URE  URE	FR A	MPL  And I	LIFIE	75Mc.  2.5 h 2.5 h 2.5 h 2.5 h 2.0 h	MAX. MAX. MAX. MAX. MAX. MAX. MAX. MAX.	VOLTS AMPS WATTS VOLTS AMPS WATTS VOLTS AMPS		D-C Plate D-C Girving Useful Useful U-C Girving CFrid D-C Girving D-C Girving Useful U-C Girving Grid D-C Girving GFrid D-C Girving U-C Girving GFrid D-C Girving U-C Girving GFrid D-C GFr	te Voltagite Currei did Currei F Grid Ir Powere F Grid Ir Power Inpi sissipation ower Out L OPERA ate Voltagit d Currei G Currei d Currei f Grid I f Powere	rion (1 control of the control of th	itage*	cc., per	tube)		4000 2.5 -300 245 580 142 68 10,000 2500 7500	3700 2.5 750 197 12,500 2500 10,000 3700 -450 -1.8 190 1600 6850 190 140 715 100 300 300 4500	2.08 ar

## AUDIO-FREQUENCY POWER AMPLIFIER OR MODULATOR

Class-AB or B
MAXIMUM RATINGS

D-C PLATE VOLTAGE - - - 6000 MAX. VOLTS
D-C PLATE CURRENT - - 2.5 MAX. AMPS
PLATE DISSIPATION - - 2500 MAX. WATTS
GRID DISSIPATION - - 150 MAX. WATTS

TYPICAL OPERATION (Sinusoidal	wave	, two	tubes	uniess no	oted)	
D-C Plate Voltage	-	-	- 4000	5000	6000	volts
D-C Grid Voltage <sup>1</sup>	-	•	150	<del></del> 190	240	volts
Zero-Signal D-C Plate Current	-	-	- 0.6	0.5	0.4	amps
Max-Signal D-C Plate Current		-	- 4.0	3.2	3.0	amps
Effective Load, Plate to Plate	-	-	- 2200	3600	4650	ohms
Peak A-F Grid Input Voltage (per	tube	*(•	- 340	360	390	volts
Max-Signal Peak Driving Power*	-	•	- 340	230	225	watts
Max-Signal Nominal Driving Power	r <b>*</b>	•	- 170	115	113	watts
Max-Signal Plate Output Power		-	11,000	11,000	13,000	watts
*Approximate values.						
Adjust to give listed zero-signal pl	ate d	curre	nt.			

IF IT IS DESIRED TO OPERATE THIS TUBE UNDER CONDITIONS WIDELY DIFFERENT FROM THOSE GIVEN UNDER "TYPICAL OPERATION", POSSIBLY EXCEEDING THE MAXIMUM RATINGS GIVEN FOR CW SERVICE, WRITE EITEL-McCULLOUGH, INC., FOR INFORMATION AND RECOMMENDATIONS

### **APPLICATION**

▶ Cooling—Forced-air cooling must be provided to hold the glass-to-metal seals and the anode cooler core below the maximum rated temperature of 175° C. Although the air requirements stated below are sufficient to maintain rated tube temperatures under many conditions, air in excess of the amounts shown will usually result in longer tube life. At ambient temperatures higher than 20° C., at high altitudes, and at operating frequencies above 30 megacycles, additional air flow must be provided. In all cases, tube temperatures are the criteria which govern air requirements. Surface temperatures may be measured conveniently with the aid of temperature-sensitive paints.

		Anode-to-Base A	ir-Flow			
	Se	a Level	10,	0,000 Feet		
Plate Dissipation (Watts)	Air-Flow (CFM)	Pressure Drop (Inches H <sub>2</sub> O)	Air-Flow (CFM)	Pressure Drop (Inches H <sub>2</sub> O)		
2000 2500	58.5 85.5	0.8 1.6	85.5 125	1.15 2.3		

	Base-to-Anode Air-Flow									
<del> </del>	Se	a Level	000 Feet							
Plate Dissipation (Watts)	Air-Flow (CFM)	Pressure Drop (Inches H <sub>2</sub> O)	Air-Flow (CFM)	Pressure Drop (Inches H <sub>2</sub> O)						
2000 2500	35.5 42	0.25 0.5	52 61.5	0.35 0.75						

Under the same conditions, a minimum air-flow rate of 6 CFM directed into the filament-stem structure between the inner and outer filament terminals is required to maintain the base seals below 175°C.

Simultaneous removal of all power and air (as in the case of a power failure) will not ordinarily injure the tube, but it is not recommended as a standard operating practice. **Filament Voltage**—The filament voltage, as measured directly at the tube, should be 7.5 volts with maximum allowable variations due to line fluctuation of from 7.12 to 7.87 volts.

**Bias Voltage**—There is little advantage in using bias voltages in excess of those given under "Typical Operation" except in certain very specialized applications. Where bias is obtained from a grid resistor, suitable protective means must be provided to prevent excessive plate dissipation in the event of loss of excitation.

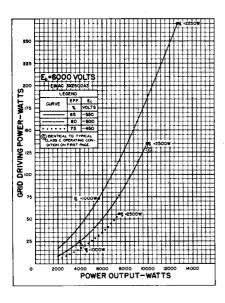
**Plate Voltage** — The plate-supply voltage for the 3X2500A3 should not exceed 6000 volts. In most cases there is little advantage in using plate-supply voltages higher than those given under "Typical Operation" for the power output desired.

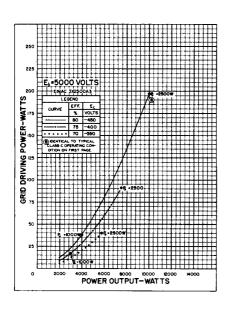
In Class-C FM or Telegraphy service a 0.1 —henry choke, shunted by a spark gap, should be series connected between the plates of the amplifier tubes and the high-voltage plate-supply capacitor to offer protection from transients and surges. In plate-modulated services where a plate-modulation transformer is used the protective choke is not normally required.

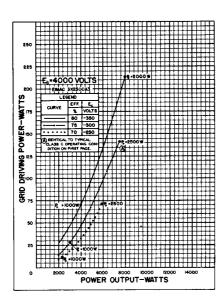
**Grid Dissipation**—The power dissipated by the grid of the 3X2500A3 must never exceed 150 watts. Grid dissipation is the product of d-c grid current and peak positive grid voltage.

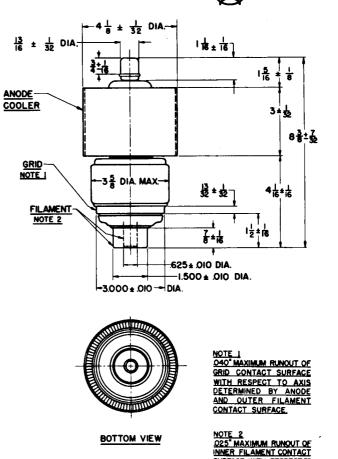
In equipment in which the plate loading varies widely, such as oscillators used for radio-frequency heating, care should be taken to make certain that the grid dissipation does not exceed the maximum rating under any condition of loading.

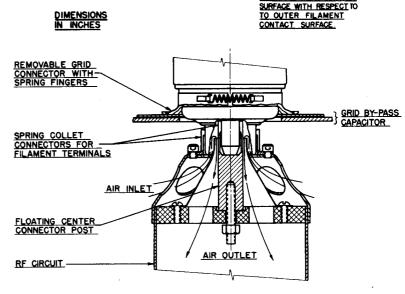
In VHF operation, particularly above 75 Mc., the d-c grid current must not exceed 200 ma. under any conditions of plate loading. With lightly loaded conditions the grid driving power should be reduced so that the grid current does not exceed one-tenth of the plate current.











TYPICAL TUBE CONNECTORS AND STEM COOLING

#### DRIVING POWER vs. POWER OUTPUT

The three charts on this page show the relationship of plate efficiency, power output and approximate grid driving power at plate voltages of 4000, 5000 and 6000 volts. These charts show combined grid and bias losses only. The driving-power and power-output figures do not include circuit losses. The plate dissipation in watts is indicated by Pp. Points A, B, and C are identical to the typical Class C operating conditions shown on the first page under 4000, 5000 and 6000 volts respectively.

