

# ML-7248 ML-7249

## High Voltage Tetrodes

Plate Voltage  
to 125 kV



ELECTRON TUBE SPECIALIST

### DESCRIPTION

The ML-7248 and ML-7249 are high-voltage tetrodes designed for use as switch tubes in hard pulse modulators for radar application and as general-purpose electronic switches in high-voltage switching and control circuits. The cathode of each type is a thoriated-tungsten filament.

The ML-7248 is designed for oil-immersed operation and

has a maximum d-c plate voltage rating of 125 kV. The ML-7249, which incorporates a radiator for increased plate dissipation ratings, is designed for either air insulation or oil-immersed operation. When operated in air, the maximum d-c plate voltage rating is 65 kV; in oil, the corresponding rating is 125 kV.

### GENERAL CHARACTERISTICS

#### Electrical

Filament Voltage .....	6.3 volts
Filament Current, approximate .....	11.7 Amps
Direct Interelectrode Capacitances, approximate	
Cathode-control grid .....	6.7 $\mu\text{mf}$
Cathode-screen grid .....	3.5 $\mu\text{mf}$
Cathode-plate .....	0.08 $\mu\text{mf}$
Plate-control grid .....	0.08 $\mu\text{mf}$
Plate-screen grid .....	2.0 $\mu\text{mf}$
Control grid-screen grid .....	20.0 $\mu\text{mf}$

#### Mechanical

Mounting Position .....	Horizontal or vertical cathode end down
Type of Cooling	
With oil insulation — ML-7248 & ML-7249 .....	Convection†
Maximum oil temperature for maximum dissipation .....	75 °C
With air insulation — ML-7249 .....	Forced air‡
Air flow on radiator .....	See Air Cooling Characteristics
Maximum incoming air temperature .....	50 °C
Maximum Glass Temperature .....	150 °C
Net Weight, approximate	
ML-7248 .....	2.5 lbs.
ML-7249 .....	4.3 lbs.

†When the ML-7248 or ML-7249 is mounted cathode end down in oil, a minimum oil flow of 3 pints per minute must be directed at the cathode stem during the application of filament power. Oil must be forced through the radiator of the ML-7249 in the vertical position.

‡When the ML-7249 is operated in air, a minimum air flow of 1½ cfm must be directed into the cathode stem before and during the application of filament power. (See outline drawing. This requirement applies to the ML-7248 if filament power is applied while the tube is in air.)

MAXIMUM RATINGS

Maximum Ratings, Absolute Values	ML-7248	ML-7249
D-C Plate Voltage — in oil .....	125	125 kV
in air .....	—	65 kV
D-C Screen-Grid Voltage .....	1500	1500 Volts
D-C Control-Grid Voltage .....	-600	-600 Volts
Peak Negative Grid Voltage .....	-1500	-1500 Volts
Pulse Cathode Current* .....	2.0	2.0 amps
Plate Dissipation — in oil .....	200	350† Watts
in air .....	—	200‡ Watts
Screen-Grid Dissipation .....	20	20 Watts
Control-Grid Dissipation .....	10	10 Watts

\* Represents maximum usable cathode current (plate current plus current to each grid) for any conditions of operation.

† With tube horizontal only.

‡ With forced-air cooling of 250 cfm minimum.

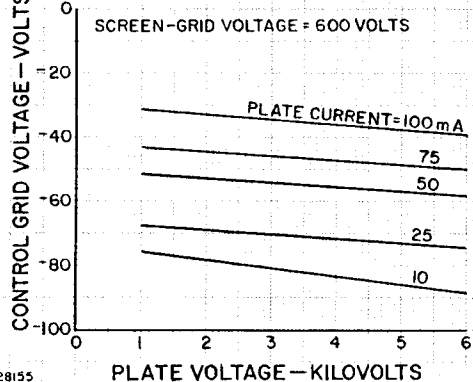
TYPICAL OPERATING CONDITIONS

Typical Operation (in oil) — Pulse High-Voltage Switching

D-C Plate Voltage .....	125 kV
D-C Screen-Grid Voltage .....	600 Volts
D-C Control-Grid Voltage .....	-360 Volts
Pulse Positive Control-Grid Voltage .....	250 Volts
Pulse Plate Current .....	1.02 amps
Pulse Screen-Grid Current .....	0.27 amp
Pulse Control-Grid Current .....	0.22 amp
Tube Drop .....	1200 volts
Duty, maximum for this condition of operation .....	12 %

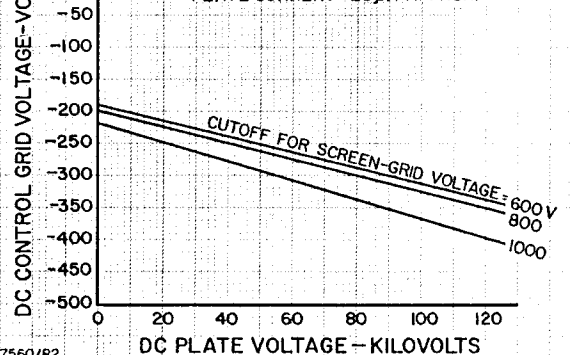
**WARNING:** Operation of this tube may produce x-rays. Adequate rayproof shielding must therefore be provided in the equipment.

CONSTANT PLATE-CURRENT CHARACTERISTICS IN NEGATIVE GRID-VOLTAGE REGION



A-28155

CUTOFF CHARACTERISTICS



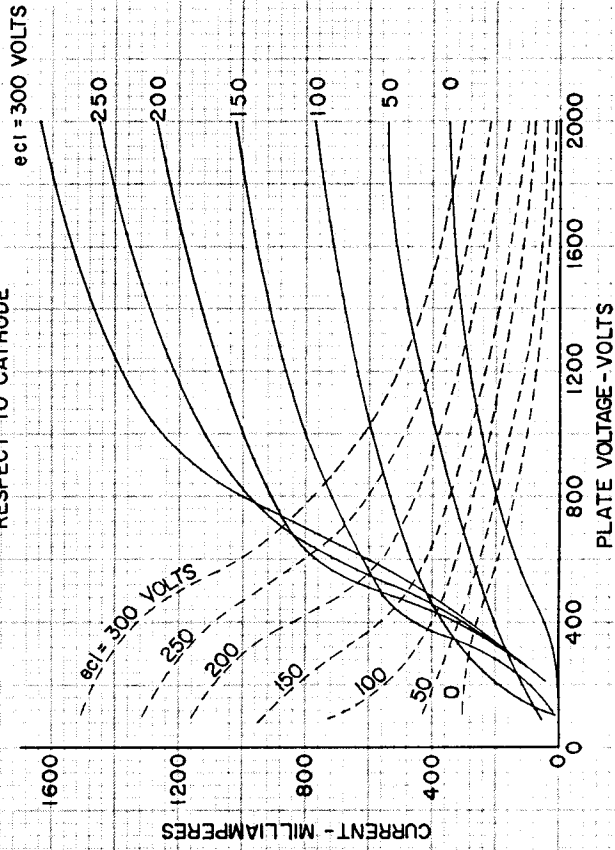
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TYPICAL CONSTANT GRID VOLTAGE CHARACTERISTICS

SCREEN GRID VOLTAGE = + 1000 VOLTS

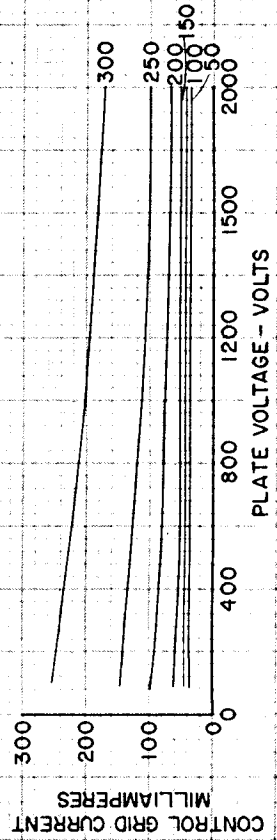
— PLATE CURRENT IN MILLIAMPERES  
- - - SCREEN GRID CURRENT IN MILLIAMPERES

$e_{c1}$  = POSITIVE PEAK GRID VOLTAGE WITH RESPECT TO CATHODE



CONTROL GRID CURRENT VERSUS PLATE VOLTAGE

SCREEN GRID = + 1000 VOLTS



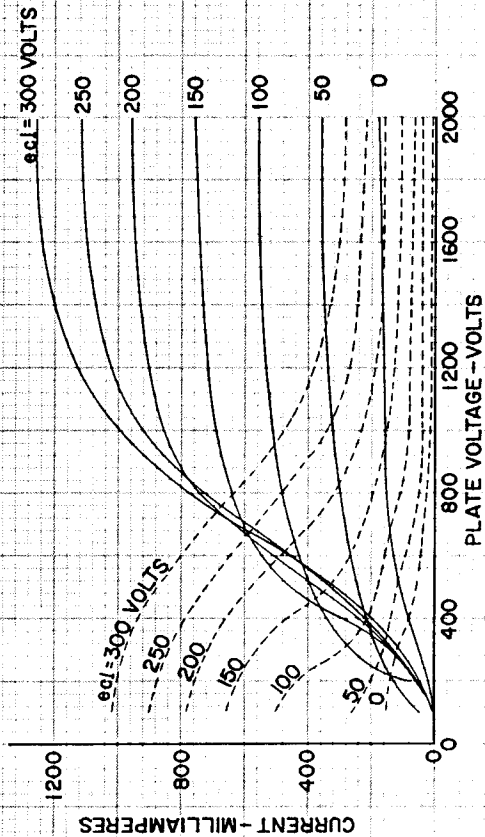
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TYPICAL CONSTANT GRID VOLTAGE CHARACTERISTICS

SCREEN GRID VOLTAGE = + 600 VOLTS

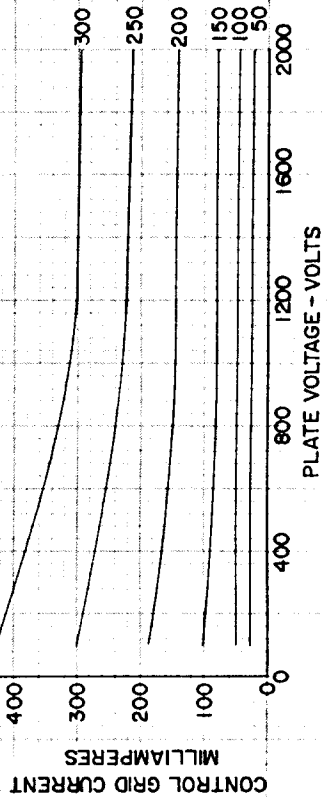
— PLATE CURRENT IN MILLIAMPERES  
- - - SCREEN GRID CURRENT IN MILLIAMPERES

$e_{c1}$  = POSITIVE PEAK GRID VOLTAGE WITH RESPECT TO CATHODE



CONTROL GRID CURRENT VERSUS PLATE VOLTAGE

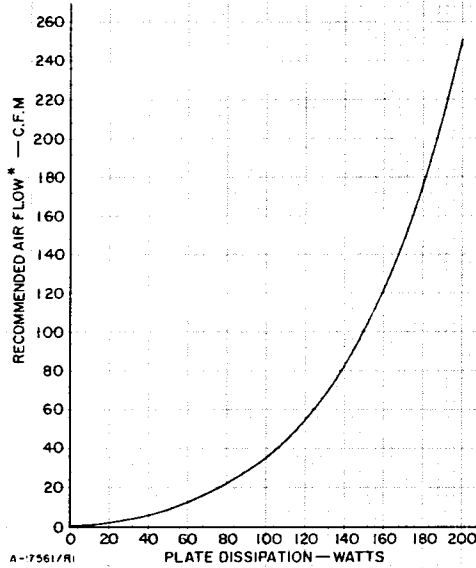
SCREEN GRID = + 600 VOLTS



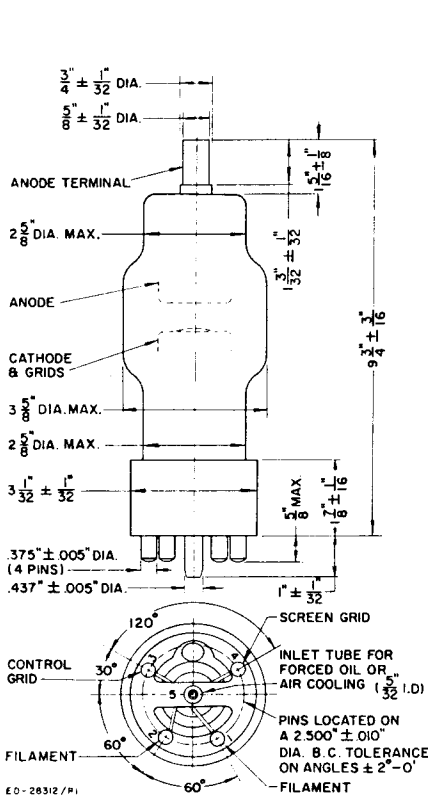
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AIR-COOLING CHARACTERISTICS

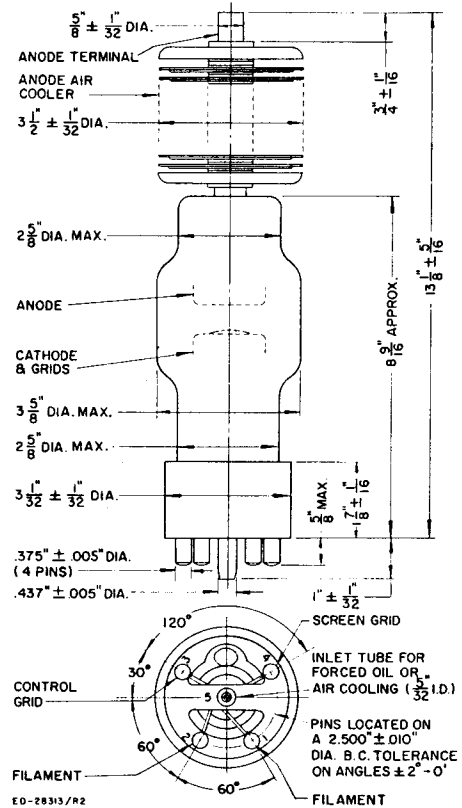
\*AIR FLOW TO BE DIRECTED AT CENTRAL PORTION OF RADIATOR, PARALLEL TO FINS, THROUGH A 3-INCH DIAMETER NOZZLE AT A MAXIMUM DISTANCE OF 4 INCHES FROM THE RADIATOR



ML-7249



DIMENSIONS — ML-7248



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