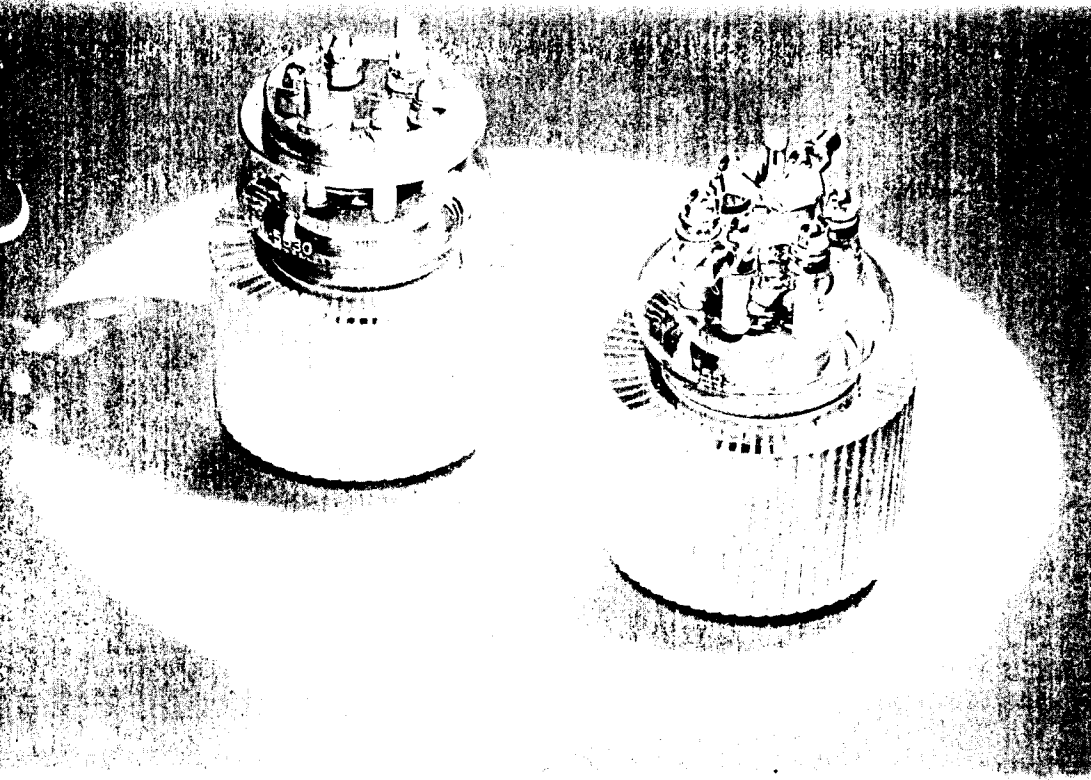




ML-5530 ML-5530-H

DESCRIPTION & RATINGS



DESCRIPTION

The ML-5530 is a three-electrode tube designed for high-frequency industrial-heating service and for AM and FM broadcasting at frequencies up to 110 megacycles. The terminal arrangement makes the tube particularly adaptable to cathode-drive applications as the filament leads are isolated from the plate by the external grid flange and internal shielding. Circuit inductance has been kept at a minimum in the grid as well as in all other internal connections. The filament is oriented with respect to the grid structure to minimize the required r-f driving power. The cathode is a thoriated-tungsten filament, whose self-supporting structure employs no sliding contacts, insulators, or tension springs. Rugged grid support rods provide great mechanical strength as well as

low electrical loss. Kovar is used for the glass-to-metal seals. The anode fin structure is designed to dissipate 4 kilowatts with an air flow of 250 cfm. Maximum ratings of 5 kVdc plate voltage and 8.75 kW plate input apply at frequencies up to 110 Mc. Increased ratings of 6.5 kVdc plate voltage and 10 kW plate input are permissible at frequencies up to 70 Mc.

The ML-5530-H is a modification of the ML-5530 designed primarily for industrial service at frequencies up to 30 megacycles. Its construction is similar to the ML-5530 except for the grid terminal arrangement. Maximum ratings of 8.5 kVdc plate voltage and 10 kW plate input apply at frequencies up to 30 Mc.

GENERAL CHARACTERISTICS

Electrical

Filament Voltage		5.0	Volts
Filament Current		55	Amps
Filament Starting Current, maximum		250	Amps
Filament Cold Resistance		.013	Ohm
Amplification Factor		26	
Grid-Plate Transconductance at $E_b = 2.0$ kV; $I_b = 1.5$ amps		11000	μ mhos
Interelectrode Capacitances:			
	*ML-5530	ML-5530H	
Grid-Plate	23	20	μ mf
Grid-Filament	20	17	μ mf
Plate-Filament	0.6	1.0	μ mf

Mechanical

Mounting Position	Vertical, anode down
Type of Cooling	Forced-air
Air flow on anode	See Cooling Characteristics
Air flow on glass and seals	See Note
Maximum incoming air temperature	45 °C
Maximum Glass Temperature	160 °C
Net Weight, approximate	9 lbs.

Note: At frequencies above 40 Mc for the ML-5530 and 15 Mc for the ML-5530-H, or at high ambient temperatures, auxiliary air flow may be required and should be distributed to maintain uniform glass temperature, not greater than 160°C. Auxiliary cooling may be obtained from separate blower or by reversing the direction of air flow through radiator (exhaust).

*Measured with 12-inch square metal shield attached to grid terminal ring.

MAXIMUM RATINGS AND TYPICAL OPERATING CONDITIONS

(Continuous Commercial Service)

ML-5530

Audio-Frequency Power Amplifier and Modulator
Class B

Maximum Ratings, Absolute Values

D-C Plate Voltage	6500 volts
Max.-Signal D-C Plate Current *	1.5 amps
Max.-Signal Plate Input *	9 kW
Plate Dissipation *	4 kW

Typical Operation (Values are for two tubes)

D-C Plate Voltage	5000	6000	6000 volts
D-C Grid Voltage	-150	-200	-180 volts
Peak A-F Grid-to-Grid Voltage ..	860	860	1220 volts
Peak A-F Plate-to-Plate Voltage ..	8000	9600	10000 volts
Zero-Signal D-C Plate Current ..	0.4	0.4	0.5 amp
Max.-Signal D-C Plate Current ..	1.7	1.45	2.6 amps
Effective Load Resistance, Plate-to-Plate	6000	8350	4800 ohms
Max.-Signal Driving Power, approximate	45	30	140 watts
Max.-Signal Power Output, approximate	5.4	5.5	10.4 kW

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

Plate-Modulated R-F Power Amplifier
Class C Telephony

Carrier conditions per tube for use with a maximum modulation factor of 1.0

Maximum Ratings, Absolute Values

D-C Plate Voltage	5000 volts
D-C Grid Voltage	-1000 volts
D-C Plate Current	1.3 amps
D-C Grid Current	0.40 amp
Plate Input	8.0 kW
Plate Dissipation	2.7 kW
Frequency	70 Mc

Typical Operation

D-C Plate Voltage	4800 volts
D-C Grid Voltage	-600 volts
Peak R-F Grid Voltage	970 volts
Peak R-F Plate Voltage	3800 volts
D-C Plate Current	0.78 amp
D-C Grid Current	0.08 amp
R-F Load Resistance	2700 ohms
Driving Power, approximate	80 watts
Power Output, approximate	2.7 kW

R-F Power Amplifier and Oscillator
Class C Telegraphy

Key-down conditions per tube without amplitude modulation‡

Maximum Ratings, Absolute Values

D-C Plate Voltage	5000	6500 volts
D-C Grid Voltage	-1000	-1000 volts
D-C Plate Current	1.75	1.75 amps
D-C Grid Current	0.20	0.40 amp
Plate Input	8.75	10 kW
Plate Dissipation	4	4 kW
Frequency	110	70 Mc

Typical Operation

	<i>Cathode drive</i>	<i>Grid drive</i>
D-C Plate Voltage	4000	6300 volts
D-C Grid Voltage	-300	-650 volts
Peak R-F Grid Voltage	765	1250 volts
Peak R-F Plate Voltage	3000	5200 volts
D-C Plate Current	1.25	1.5 amps
D-C Grid Current	0.15	0.20 amp
R-F Load Resistance	1750	2000 ohms
Driving Power, approximate	950	250 watts
Power Output, approximate	4.0†	6.7 kW

‡ Modulation essentially negative may be used if the positive peak of the envelope does not exceed 115% of the carrier conditions.

† Includes power transferred from driver stage.

Radio-Frequency Power Amplifier
Class B

Carrier conditions per tube for use with a maximum modulation factor of 1.0

Maximum Ratings, Absolute Values

D-C Plate Voltage	5000	6500 volts
D-C Plate Current	0.90	0.90 amp
Plate Input	4.5	6 kW
Plate Dissipation	4	4 kW
Frequency	110	70 Mc

Typical Operation

D-C Plate Voltage	4500	6000 volts
D-C Grid Voltage	-175	-220 volts
Peak R-F Grid Voltage	390	310 volts
Peak R-F Plate Voltage	1875	2500 volts
D-C Plate Current	0.85	0.65 amp
D-C Grid Current	0.03	0 amp
R-F Load Resistance	1400	2500 ohms
Driving Power, approximate **	230	100 watts
Power Output, approximate	1.25	1.3 kW

** At crest of audio-frequency cycle with modulation factor of 1.0.

ML-5530-H

R-F Power Amplifier and Oscillator
Class C Telegraphy

Key-down conditions per tube without amplitude modulation‡

Maximum Ratings, Absolute Values

D-C Plate Voltage	8500 volts
D-C Grid Voltage	-1000 volts
D-C Plate Current	1.75 amps
D-C Grid Current	0.40 amp
Plate Input	10 kW
Plate Dissipation	4 kW

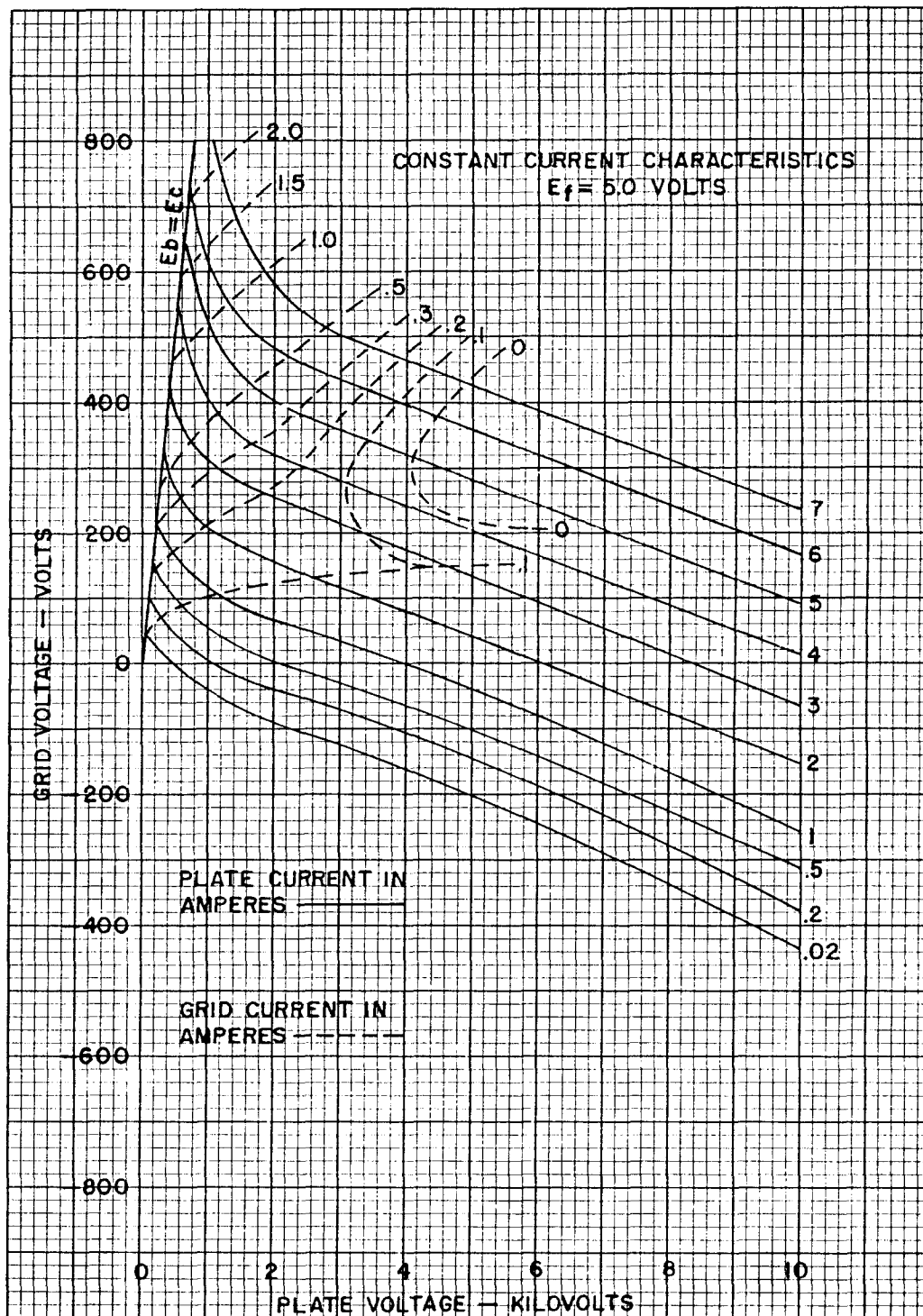
Typical Operation

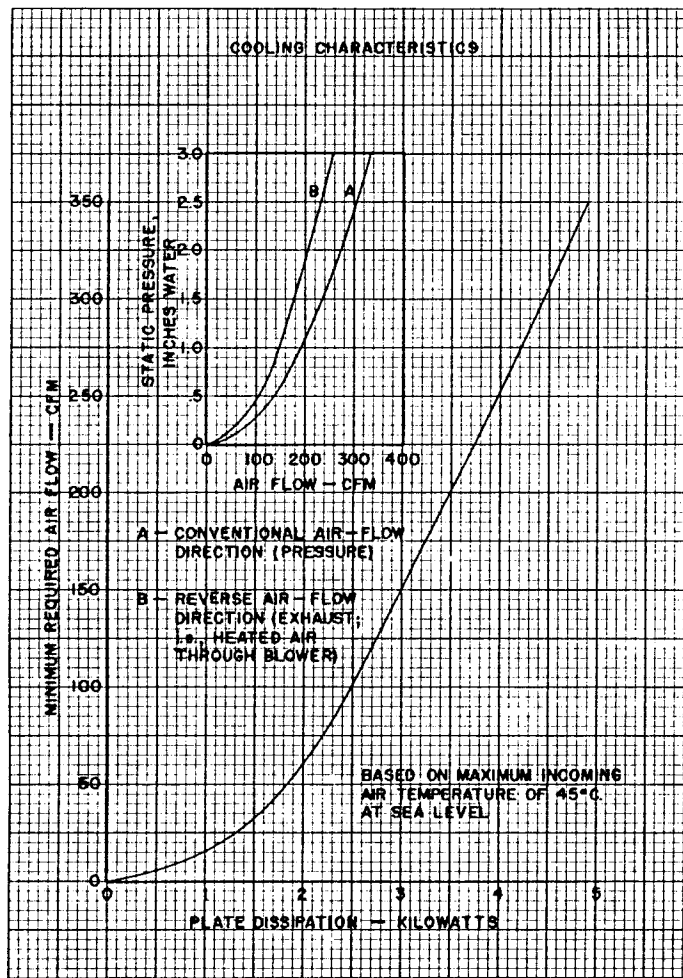
D-C Plate Voltage	6300	8000 volts
D-C Grid Voltage	-650	-750 volts
Peak R-F Grid Voltage	1250	1250 volts
Peak R-F Plate Voltage	5200	6800 volts
D-C Plate Current	1.5	1.2 amps
D-C Grid Current	0.20	0.12 amp
R-F Load Resistance	2000	3200 ohms
Driving Power, approximate	250	150 watts
Power Output, approximate	6.7	7.2 kW

‡ Modulation essentially negative may be used if the positive peak of the envelope does not exceed 115% of the carrier conditions.

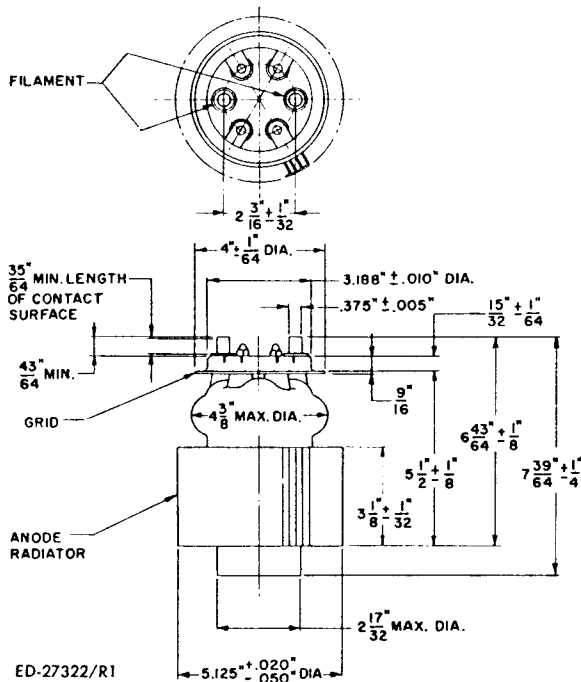
CHARACTERISTIC RANGE VALUES FOR EQUIPMENT DESIGN

Characteristics	Conditions		Minimum	Limits Bogey	Maximum
Grid Voltage	$e_b = 1000$ volts; $i_b = 6.5$ amps	e_c :	—	—	850 volts
Grid Current	$e_b = 1000$ volts; $i_b = 6.5$ amps	i_c :	—	—	2.2 amps
Plate Voltage	$E_c = 0$ Vdc; $I_b = 0.5$ Adc	E_b :	1.6	2.1	2.6 kVdc
Plate Voltage	$E_c = -200$ Vdc; $I_b = 0.5$ Adc	E_b :	6.5	7.3	8.1 kVdc
Grid Voltage	$E_b = 7.0$ kVdc; $I_b = 0.05$ Adc	E_c :	-220	-270	-320 Vdc
Plate Power Output	$E_b = 6.3$ kVdc; $E_c = -650$ Vdc $I_b = 1.5$ Adc; $I_c = 0.20$ Adc	P_o :	5.7	—	— kW

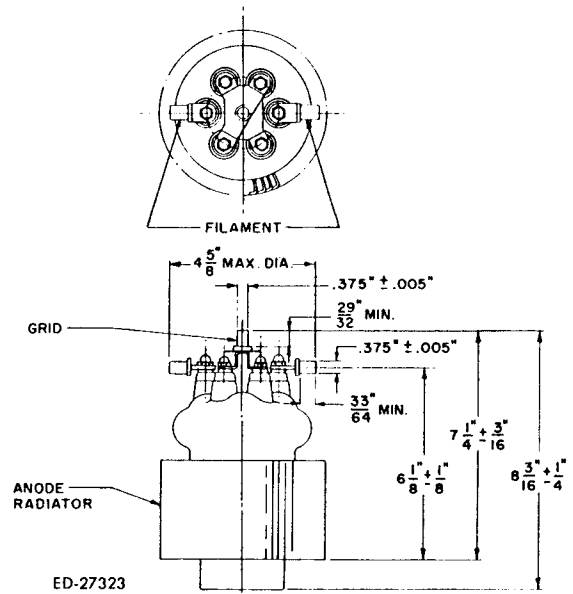




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DIMENSIONS — ML-5530



DIMENSIONS — ML-5530-H

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