

POWER PENTODE TYPE 7189

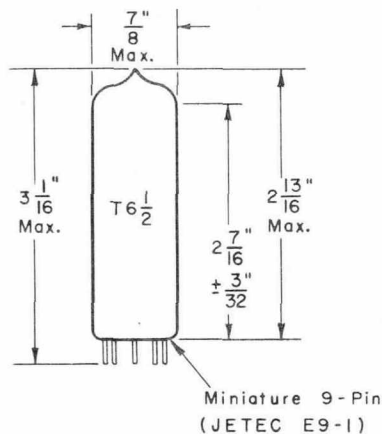
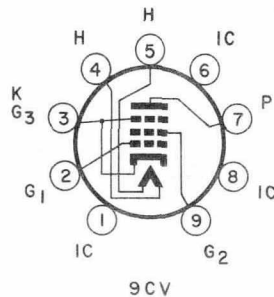
The 7189 is a 9-Pin miniature power pentode designed for service as audio output amplifier. It is intended for radio and television receivers and home music systems. The 7189 combines high power sensitivity and plate efficiency with low distortion and driving voltage requirements.

ELECTRICAL

Cathode.....	Coated Unipotential
Heater:	
Voltage.....	6.3 Volts
Current.....	0.76 Amperes
Direct Interelectrode Capacitances:	
Grid 1 to Plate.....	0.5 max. $\mu\mu\text{f}$
Grid 1 to Heater.....	0.25 max. $\mu\mu\text{f}$
Plate to All Other Elements.....	6.5 $\mu\mu\text{f}$
Grid 1 to All Other Elements.....	10.8 $\mu\mu\text{f}$

MECHANICAL

Bulb.....	T-6-1/2
Base.....	Miniature 9-Pin (JEDEC E9-1)
Basing.....	9CV
Mounting Position.....	Any



MAXIMUM RATINGS

Design Center Values

Plate Voltage (Note 1).....	400 max.	Volts
Grid 2 Voltage (Note 1).....	300 max.	Volts
Plate Dissipation.....	12 max.	Watts
Grid 2 Dissipation (Note 2).....	2 max.	Watts
Cathode Current.....	65 max.	Ma.
Heater Cathode Voltage.....	± 100 max.	Volts
Grid 1 Circuit Values:		
Fixed Bias.....	0.3 max.	Megohm
Cathode Resistor Bias.....	1.0 max.	Megohm

CLASS A AMPLIFIER

(one tube)

Typical Operating Characteristics:

For: Plate Voltage.....	250	Volts
Grid 2 Voltage.....	250	Volts
Grid 1 Voltage.....	-7.3	Volts
or Cathode Bias Resistor.....	135	Ohms
Plate Load Impedance.....	5200	Ohms
With RMS Input AF Voltage of.....	0 4.3 4.7	Volts
Plate Current.....	48 49.5 49.2	Ma.
Grid 2 Current.....	5.5 10.8 11.6	Ma.
Transconductance.....	11300 — —	Ohms
Amplification Factor (Note 3).....	19 — —	—
Power Output (Note 4).....	0 5.7 6.0 (s)	Watts
Distortion: (Note 4)		
Total Harmonic.....	— 10 —	Percent
Second Harmonic.....	— 2.0 —	Percent
Third Harmonic.....	— 9.5 —	Percent

Typical Operating Characteristics:

For: Plate Voltage.....	250	Volts
Grid 2 Voltage.....	250	Volts
Grid 1 Voltage.....	-7.3	Volts
or Cathode Bias Resistor.....	135	Ohms
Plate Load Impedance.....	4500	Ohms
With RMS Input AF Voltage of.....	0 4.4 4.8	Volts
Plate Current.....	48 50.6 50.5	Ma.
Grid 2 Current.....	5.5 10 11	Ma.
Transconductance.....	11300 — —	μmhos
Plate Resistance.....	38000 — —	Ohms
Amplification Factor (Note 3).....	19 — —	—
Power Output (Note 4).....	0 5.7 6.0 (s)	Watts
Distortion: (Note 4)		
Total Harmonic.....	— 10 —	Percent
Second Harmonic.....	— 5.0 —	Percent
Third Harmonic.....	— 8 —	Percent

Typical Operating Characteristics:

For: Plate Voltage	250	Volts
Grid 2 Voltage	250	Volts
Grid 1 Voltage	-8.4	Volts
or Cathode Bias Resistor	210	Ohms
Plate Load Impedance	7000	Ohms
With RMS Input AF Voltage of	0 3.5 5.5	Volts
Plate Current	36 36.8 36	Ma.
Grid 2 Current	4.1 8.5 14.6	Ma.
Transconductance	10000 - -	μ mhos
Plate Resistance	40000 - -	Ohms
Amplification Factor (Note 3)	19 - -	-
Power Output (Note 4)	0 4.2 5.6 (s)	Watts
Distortion: (Note 4)		
Total Harmonic	- 10 -	Percent
Second Harmonic	- 1.7 -	Percent
Third Harmonic	- 8.7 -	Percent

Typical Operating Characteristics:

For: Plate Voltage	250	Volts
Grid 2 Voltage	210	Volts
Grid 1 Voltage	-6.4	Volts
or Cathode Bias Resistor	160	Ohms
Plate Load Impedance	7000	Ohms
With RMS Input AF Voltage of	0 3.4 3.8	Volts
Plate Current	36 36.6 36.5	Ma.
Grid 2 Current	3.9 7.3 8.0	Ma.
Transconductance	10400 - -	μ mhos
Plate Resistance	40000 - -	Ohms
Amplification Factor	19 - -	-
Power Output	0 4.3 4.7	Watts
Distortion:		
Total Harmonic	- 10 -	Percent
Second Harmonic	- 1.8 -	Percent
Third Harmonic	- 9.3 -	Percent

PUSH-PULL CLASS AB AMPLIFIER

Typical Operating Characteristics for Two Tubes

For: Plate Voltage	250	Volts
Grid 2 Voltage	250	Volts
Common Cathode Bias Resistor	130	Ohms
Plate-to-Plate Load Impedance	8000	Ohms
With RMS Input AF Voltage of	0 8	Volts
Plate Current	62 75	Ma.
Grid 2 Current	7 15	Ma.
Power Output	0 11	Watts
Total Harmonic Distortion	- 3	Percent

Typical Operating Characteristics for Two Tubes

For: Plate Voltage	400	300	Volts
Grid 2 Voltage	300	300	Volts
Grid 1 Voltage	-15	-	Volts
Common Cathode Bias Resistor	-	130	Ohms
Plate-to-Plate Load Impedance	8000	8000	Ohms
With RMS Input AF Voltage of	0 10.5 0	10	Volts
Plate Current	15 105 72	92	Ma.
Grid 2 Current	1.6 25 8	22	Ma.
Power Output	0 24 0	17	Watts
Total Harmonic Distortion	- 4 -	4	Percent

PUSH-PULL CLASS B AMPLIFIER

Typical Operating Characteristics for Two Tubes

For: Plate Voltage	250	Volts
Grid 2 Voltage	250	Volts
Grid 1 Bias Voltage	-11.6	Volts
Plate-to-Plate Load Impedance	8000	Ohms
With RMS Input AF Voltage of	0 8	Volts
Plate Current	20 75	Ma.
Grid 2 Current	2.2 15	Ma.
Power Output	0 11	Watts
Total Harmonic Distortion	- 3	Percent

Typical Operating Characteristics for Two Tubes

For: Plate Voltage	300	Volts
Grid 2 Voltage	300	Volts
Grid 1 Bias Voltage	-14.7	Volts
Plate-to-Plate Load Impedance	8000	Ohms
With RMS Input AF Voltage of	0 10	Volts
Plate Current	15 92	Ma.
Grid 2 Current	1.6 22	Ma.
Power Output	0 17	Watts
Total Harmonic Distortion	- 4	Percent

TRIODE-CONNECTED CLASS A AMPLIFIER

(Grid 2 Connected to Plate)

Typical Operating Characteristics

Plate Voltage	250	Volts
Cathode Bias Resistor	270	Ohms
Plate Load Resistance	3500	Ohms
Input AF Voltage (RMS)	6.7	Volts
Zero Signal Plate Current	34	Ma.
Maximum Signal Plate Current	36	Ma.
Power Output	1.95	Watts
Total Harmonic Distortion	9	Percent
Input AF RMS Voltage for Power Output of 50		
Milliwatts	1.0	Volts

PUSH-PULL TRIODE CONNECTED

CLASS A AMPLIFIER

(Grids No. 2 Connected to Plates)

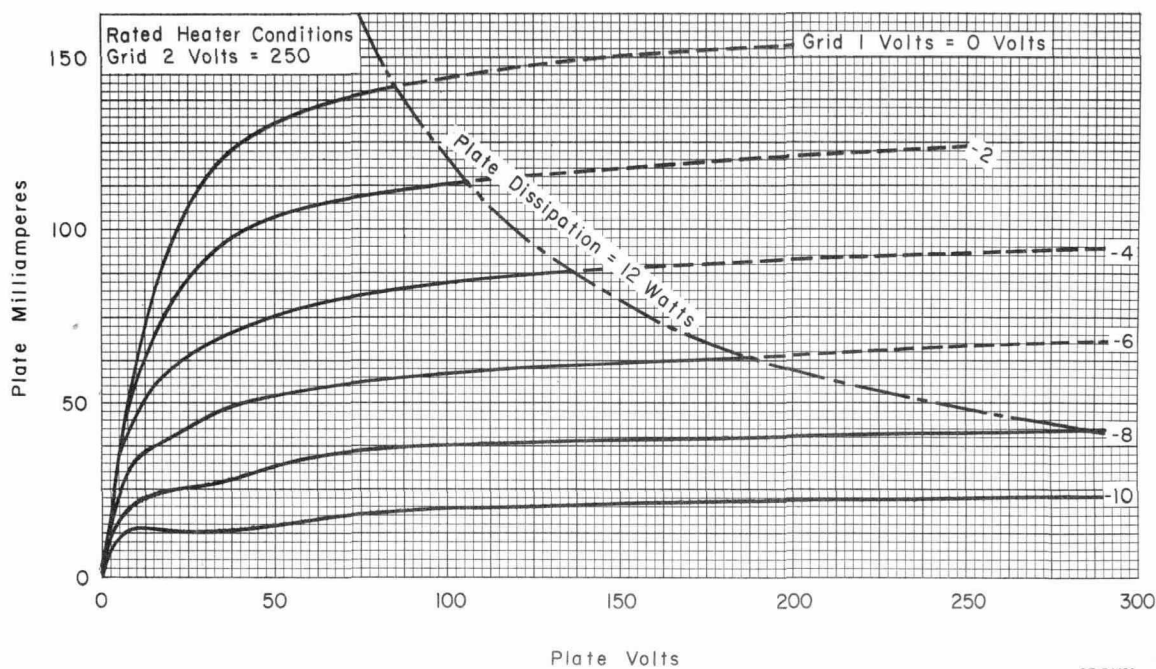
Typical Operating Characteristics for Two Tubes

Plate Voltage	250	300	Volts
Cathode Bias Resistor	270	270	Ohms
Plate-to-Plate Load Impedance	10000	10000	Ohms
Input AF Voltage (RMS)	8.3	10	Volts
Zero Signal Plate Current	40	48	Ma.
Maximum Signal Plate Current	43.4	52	Ma.
Power Output	3.4	5.2	Watts
Total Harmonic Distortion	2.5	2.5	Percent
Input AF RMS Voltage for Power			
Output of 50 Milliwatts	0.95	0.9	Volts

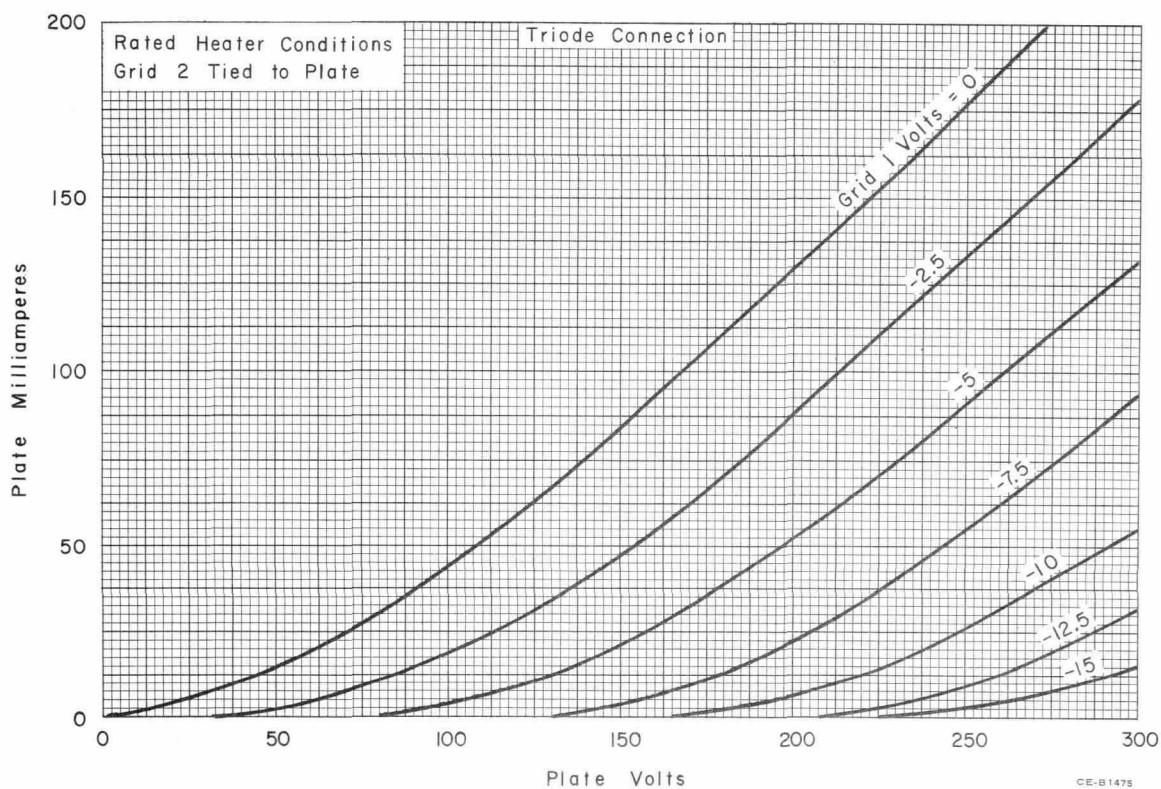
NOTES

1. For cathode bias operation this figure is 375 volts.
2. Max. Signal value is 4 watts.
3. Amplification factor of grid 2 to grid 1.
4. Measured with fixed bias.
5. Power output when grid starts to draw current.

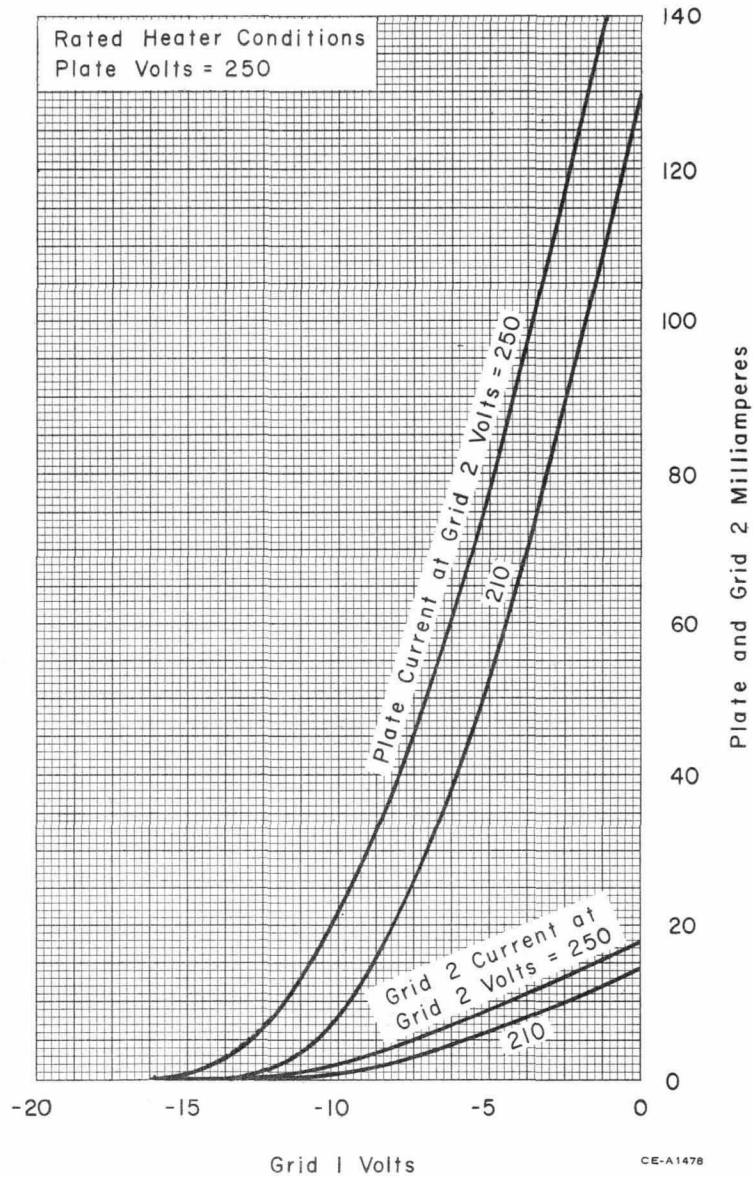
AVERAGE PLATE CHARACTERISTICS



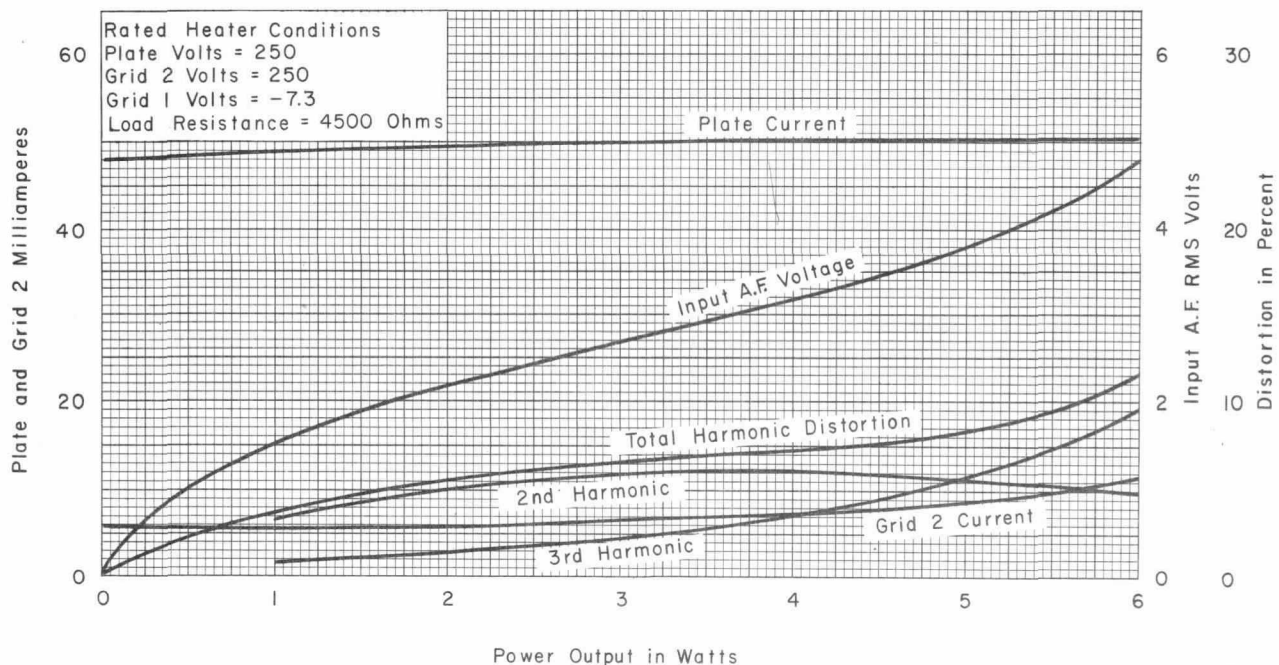
AVERAGE PLATE CHARACTERISTICS



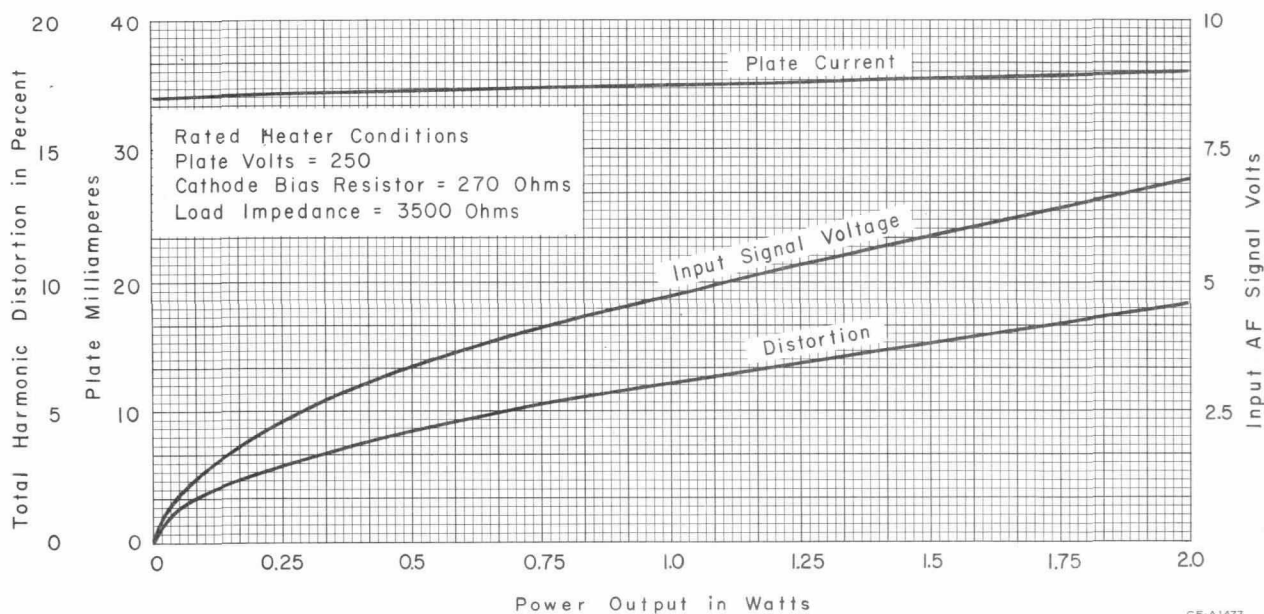
AVERAGE TRANSFER CHARACTERISTICS



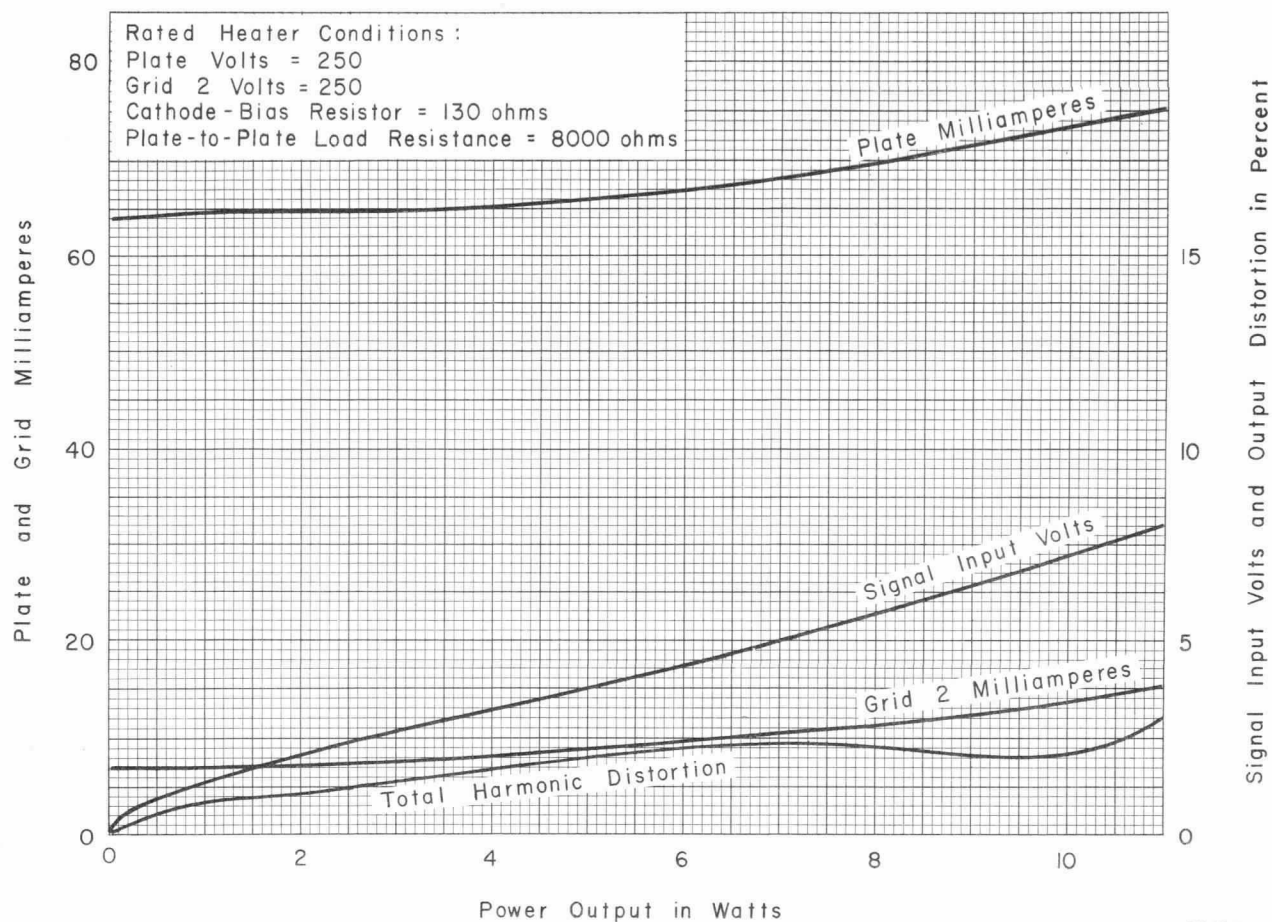
OPERATION CHARACTERISTICS



OPERATION CHARACTERISTICS (TRIODE CONNECTION)



OPERATING CHARACTERISTICS
PUSH - PULL CLASS AB



CE-B1476