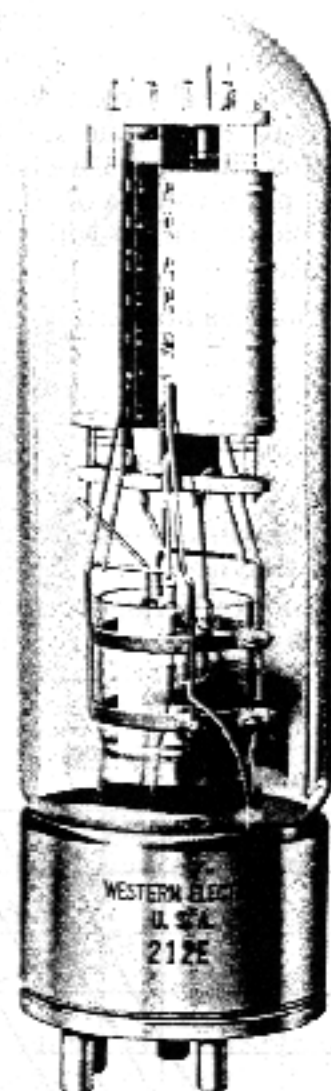


Western Electric

212E Vacuum Tube



Classification—Filamentary air-cooled triode

May be used as an audio-frequency amplifier or modulator; or as a radio-frequency oscillator or amplifier.

Dimensions—Dimensions and outline diagrams are shown in Figures 1 and 2. The overall dimensions are:

Maximum overall length	13 $\frac{3}{8}$ "
Maximum diameter	3 $\frac{5}{8}$ "

Mounting—Large four-pin bayonet base for use in a W. E. 113A or similar socket, for either vertical or horizontal mounting. If mounted horizontally the plane of the filament, which is indicated in Figure 2, should be vertical.

Grid Bias Modulator

Direct plate voltage.....	3000 volts
Grid bias.....	-260 volts
Plate dissipation.....	175 watts
Load impedance.....	8000 ohms
Peak power output.....	200 watts

Class B Audio Amplifier or Modulator for balanced 2 tube circuit

Direct plate voltage.....	2000	1500 volts
Grid bias.....	-105	-75 volts
Direct plate current per tube		
No drive.....	40	50 milliamperes
Max. drive.....	300	300 milliamperes
Plate dissipation.....	250	250 watts
Load res. plate-to-plate.....	8000	5900 ohms
Load res. per tube.....	2000	1475 ohms
Approx. max. output.....	650	500 watts
Recommended power for driving stage.....	50	50 watts

Class B Radio-Frequency Amplifier

Direct plate voltage.....	2000	1500 volts
Direct plate current.....	300	300 milliamperes
Plate dissipation.....	275	275 watts
Grid bias.....	-120	-90 volts
Approx. carrier watts for use with 100% modulation...	200	150 watts

Class C Radio-Frequency Oscillator or Power Amplifier—Unmodulated

Direct plate voltage.....	2000	1500 volts
Direct plate current.....	300	300 milliamperes
Grid bias.....	-185 to -250	-150 to -200 volts
Nominal power output.....	400	300 watts

Class C Radio-Frequency Amplifier—Plate Modulated

Direct plate voltage.....	1500	1000 volts
Direct plate current.....	300	300 milliamperes
Grid bias.....	-200	-125 volts
Max. direct grid current.....	75	75 milliamperes
Nominal carrier power output for use with 100% modulation.....	300	200 watts

Operating Precautions

Mechanical—Figures 1 and 2 show the overall dimensions and basing arrangements for the tube.

The tubes should not be subjected to mechanical shock or excessive vibration. Mechanical vibration may cause breakage of the thoriated tungsten filaments.

A free circulation of air must be provided to insure adequate cooling of the glass during operation.

Electrical—Overload protection should always be provided for the plate circuit. A suitable fuse or circuit breaker should remove the plate voltage if the plate current exceeds 350 milliamperes. Although the tube is sufficiently rugged to withstand momentary overloads, a prolonged overload caused by inefficient adjustment of the circuit, may damage the tube. When adjusting a new circuit, reduced plate voltage or a series resistance of 1000 to 5000 ohms in the plate circuit should be used until it is operating properly.

Filament—Thoriated tungsten.

Filament voltage.....	14 volts
Nominal filament current.....	8 amperes
Average thermionic emission.....	4 amperes

Average Direct Interelectrode Capacitances

Plate to grid.....	18.8 $\mu\mu\text{f}$
Grid to filament.....	14.9 $\mu\mu\text{f}$
Plate to filament.....	8.6 $\mu\mu\text{f}$

Characteristics—Performance data given below are based upon a typical set of conditions. Variations can be expected with different circuits and tubes.

Figures 3 and 4 give the static characteristics of a typical tube plotted against grid and plate voltages.

Average Characteristics at 2000 volts direct plate potential and minus 90 volts grid bias:

Amplification factor.....	16
Plate resistance.....	1900 ohms
Grid to plate transconductance.....	8500 micromhos

Each 212E vacuum tube falls within one of four impedance classes and is stamped accordingly. These classifications are #1, #2, #3 and #4, and are in no way a gradation of quality, but are to facilitate parallel operation in the ordinary system using a common grid battery. Where more than one tube is used, those of the same or adjacent classes should be employed so that the load may be evenly distributed. When only a single tube is used no one of the classes has any advantage over the other. Tubes may not be ordered according to impedance classification.

With a plate voltage of 1500 volts, a grid bias of -60 volts and a filament voltage of 14, the plate current will be as follows for each impedance class:

#1	110-129 milliamperes, inclusive
#2	130-148 " "
#3	149-167 " "
#4	168-185 " "

Operation**Maximum Ratings**

Max. direct plate voltage.....	3000 volts
Max. direct plate current.....	350 milliamperes
Max. plate dissipation.....	275 watts
Max. direct grid current.....	75 milliamperes
Max. r-f grid current.....	5 amperes
Max. frequency for the above ratings.....	1.5 megacycles
Max. plate voltage for upper frequency limit of 4.5 Mc.....	1000 volts
Max. plate voltage for frequencies between 1.5 and 4.5 Mc in proportion.	

The above are maximum ratings which do not apply simultaneously but depend on the type of service as specified below.

Class A Audio Amplifier or Modulator

Direct plate voltage.....	1500	1250 volts
Grid bias.....	-57	-40 volts
Direct plate current.....	170	200 milliamperes
Plate dissipation.....	250	250 watts
Load impedance.....	5000	3000 ohms
Undistorted output.....	50	40 watts