

Power Pentode

NOVAR TYPE

For Output Stages of High Fidelity
Audio-Amplifiers and Radio Receivers

ELECTRICAL

Heater Characteristics and Ratings:

Voltage (AC or DC)	6.3 ± 0.6	volts
Current at heater volts = 6.3	0.800	amp
Maximum Heater-Cathode Voltages:		
Heater negative with respect to cathode	200	volts
Heater positive with respect to cathode		
Peak	200	volts
DC component	100	volts

Direct Inter-electrode Capacitances (Approx.):^a

Grid No.1 to plate	0.15	pf
Input: G ₁ to (K + G ₃ , G ₂ , H)	11.0	pf
Output: P to (K + G ₃ , G ₂ , H)	4.4	pf

MECHANICAL

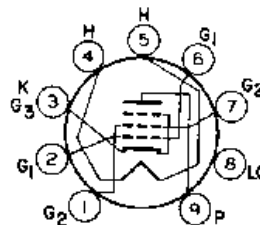
Operating Position	Any
Type of Cathode	Coated Unipotential
Maximum Overall Length	3.110 in
Maximum Sealed Length	2.750 in
Diameter	1.062 to 1.186 in
Bulb	19
Dimensional Outlines	See General Section

Bases (Allorates):

Small-Button Novar 9-Pin	(JEDEC No. E9-70)
Small-Button Novar 9-Pin with Exhaust Tip	(JEDEC No. F9-89)

BASE PIN DESIGNATION (Bottom View)

- Pin 1—Grid No.2
- Pin 2—Grid No.1
- Pin 3—Cathode, Grid No.3
- Pin 4—Heater
- Pin 5—Heater
- Pin 6—Grid No.1
- Pin 7—Grid No.2
- Pin 8—V₁—See Note
- Pin 9—Plate



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Note: May be used as tie point for components operating at or near the DC voltage of either the grid No.2 or plate, or between these voltages. Otherwise, do not use.

AF POWER AMPLIFIER — Class A₁

Maximum Ratings, Design-Maximum Values:

Plate Voltage	500	volts
Grid-No.2 (Screen-Grid) Voltage	440	volts
Cathode Current	90	ma
Grid-No.2 Input	3.3 ^b	watts
Plate Dissipation	19	watts
Bulb Temperature (At Hottest point on bulb surface)	240	°C

^b Indicates a change.



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Typical Operation and Characteristics:

Plate Voltage.	300	volts
Grid-No.2 Voltage.	300	volts
Grid-No.1 (Control-Grid) Voltage.	-10	volts
Peak AF Grid-No.2 Voltage.	10	volts
Zero-Signal Plate Current.	60	ma
Max.-Signal Plate Current.	75	ma
Zero-Signal Grid-No.2 Current.	8	ma
Max.-Signal Grid-No.2 Current.	15	ma
Plate Resistance (Approx.)	29000	ohms
Transconductance	10200	μmhos
Effective Load Resistance.	3000	ohms
Total Harmonic Distortion.	13	%
Max.-Signal Power Output	11	watts

Maximum-Circuit Values:

Grid-No.1-Circuit Resistance:		
For fixed-bias operation	0.3	megohms
For cathode-bias operation	1	megohms

PUSH-PULL AF POWER AMPLIFIER — Class AB₁

Maximum Ratings, Design-Maximum Values:

Plate Voltage.	550	volts
Grid-No.2 (Screen-Grid) Voltage.	440	volts
Cathode Current.	30	ma
Grid-No.2 Input.	3.3 ^b	watts
Plate Dissipation.	19	watts
Bulb Temperature (At hottest point on bulb surface)	240	°C

Typical Operation:

Values are for 2 tubes

	Fixed Bias					Cathode	
						Bias	
Plate Supply							
Voltage.	300	350	400	450	450	450	volts
Grid-No.2 Supply							
Voltage.	300	350	350	350	400	400	volts
Grid-No.1 Voltage.	-12.5	15.0	-16	-16.5	-21	c	volts
Cathode Resistor							
(Common to both cathodes).	-	-	-	-	-	170	ohms
Peak AF Grid-No.2-to-Grid-No.1							
Voltage.	25	31	32	33	42	31	volts
Zero-Signal Plate Current.	74	72	64	60	40	96	ma
Max.-Signal Plate Current.	116	130	135	142	145	94	ma
Zero-Signal Grid-No.2 Current.	10	9.5	8	7.2	5	10	ma
Max.-Signal Grid-No.2 Current.	28	32	28	26	30	20	ma



	Fixed Bias					Cathode Bias
	6600	6600	6600	6600	6600	10000 ohms
Effective Load Resistance (Plate to plate)	6600	6600	6600	6600	6600	10000 ohms
Total Harmonic Distortion	5	2.5	2	2.5	5	2 %
Max.-Signal Power Output	24	30	34	35	44	28 watts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance:	
For fixed-bias operation	0.3 megohm
For cathode-bias operation	1 megohm

PUSH-PULL AF POWER AMPLIFIER — Class AB₁

Grid No. 2 of each tube connected to tap on plate winding of output transformer

Maximum Ratings, Design-Maximum Values:

Plate and Grid-No. 2 (Screen-Grid) Supply Voltage	440	volts
DC Cathode Current	90	ma
Grid-No. 2 Input	3.3 ^b	watts
Plate Dissipation	19	watts
Bulb Temperature (At hottest point on bulb surface)	240	°C

Typical Operation:

Values are for 2 tubes

	Fixed Bias	Cathode Bias	
Plate Supply Voltage	400	425	volts
Grid-No. 2 Supply Voltage	d	d	volts
Grid-No. 1 Voltage	-20.5	c	volts
Cathode Resistor (Common to both cathodes)	—	185	ohms
Peak AF Grid-No. 1-to-Grid-No. 1 Voltage	41	12	volts
Zero-Signal Plate Current	60	88	ma
Max.-Signal Plate Current	115	100	ma
Zero-Signal Grid-No. 2 Current	8	12	ma
Max.-Signal Grid-No. 2 Current	18	16	ma
Effective Load Resistance (Plate to plate)	6600	6600	ohms
Total Harmonic Distortion	2.5	3.5	%
Max.-Signal Power Output	23	21	watts

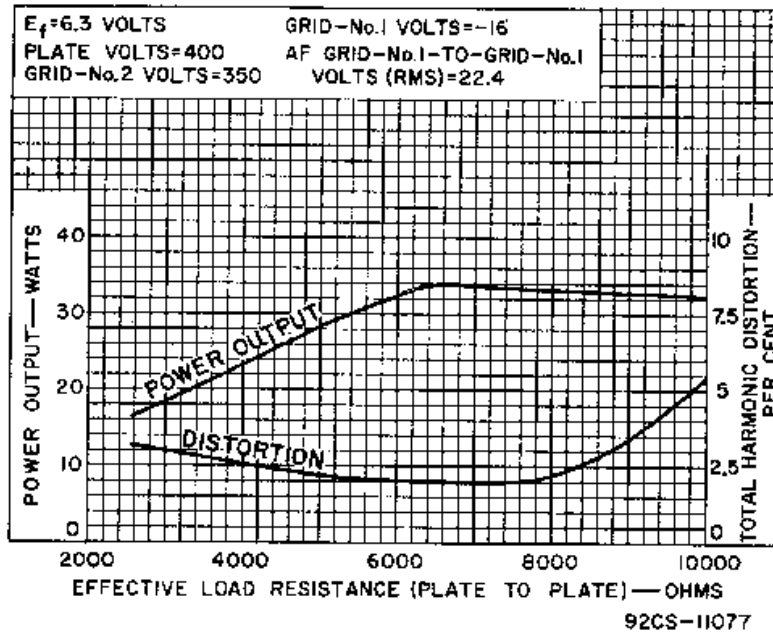
Maximum Circuit Values:

Grid-No.1-Circuit Resistance:	
For fixed-bias operation	0.3 megohm
For cathode-bias operation	1 megohm

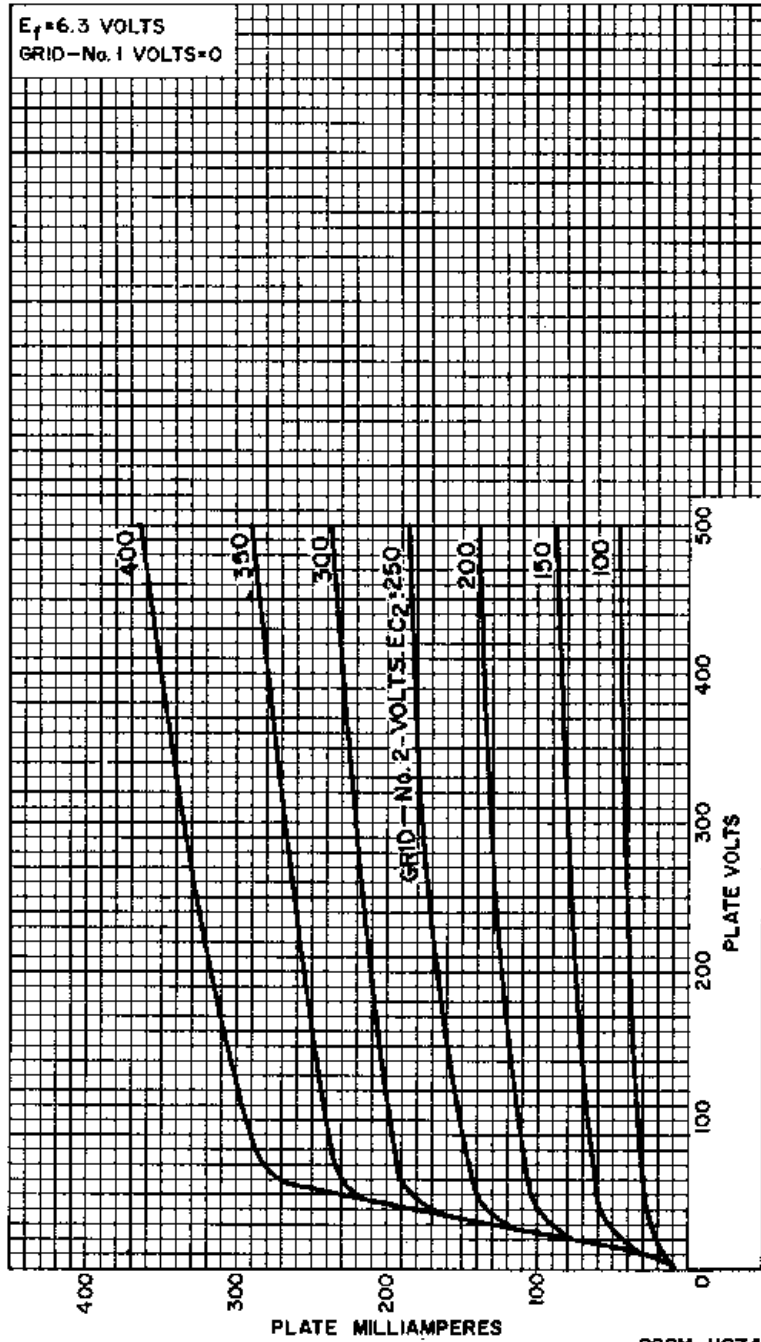


- a Without external shield.
- b Grid-No. 2 input may reach 6 watts during peak levels of speech and music signals.
- c Connected to negative end of cathode resistor.
- d Obtained from taps on the primary winding of the output transformer. The taps are located on each side of the center-tap (B+) so as to supply 50 per cent of the plate signal voltage to the grid No. 2 of each output tube.

Operation Characteristics Push-Pull Class AB₁



AVERAGE PLATE CHARACTERISTICS



92CM-11074



AVERAGE CHARACTERISTICS

