



TYPE 311-CH
MODULATOR, A-F AND R-F AMPLIFIER, OSCILLATOR
ENGINEERING INFORMATION

GENERAL RATINGS

Number of Electrodes	3
Filament Voltage	10 volts
Current	3.25 amperes
Type	Thoriated Tungsten
Average Characteristic Values Calculated at:	
Eb = 1000, Ec = -50, Ef = 10 D-C	
Plate Current	0.072 amperes
Amplification Factor	12
Plate Resistance	3400 ohms
Mutual Conductance	3530 micromhos
Average Direct Interelectrode Capacities:	
Grid to Plate	8.0 uuf
Grid to Filament	5.5 uuf
Plate to Filament	4.5 uuf
Maximum Overall Dimensions:	
Length	8 3/4 inches
Diameter	2 3/8 inches
Bulb	T-20
Base	Jumbo 4-Large Pin
Type of Cooling	Air
Net Weight	8 1/2 oz.

MAXIMUM RATINGS

Maximum D-C Plate Voltage Modulated	1500	volts
Maximum D-C Plate Voltage Unmodulated	1750	volts
Maximum D-C Plate Current Modulated	175	ma.
Maximum D-C Plate Current Unmodulated	200	ma.
Maximum Plate Dissipation	125	watts
Maximum D-C Grid Current	50	ma.
Maximum R-F Grid Current	7.5	amp.

Frequency Rating for Operating Conditions with Maximum Rated Power Input and Nominal Output:

Below	30 megacycles
Above	10 meters

*Maximum Frequency Rating with Reduced Power Input and Output:

Below	100 megacycles
Above	3 meters

* For operation at the higher frequencies, the plate voltage, plate current, plate dissipation, and d-c grid current should not exceed 50% of the Maximum Ratings. The R-F grid current should never exceed the maximum rated value.

INSTALLATION

The base of the UNITED 311-CH is designed for mounting in a standard "50 watt" socket of the four-pin, bayonet type. The tube should always be mounted vertically with ample air space provided for ventilation.

The filament of the 311-CH should be operated at the rated value of 10 volts. Operation at other than the rated value may result in loss of filament emission and short life.

While the ratings printed herein are conservative, it is important to observe the requirements of good engineering practice as to transmitter design and operation. Adequate cabinet ventilation should be provided to carry off the heat dissipated during operation. Tube sockets should be inspected to avoid high resistance contacts to the base-pin terminals.

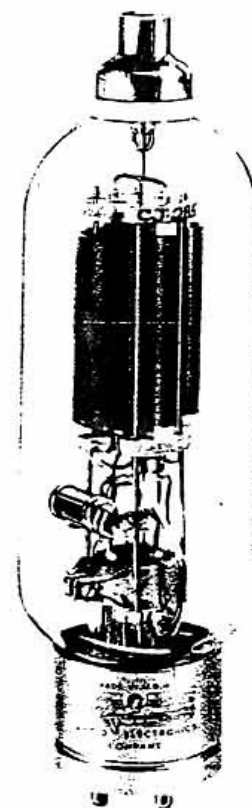
GRAPHITE ANODE AND ISOLATED GETTER TRAP

A specially processed graphite anode is used in this tube type because of several specific advantages over metals such as tantalum, molybdenum, and nickel. The radiating area of graphite is approximately twice the projected anode area because of its surface porosity and it will dissipate at least four times more heat than metal.

Graphite, being infusible will not warp or twist. The exact form of graphite is maintained under all temperatures; hence constant inter-element relationships and uniform characteristics result. The inherent advantages of graphite over metal are of primary importance in designing tubes of this type for long and satisfactory service.

Type 311-CH employs the new UNITED isolated getter trap which keeps tube free from gas and preserves filament emission.

All ratings given are for continuous service. Higher ratings are permissible for intermittent operation. Additional data will be furnished upon request.



UNITED TYPE 311-CH

Designed for especially strenuous service. Operates very efficiently in high frequency and self-rectifying circuits as used in Diathermy and R-F Heating applications.

A-F POWER AMPLIFIER AND MODULATOR—CLASS A

Maximum D-C Plate Voltage	1500	volts
Maximum Plate Dissipation	100	watts

Typical Operation:

D-C Plate Voltage	1200	1500	volts
D-C Grid Voltage	-70	-97	volts
Peak Grid Swing	65	92	volts
D-C Plate Current	80	66	ma.
Load Resistance	7600	14500	ohms

A-F POWER AMPLIFIER AND MODULATOR—CLASS B

Maximum D-C Plate Voltage	1500	volts
Maximum D-C Plate Cur.	Averaged over 210	ma.
Maximum Sig. Plate Input	any audio-freq. 315	watts
Maximum Plate Dissipation	cycle 125	watts

Typical Operation (2 tubes):

D-C Plate Voltage	1250	1500	volts
D-C Grid Voltage	-90	-110	volts
Zero-Sig. Plate Cur. (per tube)	25	25	ma.
Max.-Sig. Plate Cur. (per tube)	200	200	ma.
Load Res. (plate to plate)	6700	8200	ohms
Power Output	320	400	watts

R-F POWER AMPLIFIER—CLASS B TELEPHONY

(Carrier Conditions—Modulation Factor = 1.0)

Maximum D-C Plate Voltage	1500	volts
Maximum D-C Plate Current	150	ma.
Maximum Plate Input	185	watts
Maximum Plate Dissipation	125	watts

Typical Operation:

D-C Plate Voltage	1250	1500	volts
D-C Grid Voltage	-85	-110	volts
D-C Plate Current	120	120	ma.
Peak Power Output	200	250	watts
Power Output	50	62.5	watts

**PLATE MODULATED R-F POWER AMPLIFIER
CLASS C TELEPHONY**

(Carrier Conditions—Modulation Factor = 1.0)

Maximum D-C Plate Voltage	1500	volts
Maximum D-C Plate Current	175	ma.
Maximum Plate Input	230	watts
Maximum Plate Dissipation	85	watts
Maximum R-F Grid Current	7.5	amp.
Maximum D-C Grid Current	50	ma.

Typical Operation:

D-C Plate Voltage	1000	1250	volts
D-C Grid Voltage	-250	-300	volts
D-C Plate Current	170	166	ma.
D-C Grid Current†	10	8	ma.
Driving Power†	3.5	3.5	watts
Power Output—approx.	115	148	watts

**R-F POWER AMPLIFIER AND OSCILLATOR
CLASS C TELEGRAPHY**

(Key-Down Conditions)

Maximum D-C Plate Voltage	1750	volts
Maximum D-C Plate Current	200	ma.
Maximum Plate Input	350	watts
Maximum Plate Dissipation	125	watts
Maximum R-F Grid Current	7.5	amp.
Maximum D-C Grid Current	50	ma.

D-C Plate Voltage	1250	1500	1750	volts
D-C Grid Voltage	-250	-300	-200	volts
D-C Plate Current	200	200	200	ma.
D-C Grid Current†	10	10	20	ma.
Driving Power†	3.5	4.0	4.5	watts
Power Output—approx.	170	220	260	watts

† Subject to wide variations depending on the impedance of the load circuit. The driver stage should have a tank circuit of good regulation and should be capable of delivering considerably more than the required driving power.

