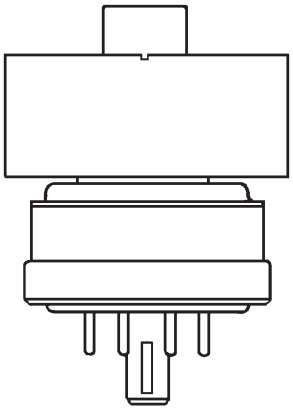


8321 / 4CX350A
8322 / 4CX350F
Radial - Beam Power Tetrodes

The Penta Laboratories 8321 / 4CX350A and the 8322 / 4CX350F are compact radial beam tetrodes with a maximum plate dissipation of 350 watts. The intended use for these radial beam tetrodes is for Class - AB_1 audio or Rf amplifier service. The 8321 / 4CX350A and the 8322 / 4CX350F differ only in the heater voltage and current.

GENERAL CHARACTERISTICS

ELECTRICAL

		Min.	Nom.	Max.	
Cathode:	Oxide-Coated, unipotential				
	Preheating Time	30		60	sec
	Cathode-to-Heater potential			±150	volts
Heater:	4CX350A Voltage		6.0		volts
	4CX350A Current	2.9		3.6	amps
	4CX350F Voltage		26.5		volts
	4CX350F Current	0.66		0.81	amps
Amplification Factor (Grid-to-Screen)			13		
Transconductance (Ib = 150 mA)			22,000		umhos
Direct Interelectrode Capacitances, Grounded Cathode:					
	Input	22.2		26.2	uuf
	Output	5.0		6.0	uuf
	Feedback			0.01	uuf

MECHANICAL

Base ..... Special 9-pin
Maximum Operating Temperatures:
Ceramic-to-Metal Seals ..... 250° C
Anode Core ..... 250° C
Recommended Socket ..... SK-600 Series

Revised 06 May 2005

P E N T A L A B O R A T O R I E S

9740 COZYCROFT AVENUE * CHATSWORTH * CALIFORNIA 91311
(800) 421-4219 * (818) 882-3872 * FAX: (818) 882-3968

4CX350A / 4CX350F - Radial - Beam Power Tetrode

Operating Position	Any	
Maximum Dimentions:		
Height	2.464	inch
Seated Height	1.910	inch
Diameter	1.640	inch
Cooling	Forced air	
Net Weight	4	ounces
Shipping Weight (approximate)	1.6	pounds

AUDIO-FREQUENCY AMPLIFIER OR MODULATOR

Class-AB_1

Maximum Ratings (per tube)

DC Plate Voltage	2500	max.	volts
DC Screen Voltage	400	max.	volts
DC Plate Current	300	max.	ma
Plate Dissipation	350	max.	watts
Screen Dissipation	8	max.	watts
Grid Current	2	max.	ma

TYPICAL OPERATION (Sinusoidal wave, two tubes unless noted)

DC Plate Voltage	1000	1500	2200	volts
DC Screen Voltage	400	400	400	volts
DC Grid Voltage[1]	-27	-27	-27	volts
Zero-Signal DC Plate Current	200	200	200	mA
Max-Signal DC Plate Current	520	530	580	mA
Max-Signal DC Screen Current	-8	-10	-6	mA
Effective Load, Plate to Plate	2600	5000	7800	ohms
Peak AF Grid Input Voltage (per tube)*	21	21	50	volts
Driving Power	0	0	0	watts
Max-Signal Plate Input Power	560	800	1260	watts
Max-Signal Plate Output Power	190	400	770	watts

*Approximate values.
[1]Adjust grid bias to obtain listed zero-signal plate current.

RADIO-FREQUENCY LINEAR AMPLIFIER

Class-AB_1 (Single-Sideband Suppressed-Carrier Operation)

Maximum Rating

DC Plate Voltage	2500	max.	volts
DC Screen Voltage	400	max.	volts
DC Plate Current	300	max.	ma
Plate Dissipation	350	max.	watts
Screen Dissipation	8	max.	watts
Grid Current	2	max.	ma

TYPICAL OPERATION (Peak-envelope conditions except where noted)

DC Plate Voltage	1000	1500	2200	volt
DC Screen Voltage	400	400	400	volt
DC Grid Voltage[1]	-27	-27	-27	volts
Zero-Signal DC Plate Current	100	100	100	mA
Peak RF Grid Voltage*	21	21	25	volt
DC Plate Current	260	265	290	mA
DC Screen Current*	-4	-5	-3	mA
Plate Input Power	260	400	630	watt
Plate Output Power	95	200	385	watt
Two-Tone Average DC Plate Current	210	215	195	mA
Two-Tone Average DC Screen Current	-7	-8	-3	mA
Resonant Load Impedance	1300	2500	3900	ohm

*Approximate values.
[1]Adjust grid bias to obtain listed zero-signal plate current.

MECHANICAL

MOUNTING - The 4CX350A and 4CX350F may be operated in any position. Sockets are available with or without built-in screen by-pass capacitors and may be obtained with either grounded or ungrounded cathode terminals.

COOLING - Sufficient cooling must be provided for the anode, base seals and body seals to maintain operating temperatures below the rated maximum values. Air requirements to maintain seal temperatures at 225 °C in 50 °C ambient air tabulated on page 3.

At 500 mc or below, base-cooling air requirements are satified automatically when the tube is operated in an Air - System Socket and the recommended air-flow rates are used. Experience has shown that if reliable long life operation is to be obtained, the cooling air flow must be maintained during standby periods when only the heater voltage is applied to the tube. The anode cooler should be inspected periodically and cleaned when necessary to remove any dirt, which might interfere with effective cooling.

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 below, plus any drop encountered in ducts and filters. The blower must be designed to deliver the air at the desired altitude.

If cooling methods other than forced air are used, if the recommended air-flow rates are not supplied or if there is any doubt that the cooling is adequate, it should be borne in mind that operating temperature is the sole criterion of cooling effectiveness. One method of measuring the surface temperatures is by the use of a temperature-sensitive lacquer. When temperature-sensitive materials are used, extremely thin applications must be used to aviod interference with the transfer of heat from the tube to the air stream, which would cause inaccurate indications.

MINIMUM COOLING AIR-FLOW REQUIREMENTS

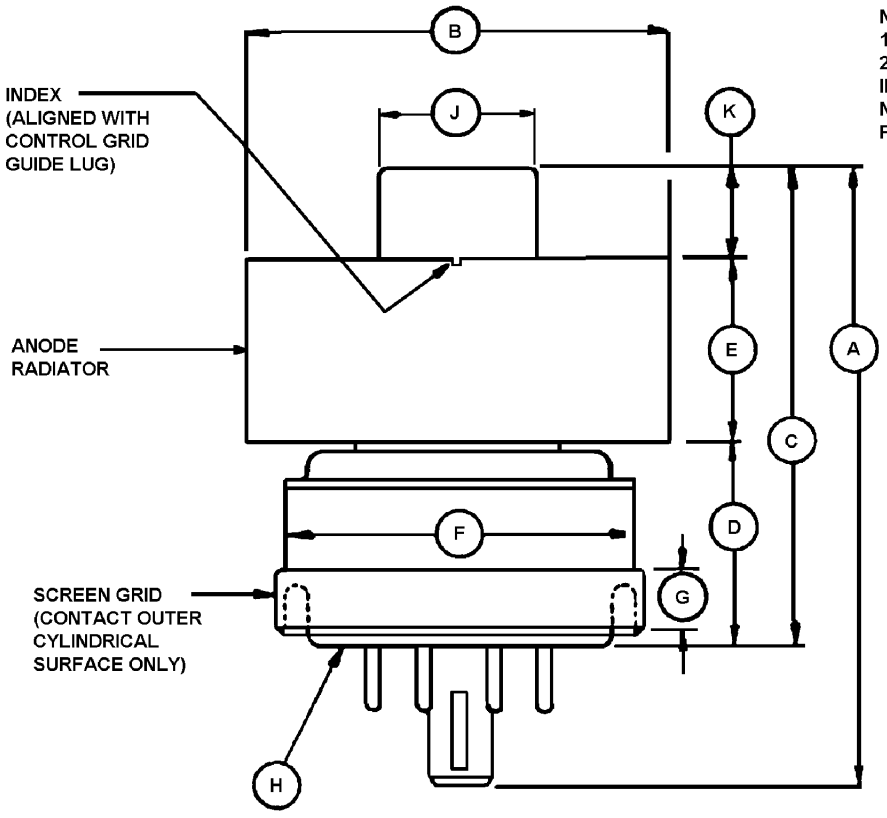
	SEA LEVEL		10,000 FEET	
Plate Dissipation (Watts)	Air-Flow (CFM)	Pressure Drop (Inches Of Water)	Air-Flow (CFM)	Pressure Drop (Inches Of Water)
250	5.3	0.6	7.7	0.85
300	6.5	0.9	9.5	1.25
350	7.8	1.2	12.0	1.9

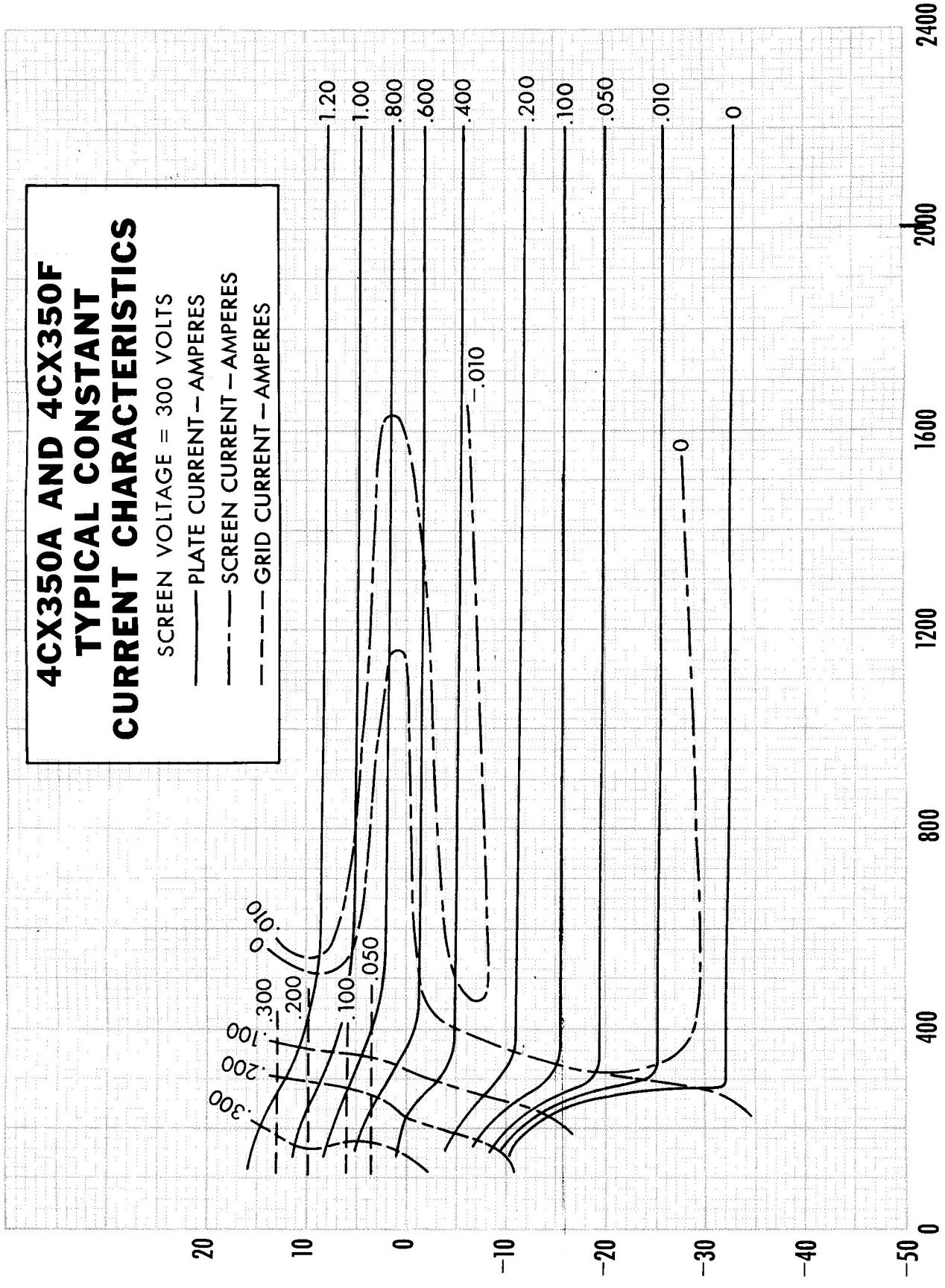
VIBRATION - These tubes are capable of satisfactorily withstanding ordinary shock and vibration, such as encountered in shipment and normal handling. The tubes will function well in automobile and truck mobile installations and similar environments.

PIN NO. 1. SCREEN GRID
PIN NO. 2. CATHODE
PIN NO. 3. HEATER
PIN NO. 4. CATHODE
PIN NO. 5. I.C. DO NOT USE FOR EXTERNAL CONNECTION
PIN NO. 6. CATHODE
PIN NO. 7. HEATER
PIN NO. 8. CATHODE
CENTER PIN - CONTROL GRID

DIMENSIONS IN INCHES			
DIMENSIONAL DATA			
DIM.	MIN.	MAX.	REF.
A	2.324	2.464	
B	1.610	1.640	
C	1.810	1.910	
D	.750	.910	
E	.710	.790	
F		1.406	
G	.187		
H	BASE: B8-236 (JEDEC DESIGNATION)		
J	.559	.573	
K	.240		

NOTES:
1. * CONTACT SURFACE
2. REF. DIMENSIONS ARE FOR INFORMATION ONLY AND ARE NOT REQUIRED FOR INSP. PURPOSES.




4CX350A AND 4CX350F
TYPICAL CONSTANT
CURRENT CHARACTERISTICS
SCREEN VOLTAGE = 300 VOLTS
PLATE CURRENT – AMPERES
SCREEN CURRENT – AMPERES
GRID CURRENT – AMPERES
1.20
1.00
.800
.600
.400
.200
.100
.050
.010
0
.010
0
.050
.100
.200
.300
100
200
300
20
10
0
−10
−20
−30
−40
−50
0
400
800
1200
1600
2000
2400
GRID VOLTAGE – VOLTS
PLATE VOLTAGE – VOLTS