7270

BEAM POWER TUBE

FORCED-AIR COOLED AT MAXIMUM RATINGS

315 Watts CW Input (ICAS) up to 60 Mc
235 Watts CW Input (ICAS) at 175 Mc

GENERAL DATA

Electrical:

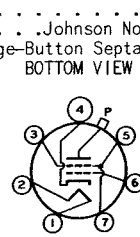
Heater, for Unipotential Cathode:		
Voltage (AC or DC)	6.3 ± 10%	volts
Current at 6.3 volts	3.1	amp
Mu-Factor, grid No.2 to grid No.1 for plate volts = 250, grid-No.2 volts = 250, and plate ma. = 100	8	
Direct Interelectrode Capacitances (Approx):		
Grid No.1 to plate	0.4	μμf
Grid No.1 to grid No.2 & internal shield	10	μμf
Grid No.1 to cathode and heater	8	μμf
Grid No.2 & internal shield to plate	10	μμf
Grid No.2 & internal shield to cathode and heater	2.2	μμf
Plate to cathode and heater	0.14	μμf
Heater to cathode	17	μμf

Mechanical:

Operating Position	Any
Maximum Overall Length	4.65"
Seated Length	4.08" ± 0.08"
Maximum Diameter	2.06"
Weight (Approx.)	3.5 oz
Bulb	T16
Socket	Johnson No.122-105*, or equivalent
Base	Large-Button Septar 7-Pin (JEDEC No.E7-55)

BOTTOM VIEW

Pin 1 - Heater
Pin 2 - Heater
Pin 3 - Grid No.2, Internal Shield
Pin 4 - Cathode



Pin 5 - Grid No.2, Internal Shield
Pin 6 - Grid No.1
Pin 7 - Grid No.2, Internal Shield
P - Plate

Cooling—Free circulation of air around the tube is required. Under operating conditions at maximum ratings, some forced-air cooling will be required from a small fan to prevent exceeding the specified maximum bulb temperature.

Bulb Temperature (At hottest point)	250 max.	°C

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AF POWER AMPLIFIER & MODULATOR — Class AB$_1$♦

	CCS●	ICAS●●	
Maximum Ratings, *Absolute-Maximum Values:*			
DC PLATE VOLTAGE	1100 max.	1350 max.	volts
DC GRID-No.2 (SCREEN-GRID) VOLTAGE	425 max.	425 max.	volts
MAX.-SIGNAL DC PLATE CURRENT■	340 max.	340 max.	ma
MAX.-SIGNAL PLATE INPUT■	180 max.	250 max.	watts
MAX.-SIGNAL GRID-No.2 INPUT■	20 max.	20 max.	watts
PLATE DISSIPATION■	60 max.	80 max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	135 max.	135 max.	volts
Heater positive with respect to cathode	135 max.	135 max.	volts
Typical Operation:			
Values are for 2 tubes			
DC Plate Voltage	1000	1250	volts
DC Grid-No.2 Voltage§	400	400	volts
DC Grid-No.1 (Control-Grid) Voltage**	-50	-50	volts
Peak AF Grid-No.1-to-Grid-No.1 Voltage	88	92	volts
Zero-Signal DC Plate Current	78	88	ma
Max.-Signal DC Plate Current	330	370	ma
Max.-Signal DC Grid-No.2 Current	90	90	ma
Effective Load Resistance (Plate to plate)	6800	7880	ohms
Max.-Signal Driving Power (Approx.)	0	0	watts
Max.-Signal Power Output (Approx.)	190	270	watts
Maximum Circuit Values:			
Grid-No.1-Circuit Resistance	30000 max.	30000 max.	ohms

LINEAR RF POWER AMPLIFIER — Class AB$_1$
Single-Sideband Suppressed-Carrier Service

	CCS●	ICAS●●	
Maximum Ratings, *Absolute-Maximum Values:*			
	Up to 60 Mc		
DC PLATE VOLTAGE	1100 max.	1350 max.	volts
DC GRID-No.2 (SCREEN-GRID) VOLTAGE	425 max.	425 max.	volts
MAX.-SIGNAL DC PLATE CURRENT	340 max.	340 max.	ma

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BEAM POWER TUBE

	CCS●		*ICAS*●●		
MAX.-SIGNAL PLATE INPUT. . . .	180	max.	250	max.	watts
MAX.-SIGNAL GRID-No.2 INPUT. .	20	max.	20	max.	watts
PLATE DISSIPATION.	60	max.	80	max.	watts
PEAK HEATER-CATHODE VOLTAGE:					
Heater negative with respect to cathode	135	max.	135	max.	volts
Heater positive with respect to cathode	135	max.	135	max.	volts
Typical Operation:					
	At 60 Mc				
DC Plate Voltage	1000		1250		volts
DC Grid-No.2 Voltage§.	400		400		volts
DC Grid-No.1 (Control-Grid) Voltage**.	−50		−50		volts
Zero-Signal DC Plate Current .	39		44		ma
Effective RF Load Resistance	3400		3940		ohms
With "Single-Tone Modulation":♦♦					
Max.-signal dc plate current.	165		185		ma
Max.-signal dc grid-No.2 current.	45		45		ma
Max.-signal peak rf grid-No.1 voltage	44		46		volts
Max.-signal driver power output (Approx.)	4.5		4.5		watts
Output-circuit efficiency (Approx.).	90		90		%
Max.-signal useful power output (Approx).	95♣		135♣		watts
With "Two-Tone Modulation":♦					
Average dc plate current . .	122		137		ma
Average dc grid-No.2 current.	26		26		ma
Max.-resultant-signal peak rf grid-No.1 voltage . . .	44		46		volts
Output-circuit efficiency (Approx.).	90		90		%
Distortion-products level:♠					
3rd order.	−26ϕ		−26ϕ		db
5th order.	−33ϕ		−33ϕ		db
Useful power output (Approx.):					
Average.	47.5♣		67.5♣		watts
Peak envelope.	95♣		135♣		watts
Maximum Circuit Values:					
Grid-No.1-Circuit Resistance.	30000	max.	30000	max.	ohms

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BEAM POWER TUBE

LINEAR RF POWER AMPLIFIER — Class B
Single-Sideband Suppressed-Carrier Service

High-Mu Triode Connection▲

	CCS●		ICAS●●		
Maximum Ratings, *Absolute-Maximum Values:*					
			Up to 60 Mc		
DC PLATE VOLTAGE.	1100	max.	1350	max.	volts
MAX.-SIGNAL DC PLATE CURRENT.	340	max.	340	max.	ma
MAX.-SIGNAL DC COMBINED GRIDS No.1 & No.2 CURRENT .	170	max.	170	max.	ma
MAX.-SIGNAL PLATE INPUT . . .	180	max.	250	max.	watts
PLATE DISSIPATION	60	max.	80	max.	watts
PEAK HEATER-CATHODE VOLTAGE:					
Heater negative with respect to cathode. . . .	135	max.	135	max.	volts
Heater positive with respect to cathode. . . .	135	max.	135	max.	volts
Typical Operation:					
In cathode-drive circuit at 60 Mc with "Single-Tone Modulation"♦♦					
DC Plate-to-Grids No.1 & No.2 Voltage.	1000		1250		volts
DC Grids No.1 & No.2 Voltage	0		0		volts
Zero-Signal DC Plate Current.	20		25		ma
Effective RF Load Resistance.	3400		3680		ohms
Max.-Signal DC Plate Current.	170		180		ma
Max.-Signal DC Combined Grids No.1 & No.2 Current .	108		94		ma
Max.-Signal Peak Cathode-to-Grids No.1 & No.2 Voltage.	40		40		volts
Max.-Signal Driver Power Output (Approx.)▲▲	13		15		watts
Output-Circuit Efficiency (Approx.)	90		90		%
Max.-Signal Useful Power Output (Approx.).	100✚		140✚		watts

PLATE-MODULATED RF POWER AMPLIFIER — Class C Telephony

Carrier conditions per tube for use with a maximum modulation factor of 1

	CCS●		ICAS●●		
Maximum Ratings, *Absolute-Maximum Values:*					
For maximum plate voltage and maximum plate input above 60 Mc, see Rating Chart I					
DC PLATE VOLTAGE.	900	max.	1100	max.	volts

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	CCS●		ICAS●●		
DC GRID-No.2 (SCREEN-GRID) VOLTAGE	425	max.	425	max.	volts
DC GRID-No.1 (CONTROL-GRID) VOLTAGE	-300	max.	-300	max.	volts
DC PLATE CURRENT	280	max.	280	max.	ma
DC GRID-No.1 CURRENT	25	max.	30	max.	ma
PLATE INPUT	160	max.	210	max.	watts
GRID-No.2 INPUT	13.5	max.	13.5	max.	watts
PLATE DISSIPATION	40	max.	50	max.	watts
PEAK HEATER-CATHODE VOLTAGE:					
Heater negative with respect to cathode	135	max.	135	max.	volts
Heater positive with respect to cathode	135	max.	135	max.	volts
Typical Operation:					
At 60 Mc					
DC Plate Voltage	800		1000		volts
DC Grid-No.2 Voltage▲	400		400		volts
DC Grid-No.1 Voltage★	-105		-107		volts
Peak RF Grid-No.1 Voltage	110		114		volts
DC Plate Current	175		190		ma
DC Grid-No.2 Current	30		30		ma
DC Grid-No.1 Current (Approx.)	4		4		ma
Driver Power Output (Approx.)★,▲▲	4		4		watts
Output-Circuit Efficiency (Approx.)	90		90		%
Useful Power Output (Approx.)	90★		130★		watts
At 175 Mc					
DC Plate Voltage	535		665		volts
DC Grid-No.2 Voltage▲	400		400		volts
DC Grid-No.1 Voltage★	-115		-119		volts
DC Plate Current	200		220		ma
DC Grid-No.2 Current	15		15		ma
DC Grid-No.1 Current (Approx.)	6		6		ma
Driver Power Output (Approx.)▲▲	10		10		watts
Output-Circuit Efficiency (Approx.)	85		85		%
Useful Power Output (Approx.)	60★		85★		watts
Maximum Circuit Values:					
Grid-No.1-Circuit Resistance‡	30000	max.	30000	max.	ohms

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BEAM POWER TUBE

RF POWER AMPLIFIER & OSCILLATOR — Class C Telegraphy†
and
RF POWER AMPLIFIER — Class C FM Telephony

	CCS●		*ICAS*●●		
Maximum Ratings, *Absolute-Maximum Values:*					
For maximum plate voltage and maximum plate input above 60 Mc, see Rating Chart II					
DC PLATE VOLTAGE	1100	max.	1350	max.	volts
DC GRID-No.2 (SCREEN-GRID) VOLTAGE	425	max.	425	max.	volts
DC GRID-No.1 (CONTROL-GRID) VOLTAGE	-300	max.	-300	max.	volts
DC PLATE CURRENT	340	max.	340	max.	ma
DC GRID-No.1 CURRENT	25	max.	30	max.	ma
PLATE INPUT	235	max.	315	max.	watts
GRID-No.2 INPUT	20	max.	20	max.	watts
PLATE DISSIPATION	60	max.	80	max.	watts
PEAK HEATER-CATHODE VOLTAGE:					
Heater negative with respect to cathode	135	max.	135	max.	volts
Heater positive with respect to cathode	135	max.	135	max.	volts
Typical Operation:					
At 60 Mc					
DC Plate Voltage	1000		1250		volts
DC Grid-No.2 Voltage■■	300		300		volts
DC Grid-No.1 Voltage⊕⊕	-79		-80		volts
Peak RF Grid-No.1 Voltage	98		111		volts
DC Plate Current	225		250		ma
DC Grid-No.2 Current	25		30		ma
DC Grid-No.1 Current (Approx.)	5		5		ma
Driver Power Output (Approx.)♣,▲▲	4		4		watts
Output-Circuit Efficiency (Approx.)	90		90		%
Useful Power Output (Approx.)	160♣		225♣		watts
Typical Operation:					
At 175 Mc					
DC Plate Voltage	650		850		volts
DC Grid-No.2 Voltage■■	400		400		volts
DC Grid-No.1 Voltage⊕⊕	-99		-100		volts
DC Plate Current	265		275		ma
DC Grid-No.2 Current	15		15		ma
DC Grid-No.1 Current (Approx.)	7.5		8		ma
Driver Power Output (Approx.)▲▲	10		10		watts

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	CCS●	*ICAS*●●	
Output-Circuit Efficiency (Approx.)	85	85	%
Useful Power Output (Approx.)	95♣	135♣	watts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance‡	30000	max.	30000	max. ohms

○ Without external shield.

* E.F. Johnson Company, Waseca, Minnesota.

♦ Subscript 1 indicates that grid-No.1 current does not flow during any part of the input cycle.

● Continuous Commercial Service.

●● Intermittent Commercial and Amateur Service.

■ Averaged over any audio-frequency cycle of sine-wave form.

§ Obtained preferably from a fixed supply.

** Obtained from a fixed supply.

♦♦ "Single-Tone Modulation" operation refers to that class of amplifier service in which the input consists of a monofrequency rf signal having constant amplitude. This signal is produced in a single-sideband suppressed-carrier system when a single audio frequency of constant amplitude is applied to the input of the system.

♦‡ "Two-Tone Modulation" operation refers to that class of amplifier service in which the input consists of two equal monofrequency rf signals having constant amplitude. These signals are produced in a single-sideband suppressed-carrier system when two equal-and-constant-amplitude audio frequencies are applied to the input of the system.

♣ This value of useful power is measured at load of output circuit having indicated efficiency.

♠ Referenced with respect to the peak envelope power output obtained at maximum drive.

⧺ Maximum encountered at any driving level up to 100%.

⧗ Grids No.1 and No.2 connected together.

▲▲ Driver stage is required to supply tube losses and rf-circuit losses. The driver stage should be designed to provide an excess of power above the indicated values to take care of variations in line voltage, in components, in initial tube characteristics, and in tube characteristics during life.

▲ Obtained preferably from a separate source modulated along with the plate supply, or from the modulated plate supply through a series resistor. It is recommended that this resistor be adjustable to permit obtaining the desired operating plate current after initial tuning adjustments are made.

★ Obtained from a grid-No.1 resistor or from a combination of grid-No.1 resistor with either fixed supply or cathode resistor. The combination of grid resistor and fixed supply has the advantage of not only protecting the tube from damage through loss of excitation but also of minimizing distortion by bias-supply compensation.

♣ Indicated values are for operation at 60 Mc. Less driver power output is required at frequencies below 60 Mc.

‡ If this value is insufficient to provide adequate bias, the additional required bias must be supplied by a cathode resistor or fixed supply.

† Key-down conditions per tube without amplitude modulation. Amplitude modulation essentially negative may be used if the positive peak of the audio-frequency envelope does not exceed 115% of the carrier conditions.

■■ Obtained preferably from a separate source or from the plate-voltage supply with a voltage divider. If a series resistor is used, it should be adjustable to permit obtaining the desired operating plate current after initial tuning adjustments are completed. Grid-No.2 voltage must not exceed 500 volts under key-up conditions.

⊕⊕ Obtained from a grid-No.1 resistor, or from a combination of grid-No.1 resistor with either fixed supply or cathode resistor.

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BEAM POWER TUBE

OPERATING CONSIDERATIONS

Shielding of the 7270 in rf service is required for stable operation. A convenient method of shielding is to mount the socket approximately 5/8" beneath a hole in the chassis plate so that when the 7270 is inserted in the socket, the internal shield (*See Dimensional Outline*) of the tube will be close to the edge of the hole and in the same plane as the chassis plate. This arrangement provides an effective shield to isolate the grid-No.1 circuit from the plate circuit.

The *connection to the plate terminal* should be flexible in order to prevent subjecting the plate-terminal seal to any strain. The connection should never be soldered to the plate terminal. A plate connector of the heat-radiating type is recommended.

The *plate* shows no color when the 7270 is operated at maximum rated plate dissipation under CCS conditions. At maximum rated plate dissipation under ICAS conditions, the plate may show a barely discernible color in a dark room.

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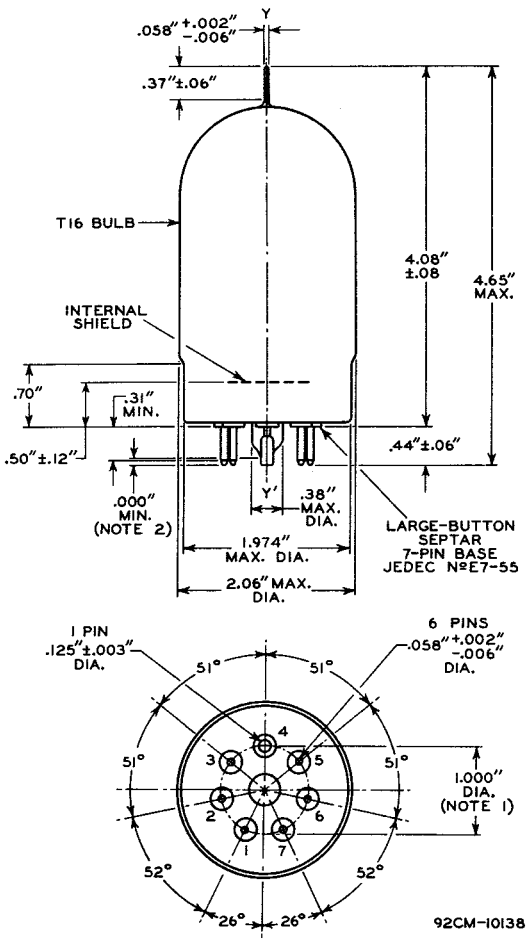

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THE REFERENCE AXIS Y-Y' IS DEFINED AS THE AXIS OF THE BASE-PIN GAUGE DESCRIBED IN NOTE 1:

NOTE 1: ANGULAR VARIATIONS BETWEEN PINS AND VARIATION IN PIN-CIRCLE DIAMETER ARE HELD TO TOLERANCES SUCH THAT PINS WILL ENTER TO A DISTANCE OF 0.375" A FLAT-PLATE BASE-PIN GAUGE HAVING SIX HOLES 0.0800" ± 0.0005" AND ONE HOLE 0.1450" ± 0.0005" ARRANGED ON A 1.0000" ± 0.0005" CIRCLE AT SPECIFIED ANGLES WITH TOLERANCE OF ± 5' FOR EACH ANGLE. GAUGE IS ALSO PROVIDED WITH A HOLE 0.500" ± 0.010" CONCENTRIC WITH PIN CIRCLE WHOSE CENTER IS ON THE AXIS Y-Y'.

NOTE 2: EXHAUST TIP WILL NOT EXTEND BEYOND THE PLANE WHICH PASSES THROUGH THE ENDS OF THE THREE LONGEST PINS.

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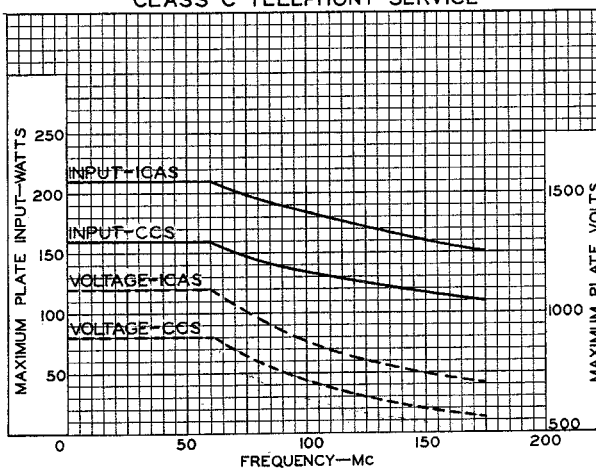
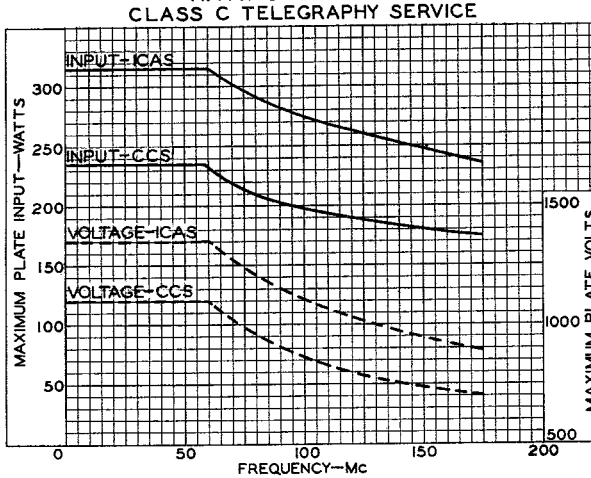
RATING CHART I
CLASS C TELEPHONY SERVICE



92CS-10155

RATING CHART II
CLASS C TELEGRAPHY SERVICE



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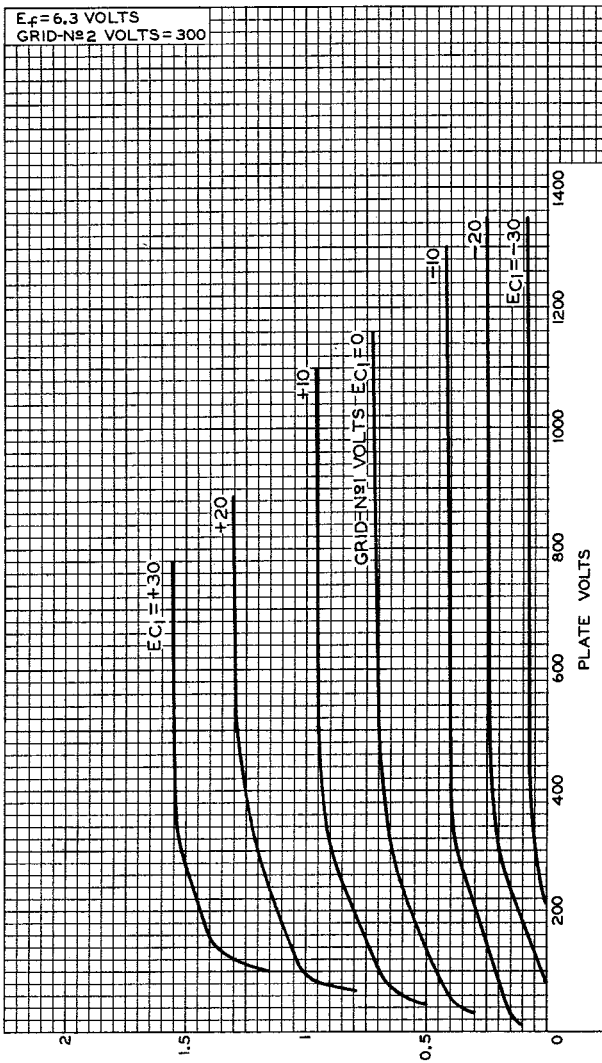
TYPICAL PLATE CHARACTERISTICS



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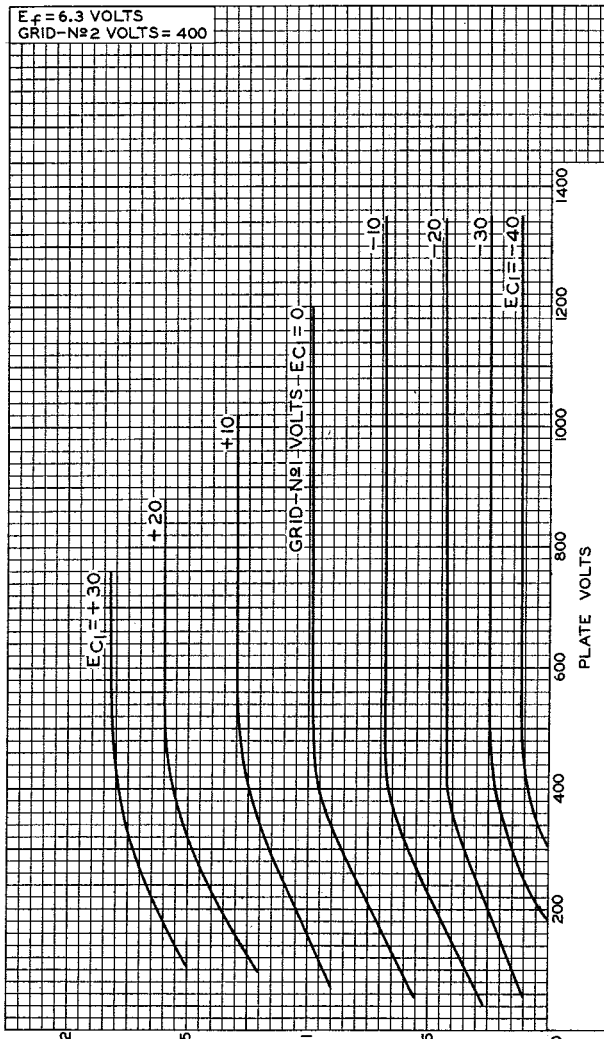
TYPICAL PLATE CHARACTERISTICS



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92CM-10175

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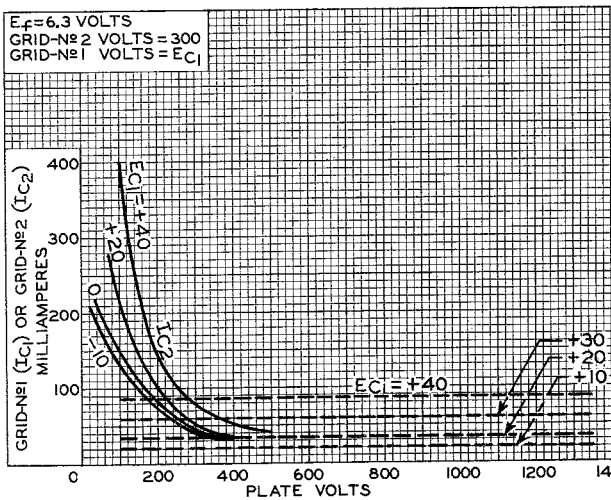
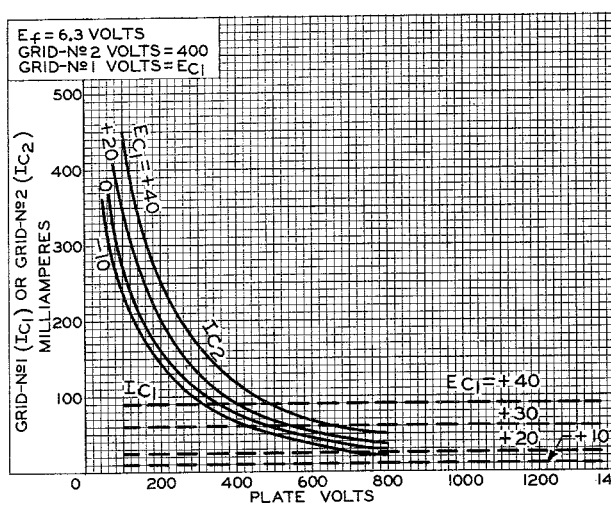
TYPICAL CHARACTERISTICS



92CS-10158



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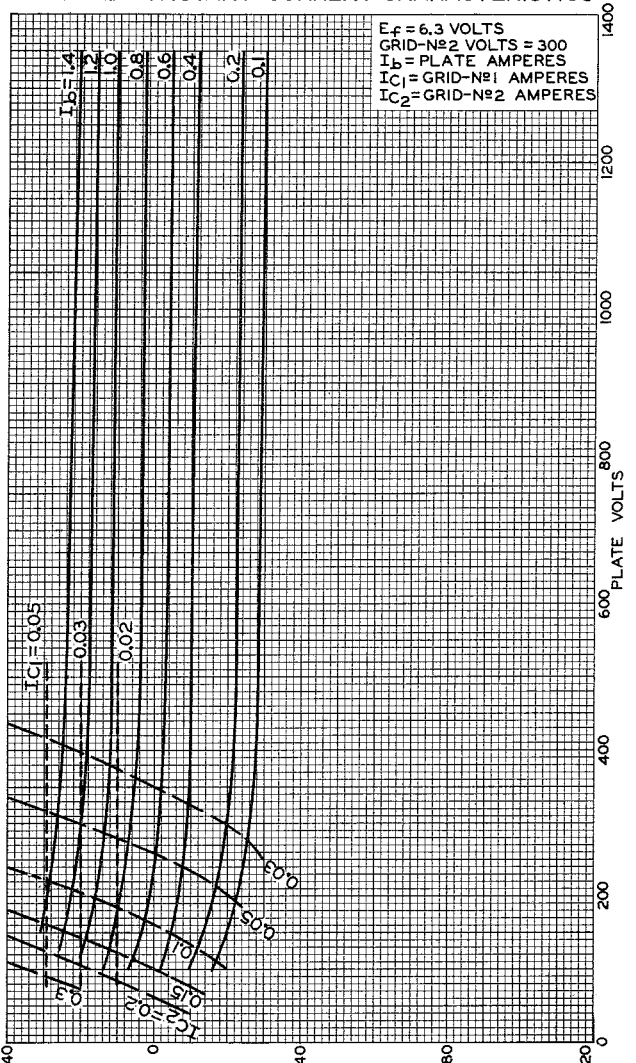
92CS-10171

TYPICAL CONSTANT-CURRENT CHARACTERISTICS



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92CM-10169

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RCA

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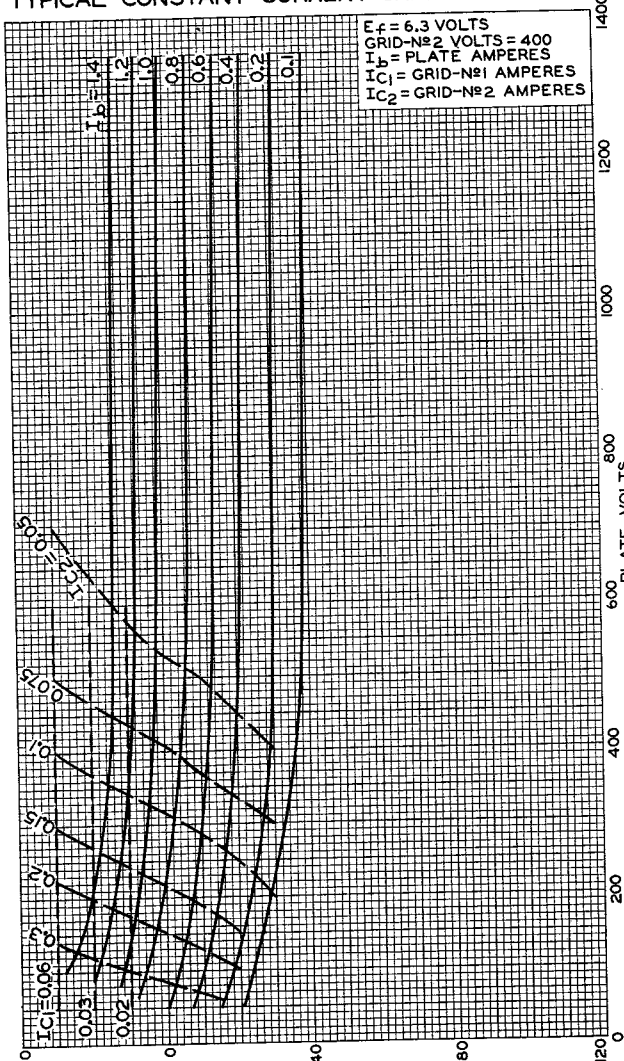
TYPICAL CONSTANT-CURRENT CHARACTERISTICS



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TYPICAL CHARACTERISTICS
TRIODE CONNECTION

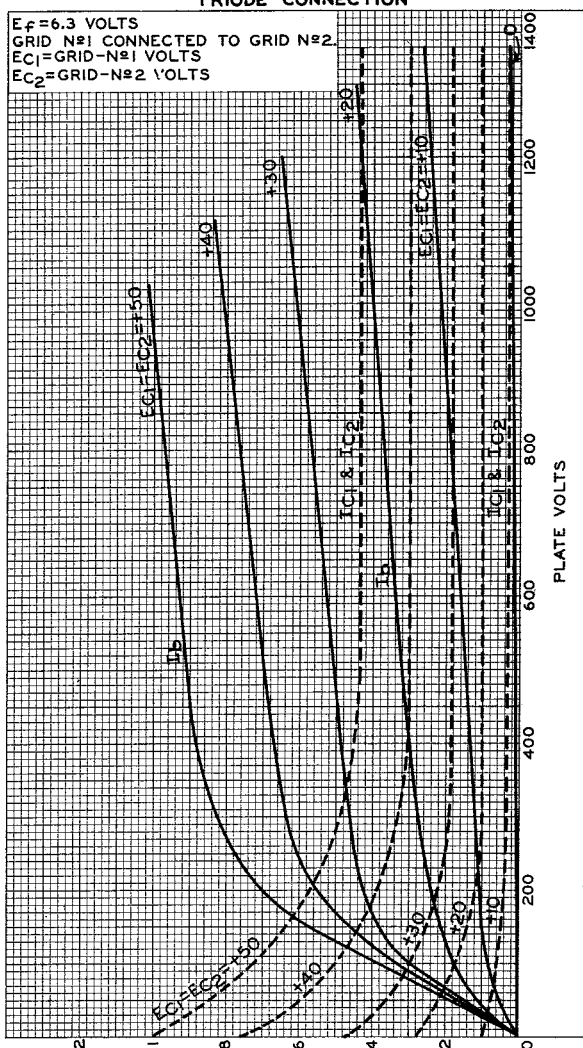

PLATE (I_b) OR COMBINED GRIDS Nº1 & Nº2 (I_{C1} & I_{C2}) AMPERES

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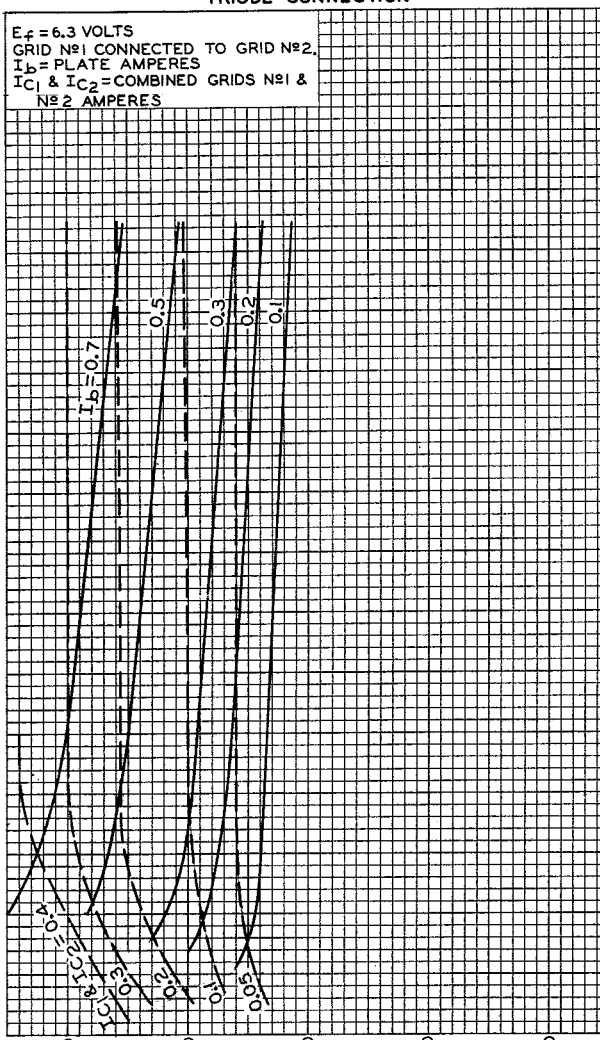
TYPICAL CONSTANT-CURRENT CHARACTERISTICS
TRIODE CONNECTION



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92CM-10178RI