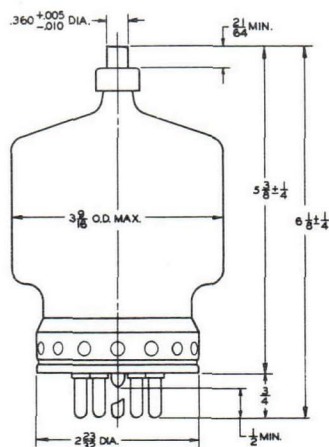


PL-5D22

(4-250A)

Power Tetrode



The Penta PL-5D22/4-250A is a power tetrode with a maximum plate dissipation rating of 250 watts. Cooling for normal operation is by radiation and by forced air cooling of five cubic feet per minute through the base. A radiator-type plate connector must be used for all classes of service at all frequencies. Forced cooling of the envelope and of the radiator-type plate connector, in addition to forced cooling of the base, is required for normal operation at frequencies above 30 Mc.

ELECTRICAL CHARACTERISTICS

Filament -- Thoriated Tungsten

Voltage (± 5 per cent) - - - - - 5.0 volts

Current - - - - - 14.5 amperes

Grid-Screen mu factor - - - - - 5.1

Transconductance (2500 v. E_b , 500 v. E_{c2} , 100 ma. I_b) - - - - 4000 μ mhos

Interelectrode Capacitances

Grid-Plate - - - - - 0.12 μ f.

Input - - - - - 12.7 μ f.

Output - - - - - 4.5 μ f.

Maximum Frequency for Full Ratings - - - - - 75 Mc.

MECHANICAL CHARACTERISTICS

Base¹ - - - - - EIA A5-97

Basing - - - - - EIA Type 5BK

Maximum Overall Dimensions

Length - - - - - 6.38 inches

Diameter - - - - - 3.56 inches

Mounting Position - - - - - Vertical, base up or down

Net Weight - - - - - 8.0 ounces

¹ Fits E. F. Johnson Co. No. 122-275 socket.



PENTA LABORATORIES, INC.

312 NORTH NOPAL STREET • SANTA BARBARA, CALIFORNIA



PL-5D22

COOLING

Forced-air cooling of the base and base seals of the PL-5D22/4-250A is required for all classes of operation. Such cooling normally is provided through use of a tube socket having holes which align with the holes in the tube base, and with a small fan or blower to pressurize the chassis upon which the tube is mounted. Alternatively, when an open chassis is used, a small fan or blower may be used with the outlet air stream directed at the tube socket. A minimum air flow of five cubic feet per minute through the base of the tube is required during the period that filament power is applied.

Adequate cooling of the envelope and plate seal for operation at frequencies below 30 Mc. can be obtained by convective air flow. Above 30 Mc. the air stream from a small fan or blower directed at the upper portion of the envelope normally will provide adequate cooling. In any event, the temperature of the plate cap should not be permitted to exceed 170°C for any class of continuous service.

RADIO-FREQUENCY OPERATION

The PL-5D22/4-250A is especially suited for use as a radio-frequency power amplifier. The compact construction and low interelectrode capacitances permit operation at full ratings at frequencies as high as 75 Mc. Operation at reduced ratings may be attained at frequencies as high as 120 Mc.

Under normal operating conditions, the PL-5D22/4-250A requires an unusually small amount of driving power for a specified value of plate power output. The high power sensitivity of the type permits a reduction in the power requirements imposed upon the preceding driver stage, but requires that adequate precautions be taken to minimize the feedback of energy from the output circuit back to the input circuit of the tube.

AUDIO-FREQUENCY OPERATION

The high power sensitivity of the PL-5D22/4-250A makes it well suited for use as an audio-frequency power amplifier or modulator in push-pull Class AB₁ or Class AB₂ service. In these classes of operation a pair of PL-5D22/4-250A's can give relatively high audio-frequency power output with low driving power and low harmonic distortion. Under Class AB₂ operating condition both grid bias and screen voltage must be obtained from a source having relatively good regulation. A series-connected string of voltage regulator tubes connected so as to regulate the output voltage of the screen-voltage supply normally will prove adequate. Grid bias voltage may be obtained from batteries or from a supply having a bleeder resistor of 250 ohms or less.

Under Class AB₁ operating conditions, the d-c screen voltage must be obtained from a supply having good regulation, but the internal impedance of the bias supply is not of critical importance. However, the effective grid circuit resistance per tube should not exceed 250,000 ohms.

MAXIMUM RATINGS—C C S (Continuous Commercial Service)

(Frequencies below 75 Mc.)

	Class C FM or C.W.	Plate Mod. Class C	Class AB ₁ Audio Ampl.	Class AB ₂ Audio Ampl.
D-C Plate Voltage	4000	3200	4000	4000 volts
D-C Screen Voltage	600	600	600	600 volts
D-C Grid Bias	—500	—500		volts
D-C Plate Current	350	275	350	350 ma.
Plate Dissipation	250	165	250	250 watts
Screen Dissipation	35	35	35	35 watts
Grid Dissipation	10	10	10	10 watts



PL-5D22

TYPICAL OPERATION—Class C C-W or FM Amplifier

Frequencies below 75 Mc.

D-C Plate Voltage	2500	3000	4000	volts
D-C Screen Voltage	500	500	500	volts
D-C Grid Voltage	—150	—175	—225	volts
D-C Plate Current	300	333	313	ma.
D-C Screen Current	60	60	45	ma.
D-C Grid Current	9	9	9	ma.
Plate Dissipation	175	225	250	watts
Screen Dissipation	30	30	30	watts
Grid Dissipation	0.3	0.6	0.5	watts
Peak R-F Grid Voltage (approx.)	220	260	300	volts
Driving Power (approx.)	1.7	2.2	2.5	watts
Plate Power Input	750	1000	1250	watts
Plate Power Output	575	775	1000	watts

TYPICAL OPERATION—Class C Amplitude-Modulated Amplifier, Carrier Conditions

Frequencies below 75 Mc.

D-C Plate Voltage	2500	3000	volts
D-C Screen Voltage	400	400	volts
D-C Grid Voltage	—200	—310	volts
D-C Plate Current	200	225	ma.
D-C Screen Current	30	30	ma.
D-C Grid Current	9	9	ma.
Plate Dissipation	125	165	watts
Screen Dissipation	12	12	watts
Grid Dissipation	1.8	2.7	watts
Peak A-F Screen Voltage	350	350	volts
Peak R-F Grid Voltage (approx.)	250	360	volts
Driving Power (approx.)	2.1	3.1	watts
Plate Power Input	500	675	watts
Plate Power Output	375	510	watts

TYPICAL OPERATION—Class AB₁ A-F Power Amplifier or Modulator (Sine Wave, Two Tubes)

D-C Plate Voltage	2000	2500	3000	volts
D-C Screen Voltage	600	600	600	volts
D-C Grid Voltage	—105	—110	—115	volts
Zero-Sig. D-C Plate Current	110	120	120	ma.
Max.-Sig. D-C Plate Current	405	430	416	ma.
Zero-Sig. D-C Screen Current	—0.3	—0.3	—0.3	ma.
Max.-Sig. D-C Screen Current	22	13	11	ma.
Plate-to-Plate Load Resistance	9170	11,400	15,000	ohms
Peak A-F Grid-to-Grid Signal	175	180	186	volts
Driving Power	0	0	0	watts
Max.-Sig. Plate Dissipation (per tube)	175	225	250	watts
Max.-Sig. Plate Power Output	460	625	750	watts
Total Harmonic Distortion	2.5	2	2.5	pct.

TYPICAL OPERATION—Class AB₂ A-F Power Amplifier or Modulator (Sine Wave, Two Tubes)

D-C Plate Voltage	2000	2500	3000	volts
D-C Screen Voltage	300	300	300	volts
D-C Grid Voltage	—48	—51	—53	volts
Zero-Sig. D-C Plate Current	120	120	123	ma.
Max.-Sig. D-C Plate Current	510	500	475	ma.
Zero-Sig. D-C Screen Current	0	0	0	ma.
Max.-Sig. D-C Screen Current	26	23	33	ma.
Plate-to-Plate Load Resistance	8000	11,000	16,000	ohms
Peak A-F Grid-to-Grid Signal	200	200	200	volts
Average Driving Power (Max. Sig.)	2.3	2.1	1.9	watts
Peak Driving Power (Max. Sig.)	5.5	4.8	4.6	watts
Max.-Sig. Plate Dissipation (per tube)	185	205	190	watts
Max.-Sig. Plate Power Output	650	840	1045	watts
Total Harmonic Distortion	4	4	4.6	pct.



PL-5D22

