



## TYPE 276-A

MODULATOR, A-F AND R-F POWER AMPLIFIER, OSCILLATOR

### ENGINEERING INFORMATION

#### GENERAL RATINGS

|                                              |                    |
|----------------------------------------------|--------------------|
| Number of Electrodes .....                   | 3                  |
| Filament Voltage .....                       | 10 volts           |
| Current .....                                | 3.00 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 .....                          | 9.0 uuf            |
| Grid to Filament .....                       | 6.0 uuf            |
| Plate to Filament .....                      | 5.0 uuf            |
| Maximum Overall Dimensions:                  |                    |
| Length .....                                 | 7 7/8 inches       |
| Diameter .....                               | 2 5/16 inches      |
| Bulb .....                                   | T-18               |
| Base .....                                   | Jumbo 4-Large Pin  |
| Type of Cooling .....                        | Air                |
| Net Weight .....                             | 8 oz.              |

#### MAXIMUM RATINGS

|                                                                                              |       |            |
|----------------------------------------------------------------------------------------------|-------|------------|
| Maximum D-C Plate Voltage Modulated.....                                                     | 1000  | volts      |
| Maximum D-C Plate Voltage Unmodulated.....                                                   | 1250  | volts      |
| Maximum A-C Plate Voltage R. M. S. ....                                                      | 1250  | volts      |
| Maximum D-C Plate Current Modulated.....                                                     | 150   | ma.        |
| Maximum D-C Plate Current Unmodulated.....                                                   | 175   | 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 .....                                                                                  | 15    | megacycles |
| Above .....                                                                                  | 20    | meters     |
| *Maximum Frequency Rating with Reduced Power Input and Output:                               |       |            |
| Below .....                                                                                  | *80   | megacycles |
| Above .....                                                                                  | *3.75 | 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 276-A 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 276-A 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.

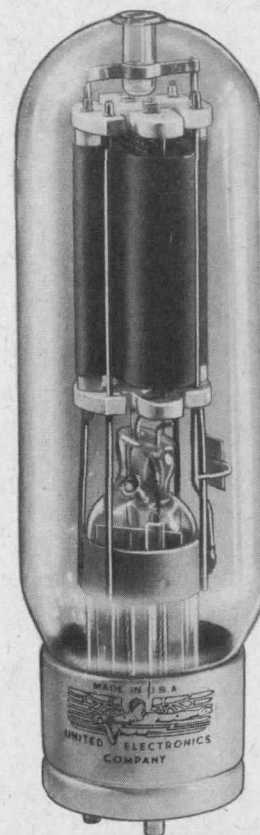
While the ratings printed herein are conservative, it is important to observe the requirements of good engineering practice as to transmitter design and operation. Adequate cabinet ventilation should be provided to carry off the heat dissipated during operation. Tube sockets should be inspected to avoid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

#### GRAPHITE ANODE

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.

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



REPLACES UNITED 376-A

"Ruggedized" construction enables type 276-A to withstand unusual shock and vibration conditions. Type 276-A is used in many airway, police, and broadcast transmitters.

**A-F POWER AMPLIFIER AND MODULATOR—CLASS A**

|                                 |      |       |
|---------------------------------|------|-------|
| Maximum D-C Plate Voltage.....  | 1250 | volts |
| Maximum Plate Dissipation ..... | 100  | watts |

## Typical Operation:

|                                  |      |      |      |               |
|----------------------------------|------|------|------|---------------|
| Filament Voltage .....           | 10   | 10   | 10   | a-c volts     |
| D-C Plate Voltage .....          | 750  | 1000 | 1250 | volts         |
| D-C Grid Voltage .....           | -46  | -61  | -80  | volts         |
| Peak Grid Swing .....            | 41   | 56   | 75   | approx. volts |
| D-C Plate Current .....          | 34   | 53   | 60   | ma.           |
| Plate Resistance .....           | 4400 | 3800 | 3600 | ohms          |
| Mutual Conductance .....         | 2750 | 3150 | 3300 | umhos         |
| Load Resistance .....            | 8800 | 7600 | 9200 | ohms          |
| U. P. O. (5% 2nd harmonic) ..... | 5.6  | 12.0 | 19.7 | watts         |

**A-F POWER AMPLIFIER AND MODULATOR—CLASS B**

|                                                    |      |       |
|----------------------------------------------------|------|-------|
| Maximum D-C Plate Voltage.....                     | 1250 | volts |
| Maximum D-C Plate Current.....                     | 175  | ma.   |
| Maximum Plate Dissipation } averaged over any..... | 125  | watts |
| Maximum Plate Dissipation } audio-freq. cycle....  |      |       |

## Typical Operation (2 tubes):

|                                      |      |      |           |
|--------------------------------------|------|------|-----------|
| Filament Voltage .....               | 10   | 10   | a-c volts |
| D-C Plate Voltage .....              | 1000 | 1250 | volts     |
| D-C Grid Voltage .....               | -77  | -100 | volts     |
| Zero-Sig. Plate Cur. (per tube)..... | 10   | 10   | ma.       |
| Max.-Sig. Plate Cur. (per tube)..... | 160  | 160  | ma.       |
| Load Res. (plate to plate).....      | 6900 | 9000 | ohms      |
| Power Output .....                   | 200  | 260  | watts     |

**R-F POWER AMPLIFIER—CLASS B TELEPHONY**

(Carrier Conditions—Modulation Factor = 1.0)

|                                 |      |       |
|---------------------------------|------|-------|
| Maximum D-C Plate Voltage.....  | 1250 | volts |
| Maximum D-C Plate Current.....  | 150  | ma.   |
| Maximum Plate Dissipation ..... | 125  | watts |
| Maximum R-F Grid Current.....   | 6    | amp.  |

## Typical Operation:

|                         |      |      |           |
|-------------------------|------|------|-----------|
| Filament Voltage .....  | 10   | 10   | a-c volts |
| D-C Plate Voltage ..... | 1000 | 1250 | volts     |
| D-C Grid Voltage .....  | -77  | -100 | volts     |
| D-C Plate Current ..... | 130  | 160  | ma.       |
| Peak Power Output ..... | 160  | 170  | watts     |
| Power Output .....      | 40   | 42.5 | watts     |

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

(Carrier Conditions—Modulation Factor = 1.0)

|                                 |      |       |
|---------------------------------|------|-------|
| Maximum D-C Plate Voltage.....  | 1000 | volts |
| Maximum D-C Plate Current.....  | 175  | ma.   |
| Maximum Plate Dissipation ..... | 85   | watts |
| Maximum R-F Grid Current.....   | 6    | amp.  |
| Maximum D-C Grid Current.....   | 50   | ma.   |

## Typical Operation:

|                         |      |      |               |
|-------------------------|------|------|---------------|
| Filament Voltage .....  | 10   | 10   | a-c volts     |
| D-C Plate Voltage ..... | 750  | 1000 | volts         |
| D-C Grid Voltage .....  | -200 | -260 | volts         |
| D-C Plate Current ..... | 150  | 150  | ma.           |
| D-C Current† .....      | 35   | 35   | ma.           |
| Driving Power† .....    | 12   | 14   | watts         |
| Power Output .....      | 65   | 100  | approx. watts |

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

(Key-Down Conditions)

|                                 |      |       |
|---------------------------------|------|-------|
| Maximum D-C Plate Voltage.....  | 1250 | volts |
| Maximum D-C Plate Current.....  | 175  | ma.   |
| Maximum Plate Dissipation ..... | 125  | watts |
| Maximum R-F Grid Current.....   | 7.5  | amp.  |
| Maximum D-C Grid Current.....   | 50   | ma.   |

## Typical Operation:

|                         |      |      |      |               |
|-------------------------|------|------|------|---------------|
| Filament Voltage .....  | 10   | 10   | 10   | a-c volts     |
| D-C Plate Voltage ..... | 750  | 1000 | 1250 | volts         |
| D-C Grid Voltage .....  | -135 | -175 | -225 | volts         |
| D-C Plate Current ..... | 150  | 150  | 150  | ma.           |
| D-C Grid Current† ..... | 18   | 18   | 18   | ma.           |
| Driving Power† .....    | 5    | 6    | 7    | watts         |
| Power Output .....      | 65   | 100  | 130  | approx. 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.

