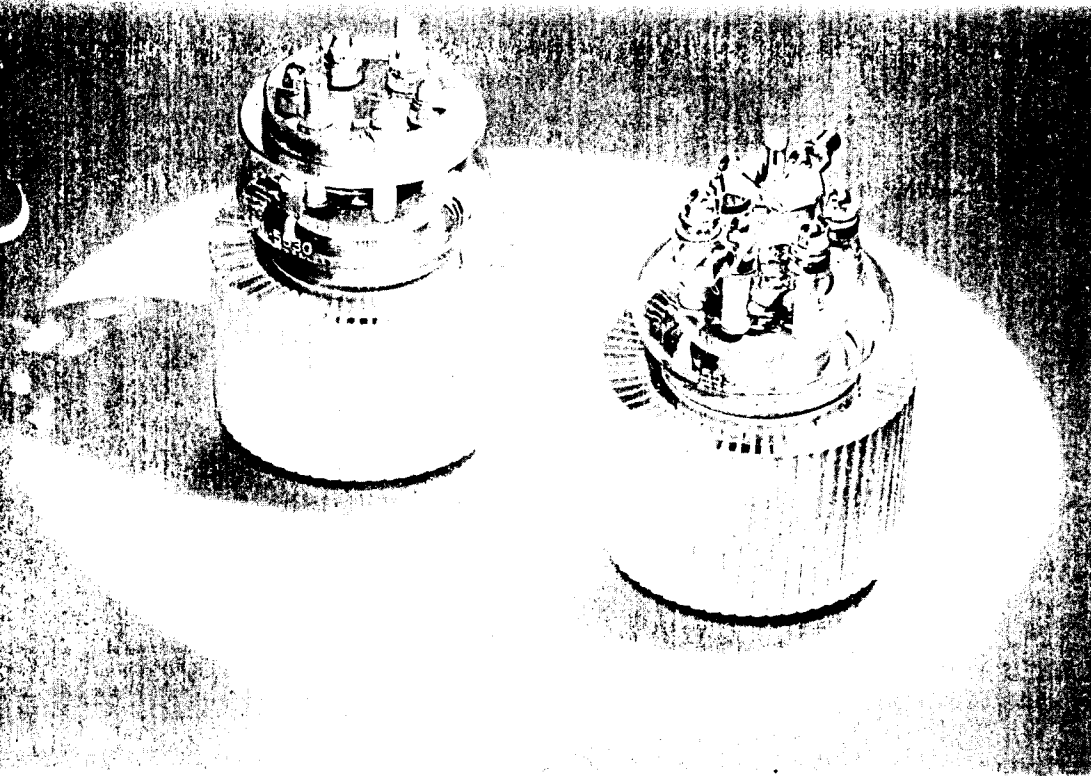




**ML-5530**  
**ML-5530-H**

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	$\mu$ mhos
Interelectrode Capacitances:	<b>*ML-5530</b>	<b>ML-5530H</b>	
Grid-Plate .....	23	20	$\mu$ mf
Grid-Filament .....	20	17	$\mu$ mf
Plate-Filament .....	0.6	1.0	$\mu$ 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

**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.

**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.

**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

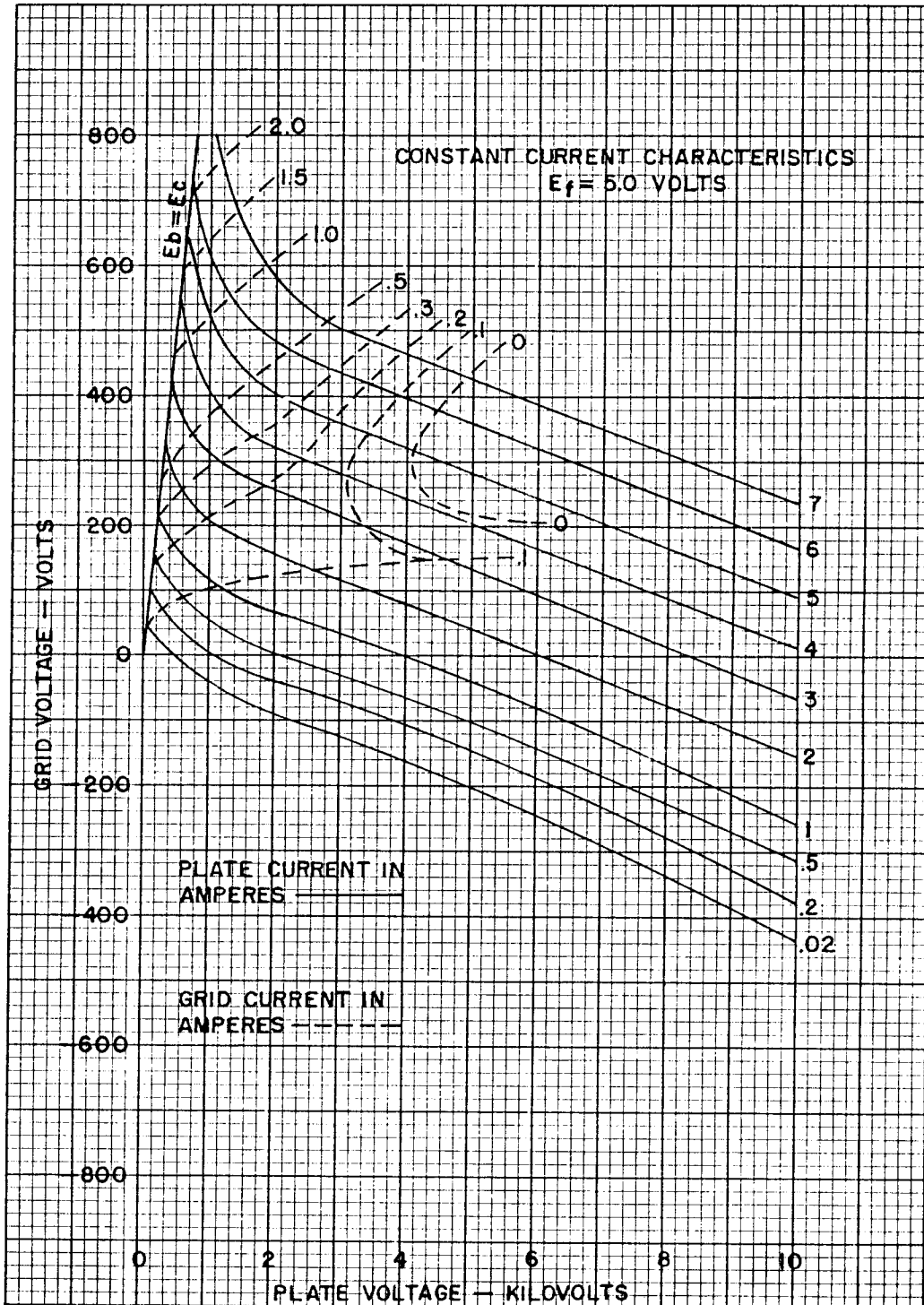
Typical Operation

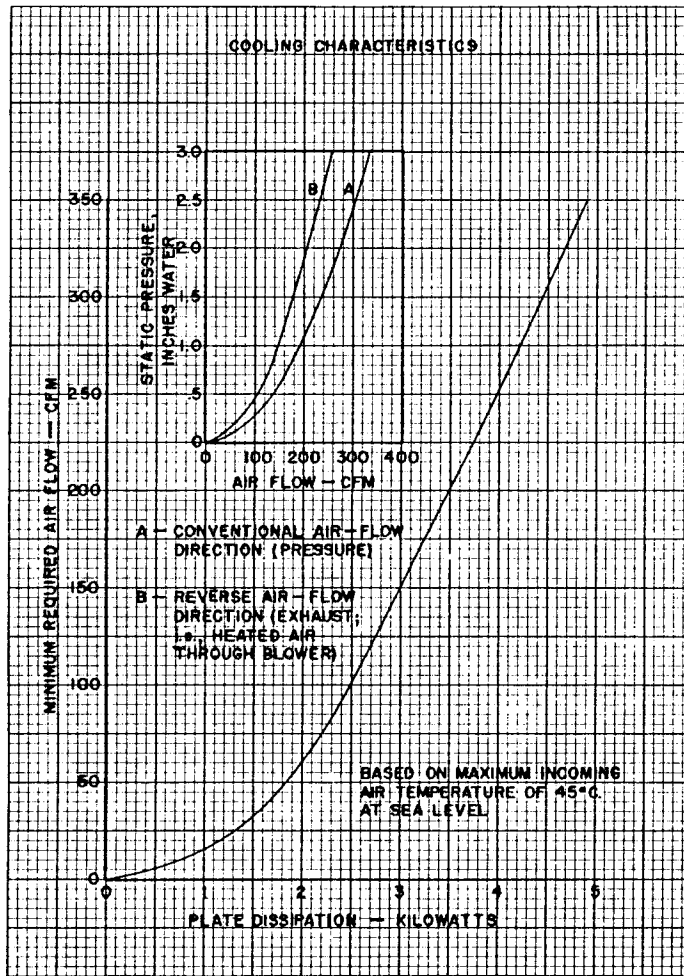
D-C Plate Voltage .....	6300	8000 volts
D-C Grid Voltage .....	-650	-750 volts
Peak R-F Grid Voltage .....	1250	1250 volts
Peak R-F Plate Voltage .....	5200	6800 volts
D-C Plate Current .....	1.5	1.2 amps
D-C Grid Current .....	0.20	0.12 amp
R-F Load Resistance .....	2000	3200 ohms
Driving Power, approximate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

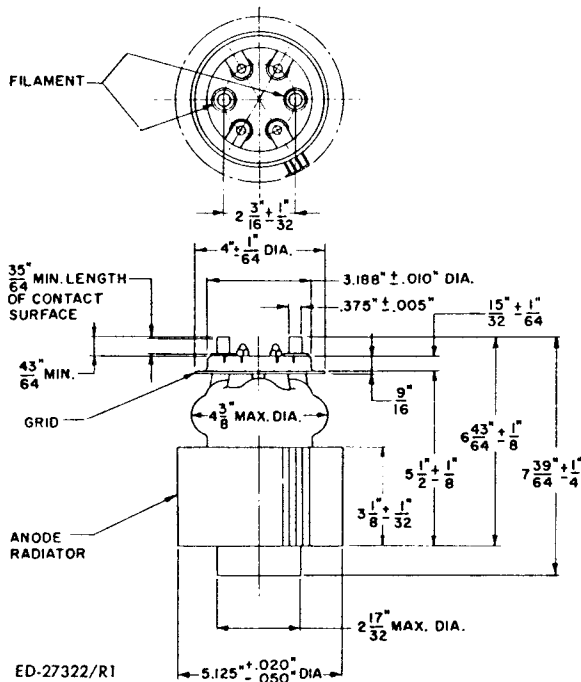
CHARACTERISTIC RANGE VALUES FOR EQUIPMENT DESIGN

Characteristics	Conditions		Limits		Maximum
			Minimum	Bogey	
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

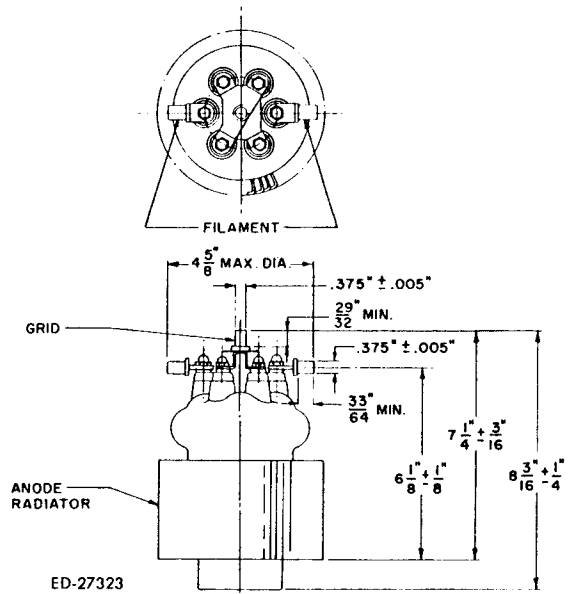




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DIMENSIONS — ML-5530



DIMENSIONS — ML-5530-H

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