



PL8161/ 3CX2500A3 Medium-Mu Power Triode



The Penta PL8161/3CX2500A3 is a medium-mu metal/ceramic external anode power triode. Maximum plate dissipation for this tube is 4000 watts, and cooling is forced-air. At moderate voltages, relatively high power output can be obtained from the PL8161/3CX2500A3 as an amplifier, oscillator, or modulator.

For grounded-grid operation, excellent shielding between the input and output circuits is provided by the grid, conveniently terminated between the filament and plate terminals. The PL8161/3CX2500A3 is designed using a rugged, low-inductance cylindrical filament stem, making it especially well suited for use in the linear filament tank circuit under VHF operation.

ELECTRICAL CHARACTERISTICS

Filament -- Thoriated Tungsten

Voltage	7.5 Volts
Current	51.5 Amperes
Amplification Factor	22
Frequency of Maximum Rating	110 MHz
Interelectrode Capacitances (Grounded Filament)	
Input	35 pF
Output	0.9 pF
Grid-Plate	20 pF

MECHANICAL CHARACTERISTICS

Base	See Diagram
Maximum Overall Dimensions	
Length	9.0 Inches
Diameter	4.16 Inches
Net Weight	6.25 Pounds
Mounting Position	Vertical, Base Up or Down
Cooling	Forced Air
Maximum Operating Temperature (Anode Core and Seals)	250 °C

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P E N T A L A B O R A T O R I E S , I N C .

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ELECTRON TUBES FOR INDUSTRY



PL8161/3CX2500A3

COOLING

Forced-air cooling of the PL8161/3CX2500A3 is required for all classes of operation. Although the maximum temperature rating for the anode and ceramic/metal seals is 250°C, the useful life of the tube can usually be prolonged substantially by maintaining tube temperature below this rated maximum.

The air flow required to the tube surface temperature at 225°C under various conditions has been tabulated below. It is necessary to keep in mind that high altitude operation, operation at frequencies exceeding 30 MHz, or operation where ambient air temperatures exceed 40°C will require additional air flow to maintain the desired tube surface temperature.

FILAMENT VOLTAGE

The PL8161/3CX2500A3 is designed to operate with 7.5 volts applied to the filament. Under no circumstances should the filament voltage be allowed to deviate from this value by more than 5%. The useful life of the tube can be extended by adhering to this value as closely as possible.

Recommended Cooling Conditions - Air Flow From Base to Anode				
	Sea Level		5,000 Feet	
Dissipation (Watts)	Air Flow (CFM)	Pressure Drop (Inches of H ₂ O)	Air Flow (CFM)	Pressure Drop (Inches of H ₂ O)
2500	38	0.62	45	0.75
4000	69	1.25	81	1.47
Recommended Cooling Conditions - Air Flow From Anode to Base				
2500	43	0.72	51	0.84
4000	84	1.70	99	2.00

MAXIMUM RATINGS AND TYPICAL OPERATING CONDITIONS

AF Power Amplifier or Modulator-Class AB or B

Maximum Ratings

DC Plate Voltage	6000	Volts
DC Plate Current	2.5	Amperes
Plate Dissipation	4000	Watts
Grid Dissipation	150	Watts
DC Grid Voltage	-1000	Volts

Typical Operation (Two Tubes Unless Noted, Sinusoidal Wave)

Plate Voltage	4000	5000	6000	DC Volts
Grid Voltage	-150	-190	-240	DC Volts
Zero-Signal DC Plate Current	0.6	0.5	0.4	DC Amperes
Maximum-Signal DC Plate Current	4.0	3.2	3.0	DC Amperes
Effective Plate to Plate Load	2200	3600	4650	Ω
Peak AF Grid Input Voltage (per tube)	340	360	390	Volts
Maximum-Signal Peak Driving Power	340	230	225	Watts
Maximum-Signal Nominal Driving Power	170	115	113	Watts
Maximum-Signal Plate Output Power	11,000	11,000	13,000	Watts



PL8161/3CX2500A3

Plate Modulated RF Amplifier - Class C Telephony

Maximum Ratings

DC Plate Voltage	5500	Volts
DC Plate Current	2.0	Amperes
Plate Dissipation	2670	Watts
Grid Dissipation	150	Watts
DC Grid Voltage	-1000	Volts

Typical Operation (Frequencies Below 30 MHz)

Plate Voltage	4000	4500	5000	DC Volts
Plate Current	1.67	1.47	1.25	DC Amperes
Grid Voltage	-450	-500	-550	DC Volts
Grid Current	180	140	150	mAdc
Peak RF Grid Input Voltage	685	715	760	Volts
Driving Power	125	100	115	Watts
Grid Dissipation	43	30	32	Watts
Plate Input Power	6670	6615	6250	Watts
Plate Dissipation	1670	1315	950	Watts
Plate Output Power	5000	5300	5300	Watts

RF Power Amplifier or Oscillator

Maximum Ratings

DC Plate Voltage	6000	Volts
DC Plate Current	2.5	Amperes
Plate Dissipation	4000	Watts
Grid Dissipation	150	Watts
DC Grid Voltage	-1000	Volts
DC Grid Current	0.4	Ampere

Typical Operation (Frequencies Below 30 MHz)

Plate Voltage	4000	5000	6000	DC Volts
Plate Current	2.5	2.5	2.08	DC Amperes
Grid Voltage	-300	-450	-500	DC Volts
Grid Current	245	265	180	mAdc
Peak RF Grid Input Voltage	580	750	765	Volts
Driving Power	142	197	136	Watts
Grid Dissipation	68	78	46	Watts
Plate Input Power	10,000	12,500	12,500	Watts
Plate Dissipation	2500	2500	2500	Watts
Plate Output Power	7500	10,000	10,000	Watts

NOTE ON TYPICAL OPERATION DATA

The data shown in the preceding Typical Operation section is calculated or measured based on industry standard published characteristic curves. It is assumed that RF grid voltage is adjusted in order to obtain the the specified plate current, plate voltage, and bias. Under this procedure, little variation in power output will occur when the tube is changed or replaced. Although grid current may vary slightly from tube to tube, it is relevant only in-so-far as it results in the appropriate plate current, and should pose no problem given that the circuit voltage is not allowed to vary with current. If a grid resistor is used as the source of grid bias, it is crucial that this resistor be adjustable so that the required bias voltage may be obtained when the correct RF grid voltage is applied.



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