

ML-892 ML-892R

DESCRIPTION & RATINGS

DESCRIPTION

The ML-892 and ML-892R are three-electrode tubes designed specifically for use as modulators, amplifiers, or oscillators in radio transmitting service. The cathode of each type is a pure-tungsten filament. The ML-892 has a water-cooled anode capable of dissipating 10 kW with a moderate water flow. The ML-892R has a forced-air-cooled anode capable of dissipating 4 kW with an air flow of

approximately 450 cfm. Maximum ratings of 15 kVdc plate voltage and 30 kW plate input for the ML-892 and 12.5 kVdc plate voltage and 18 kW plate input for the ML-892R apply at frequencies up to 1.6 Mc. These tubes are rated for service up to 20 Mc with plate voltage and plate input reduced according to the table on page 2.

GENERAL CHARACTERISTICS

Electrical

| | | | |
|--|--------|-------|------------|
| Filament Voltage | | 22 | Volts |
| Filament Current | | 60 | Amps |
| Filament Starting Current, maximum | | 120 | Amps |
| Filament Cold Resistance | | 0.031 | Ohms |
| Amplification Factor | | 50 | |
| Interelectrode Capacitances: | | | |
| Grid-Plate | ML-892 | 31 | $\mu\mu f$ |
| Grid-Filament | | 20 | $\mu\mu f$ |
| Plate-Filament | | 1.5 | $\mu\mu f$ |

Mechanical

| | | |
|---|-----|----------------------|
| Mounting Position | | Vertical, anode down |
| Type of Cooling — ML-892 | | Water |
| Water flow on anode | | 3-8 gpm |
| Maximum outgoing water temperature | | 70 °C |
| Type of Cooling — ML-892R | | Forced-air |
| Air flow on anode, minimum for 4 kW dissipation | 450 | cfm at 0.5" Water |
| Maximum incoming air temperature | | 45 °C |
| Maximum Glass Temperature | | 160 °C |
| Net Weight, approximate | | |
| ML-892 | | 3.5 lbs. |
| ML-892R | | 45 lbs. |

MAXIMUM RATINGS AND TYPICAL OPERATING CONDITIONS
 (Continuous Commercial Service)
 VALUES APPLY TO BOTH TYPES UNLESS OTHERWISE SPECIFIED

A-F Power Amplifier & Modulator
Class B

| Maximum Ratings, Absolute Values | ML-892 | | ML-892R | | |
|---|--------|-------|---------|-------|-------|
| D-C Plate Voltage | 15000 | 12500 | | | volts |
| Max-Signal D-C Plate Current* | 2.0 | 2.0 | | | amps |
| Max-Signal Plate Input* | 20000 | 12000 | | | watts |
| Plate Dissipation* | 7500 | 4000 | | | watts |
| Typical Operation (Values are for two tubes) ML-892 | | | | | |
| D-C Plate Voltage | 6000 | 8000 | 10000 | 12500 | volts |
| D-C Grid Voltage | 0 | -60 | -90 | -170 | volts |
| Peak A-F Grid-to-Grid Voltage | 1000 | 1000 | 1380 | 1370 | volts |
| Zero-Signal D-C Plate Current | 0.5 | 0.5 | 0.5 | 0.4 | amp |
| Max.-Signal D-C Plate Current | 2.6 | 2.3 | 3.3 | 2.8 | amps |
| Effective Load Resistance (plate to plate) | 4200 | 6800 | 6400 | 10000 | ohms |
| Max.-Signal Driving Power, approx. | 135 | 84 | 240 | 160 | watts |
| Max.-Signal Power Output, approx. | 8000 | 10500 | 20000 | 22000 | watts |

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

R-F Power Amplifier
Class B Telephony

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

| Maximum Ratings, Absolute Values | ML-892 | | ML-892R | | |
|----------------------------------|--------|-------|---------|-------|-------|
| D-C Plate Voltage | 15000 | 12500 | | | volts |
| D-C Plate Current | 1.0 | 1.0 | | | amp |
| Plate Input | 15000 | 6000 | | | watts |
| Plate Dissipation | 10000 | 4000 | | | watts |
| Typical Operation ML-892 | | | | | |
| D-C Plate Voltage | 6000 | 8000 | 10000 | 14000 | volts |
| D-C Grid Voltage | 0 | -60 | -100 | -190 | volts |
| Peak R-F Grid Voltage | 230 | 320 | 370 | 440 | volts |
| D-C Plate Current | 0.64 | 0.67 | 0.77 | 0.82 | amp |
| Driving Power, approx.† | 77 | 150 | 133 | 106 | watts |
| Power Output, approx. | 1000 | 1800 | 2500 | 4000 | watts |

† At crest of a-f cycle with modulation factor of 1.0.

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 | ML-892 | | ML-892R | | |
|----------------------------------|--------|-------|---------|-------|-------|
| D-C Plate Voltage | 1000 | 1000 | | | volts |
| D-C Grid Voltage | -3000 | -3000 | | | volts |
| D-C Plate Current | 1.0 | 1.0 | | | amps |
| D-C Grid Current | 0.30 | 0.30 | | | amp |
| Plate Input | 10000 | 10000 | | | watts |
| Plate Dissipation | 6600 | 2500 | | | watts |
| Typical Operation ML-892 | | | | | |
| D-C Plate Voltage | 6000 | 8000 | 10000 | 10000 | volts |
| D-C Grid Voltage | -1000 | -1300 | -1600 | -1600 | volts |
| Peak R-F Grid Voltage | 1650 | 1950 | 2250 | 2250 | volts |
| D-C Plate Current | 0.83 | 0.82 | 0.78 | 0.78 | amp |
| D-C Grid Current, approx. | 0.28 | 0.24 | 0.23 | 0.23 | amp |
| Driving Power, approx. | 420 | 430 | 460 | 460 | watts |
| Power Output, approx. | 3500 | 5000 | 6000 | 6000 | watts |

R-F Power Amplifier & Oscillator
Class C Telegraphy

Key-down conditions per tube without modulation§

| Maximum Ratings, Absolute Values | ML-892 | | ML-892R | | |
|----------------------------------|--------|-------|---------|-------|-------|
| D-C Plate Voltage | 15000 | 12500 | | | volts |
| D-C Grid Voltage | -3000 | -3000 | | | volts |
| D-C Plate Current | 2.0 | 2.0 | | | amps |
| D-C Grid Current | 0.40 | 0.40 | | | amp |
| Plate Input | 30000 | 18000 | | | watts |
| Plate Dissipation | 10000 | 4000 | | | watts |
| Typical Operation ML-892 | | | | | |
| D-C Plate Voltage | 8000 | 10000 | 12000 | 12000 | volts |
| D-C Grid Voltage | -1000 | -1300 | -1600 | -1600 | volts |
| Peak R-F Grid Voltage | 1700 | 2150 | 2550 | 2550 | volts |
| D-C Plate Current | 1.17 | 1.4 | 1.55 | 1.55 | amps |
| D-C Grid Current, approx. | 0.22 | 0.24 | 0.23 | 0.23 | amp |
| Driving Power, approx. | 330 | 495 | 565 | 565 | watts |
| Power Output, approx. | 6500 | 10000 | 14000 | 14000 | watts |

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

MAXIMUM FREQUENCY RATINGS

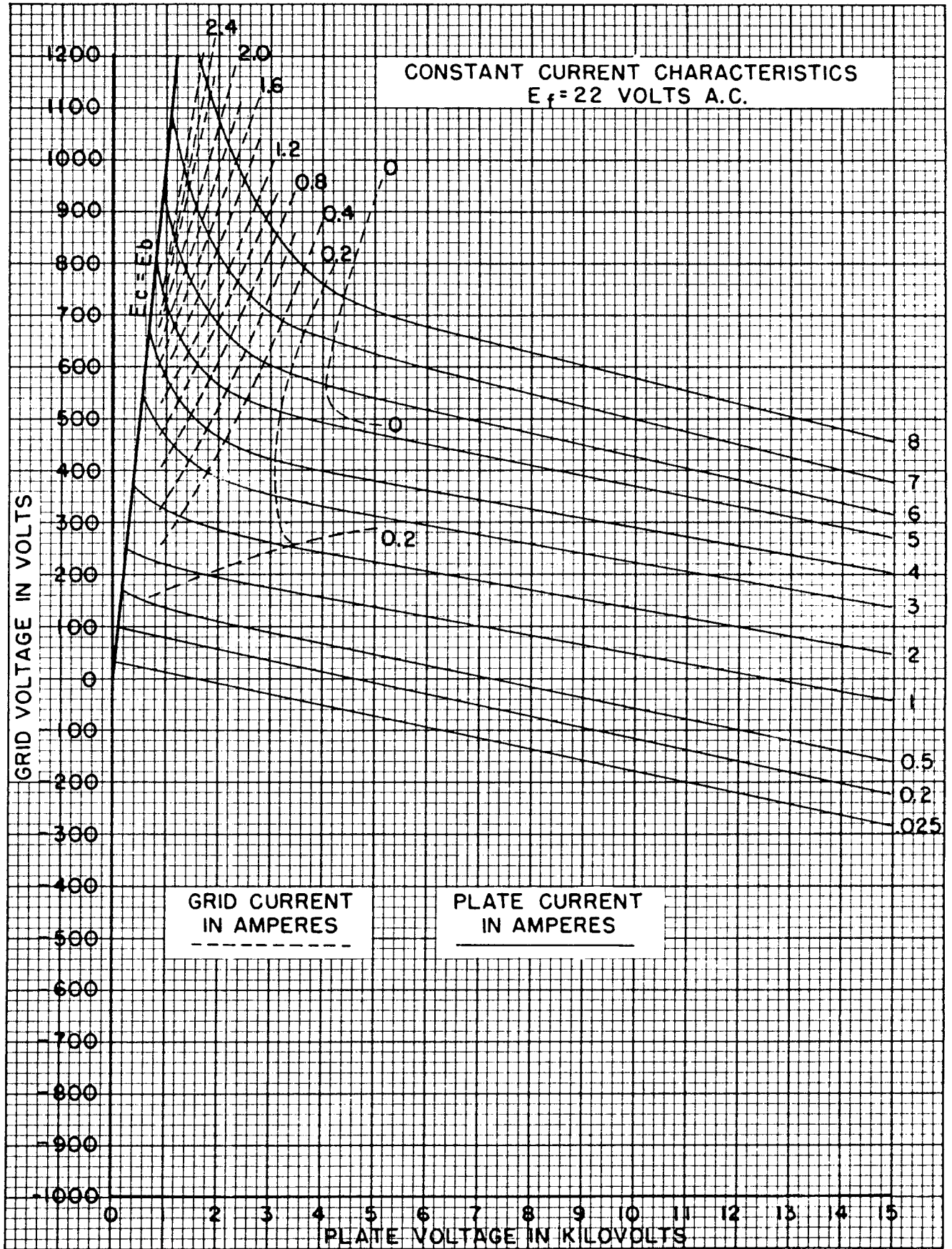
Maximum ratings apply at frequencies up to 1.6 Mc. These tubes can be operated at higher frequencies provided the maximum values of plate voltage and plate input are reduced in accordance with the table on the right. (Other maximum ratings are the same as shown above.)

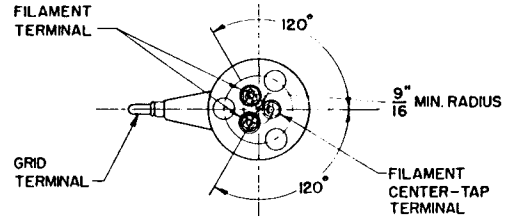
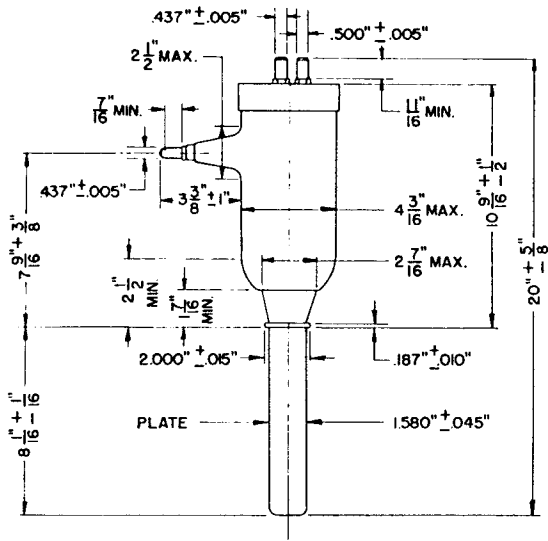
| Frequency | 1.6 | 7.5 | 20 | Mc |
|---|-----|-----|----|----|
| Percentage of Maximum Rated Plate Voltage and Plate Input | | | | |
| Class B | 100 | 85 | 76 | |
| Class C Plate Modulated (ML-892) | 100 | 85 | 75 | |
| Class C Plate Modulated (ML-892R) | 100 | 75 | 50 | |
| Class C Unmodulated | 100 | 75 | 50 | |

CHARACTERISTIC RANGE VALUES FOR EQUIPMENT DESIGN

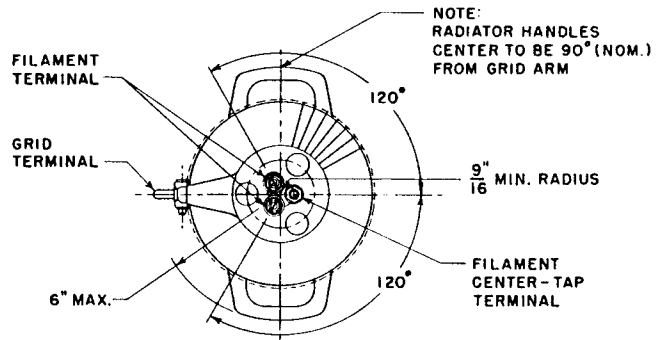
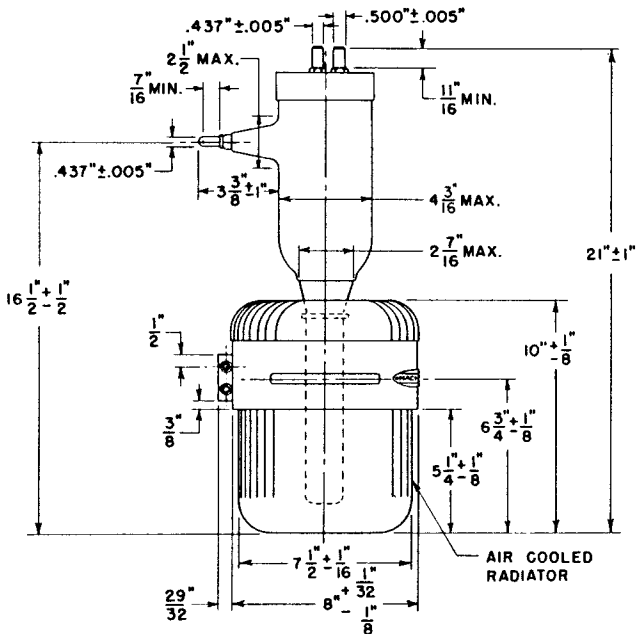
| Characteristic | Conditions | Limits | | Maximum |
|------------------------|-------------------------------------|---------|-------|-----------|
| | | Minimum | Bogey | |
| Grid Voltage | $e_b = 1500$ volts; $i_b = 6$ amps | e_c : | — | 925 volts |
| Grid Current | $e_b = 1500$ volts; $i_b = 6$ amps | i_c : | — | 1.75 amps |
| Plate Voltage | $E_c = 0$ Vdc; $I_b = 0.42$ Adc | E_b : | 5.0 | 6.2 kVdc |
| Plate Voltage | $E_c = -100$ Vdc; $I_b = 0.42$ Adc | E_b : | 9.2 | 11.2 kVdc |
| Grid Voltage | $E_b = 15$ kVdc; $I_b = 0.020$ Adc | E_c : | -240 | -320 Vdc |
| Peak Cathode Current* | | i_k : | 9.0 | — amps |
| Power Output (ML-892) | $E_b = 15$ kVdc; $I_b = 2.0$ Adc | P_o : | 20 | — kW |
| | $I_c = .250$ Adc; $R_g = 5000$ ohms | | | |
| Power Output (ML-892R) | $E_b = 10$ kVdc; $I_b = 1.4$ Adc | P_o : | 10 | — kW |
| | $I_c = .250$ Adc; $R_g = 5000$ ohms | | | |

* Represents maximum useable plate current plus grid current for any condition of operation.





DIMENSIONS — ML-892



DIMENSIONS — ML-892R

MACHLETT LABORATORIES, INC.

SPRINGDALE



CONNECTICUT

U. S. A.