

# FEDERAL POWER TRIODE Type F-124-R 20 Kilowatts Plate Dissipation



## GENERAL DATA

### DESCRIPTION:

Federal's F-124-R is a three-electrode tube engineered to serve as a radio-frequency amplifier, oscillator, or as a Class B modulator. The forced-air-cooled anode is capable of dissipating 20 kilowatts. The cathode is a pure tungsten multi-strand filament and may be operated on direct current, single-phase, three-phase, or six-phase alternating current excitation. Maximum ratings apply up to 20 megacycles.

### Electrical:

|                                                           |                  |
|-----------------------------------------------------------|------------------|
| ▶ Filament Voltage§                                       | 27.2 Volts       |
| ▶ Filament Current§                                       | 205.5 Amperes    |
| ▶ Filament Starting Current§                              | 308 Amperes max. |
| ▶ Filament Cold Resistance§                               | .015 Ohms        |
| ▶ Peak Cathode Current                                    | 35 Amperes       |
| ▶ Amplification Factor,<br>$E_c = -200V \quad I_b = 1.6A$ | 40.5             |
| ▶ Interelectrode Capacitances                             |                  |
| Grid-Plate                                                | 40 $\mu\mu f$    |
| Grid-Filament                                             | 46 $\mu\mu f$    |
| Plate-Filament                                            | 5.6 $\mu\mu f$   |

§Single phase excitation.

### Mechanical:

|                                               |       |       |          |
|-----------------------------------------------|-------|-------|----------|
| ▶ Mounting Position—<br>Vertical, Anode Down  |       |       |          |
| ▶ Type of Cooling—Forced Air                  |       |       |          |
| Maximum Incoming<br>Air Temperature           |       |       | 45° C    |
| ▶ Required Air Flow on Anode                  |       |       |          |
| Plate Dissipation—<br>Kilowatts               | 20    | 16    | 12       |
| Minimum Air Flow<br>—Cubic Feet per<br>Minute | 2,100 | 1,600 | 1,200    |
| Pressure—Inches<br>Water                      | 2.15  | 1.24  | 0.70     |
| Maximum Glass<br>Temperature                  |       |       | 150° C   |
| ▶ Net Weight,<br>approximate                  |       |       | 202 Lbs. |

It's in Federal's design where efficient tube performance gets its start. It's in the tube's performance in service where Federal's authentic design reveals its merits.

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### Maximum Ratings and Typical Operating Conditions

#### AUDIO-FREQUENCY POWER AMPLIFIER AND MODULATOR—CLASS B

##### Maximum Ratings, Absolute Values

|                                  |              |
|----------------------------------|--------------|
| DC Plate Voltage                 | 20,000 Volts |
| Maximum Signal DC Plate Current† | 5 Amperes    |
| Maximum Signal Plate Input†      | 50 Kilowatts |
| Plate Dissipation†               | 20 Kilowatts |

##### Typical Operation

(Unless otherwise specified, values are for two tubes)

|                                        |              |
|----------------------------------------|--------------|
| DC Plate Voltage                       | 10,000 Volts |
| DC Grid Voltage                        | —200 Volts   |
| Peak A-F Grid-to-Grid Voltage          | 1,600 Volts  |
| Zero Signal DC Plate Current           | 0.5 Amperes  |
| Maximum Signal DC Plate Current        | 6.0 Amperes  |
| Effective Load Resist., Plate to Plate | 3,750 Ohms   |
| Max. Sig. Driving Power, approx.       | 360 Watts    |
| Max. Sig. Power Output, approx.        | 39 Kilowatts |

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

#### RADIO-FREQUENCY POWER AMPLIFIER—CLASS B

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

##### Maximum Ratings, Absolute Values

|                   |              |
|-------------------|--------------|
| DC Plate Voltage  | 20,000 Volts |
| DC Plate Current  | 3.5 Amperes  |
| Plate Input       | 30 Kilowatts |
| Plate Dissipation | 20 Kilowatts |

##### Typical Operation

|                              |              |
|------------------------------|--------------|
| DC Plate Voltage             | 17,500 Volts |
| DC Grid Voltage              | —360 Volts   |
| Peak R-F Grid Voltage        | 120 Volts    |
| DC Plate Current             | 1.68 Amperes |
| DC Grid Current, approximate | 0.00 Amperes |
| Driving Power, approximate†  | 80 Watts     |
| Power Output, approximate    | 10 Kilowatts |

†At crest of audio-frequency cycle with modulation factor of 1.0.

#### PLATE-MODULATED RADIO-FREQUENCY POWER AMPLIFIER—CLASS C TELEPHONY

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

##### Maximum Ratings, Absolute Values

|                   |              |
|-------------------|--------------|
| DC Plate Voltage  | 14,000 Volts |
| DC Grid Voltage   | —3,000 Volts |
| DC Plate Current  | 3.5 Amperes  |
| DC Grid Current   | 1.0 Amperes  |
| Plate Input       | 60 Kilowatts |
| Plate Dissipation | 15 Kilowatts |

##### Typical Operation

|                              |                |
|------------------------------|----------------|
| DC Plate Voltage             | 12,000 Volts   |
| DC Grid Voltage              | —900 Volts     |
| Peak R-F Grid Voltage        | 1,630 Volts    |
| DC Plate Current             | 2.8 Amperes    |
| DC Grid Current, approximate | 0.18 Amperes   |
| Driving Power, approximate   | 275 Watts      |
| Power Output, approximate    | 26.2 Kilowatts |

Federal's engineers are ready to consult with you on the application of Federal tubes to your designs. Write, phone or wire to arrange your conference date.

#### RADIO-FREQUENCY POWER AMPLIFIER AND OSCILLATOR—CLASS C TELEGRAPHY

(Key-down conditions per tube without amplitude modulation)†

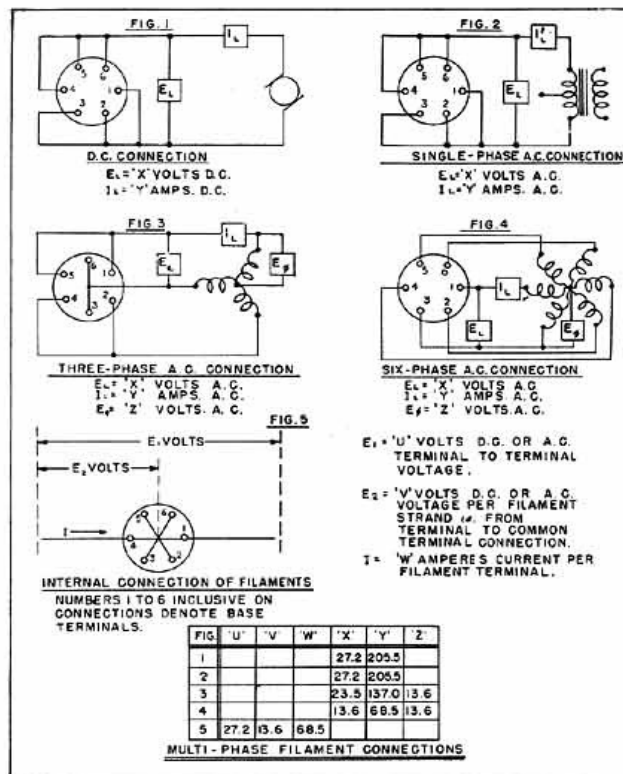
##### Maximum Ratings, Absolute Values

|                   |               |
|-------------------|---------------|
| DC Plate Voltage  | 20,000 Volts  |
| DC Grid Voltage   | —3,000 Volts  |
| DC Plate Current  | 7 Amperes     |
| DC Grid Current   | 1 Ampere      |
| Plate Input       | 100 Kilowatts |
| Plate Dissipation | 20 Kilowatts  |

##### Typical Operation

|                              |               |
|------------------------------|---------------|
| DC Plate Voltage             | 15,000 Volts  |
| DC Grid Voltage              | —1,000 Volts  |
| Peak R-F Grid Voltage        | 2,040 Amperes |
| DC Plate Current             | 4.3 Amperes   |
| DC Grid Current, approximate | 0.47 Amperes  |
| Driving Power, approximate   | 700 Watts     |
| Power Output, approximate    | 50 Kilowatts  |

†Modulation essentially negative may be used if the positive peak of the envelope does not exceed 115 per cent of carrier conditions.

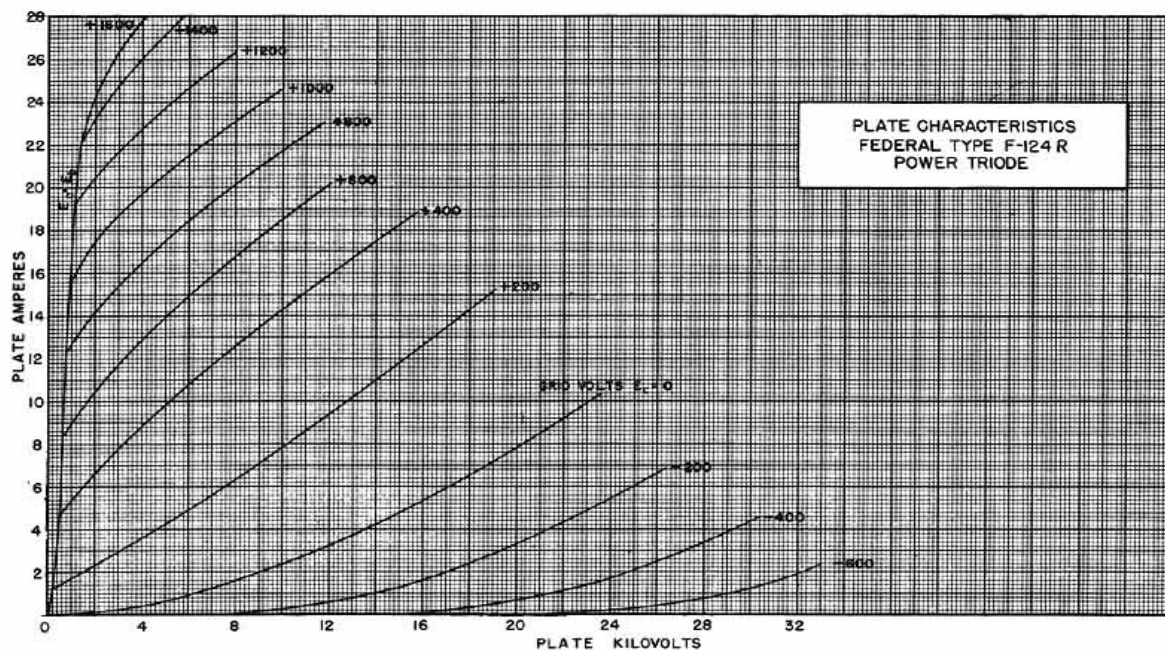
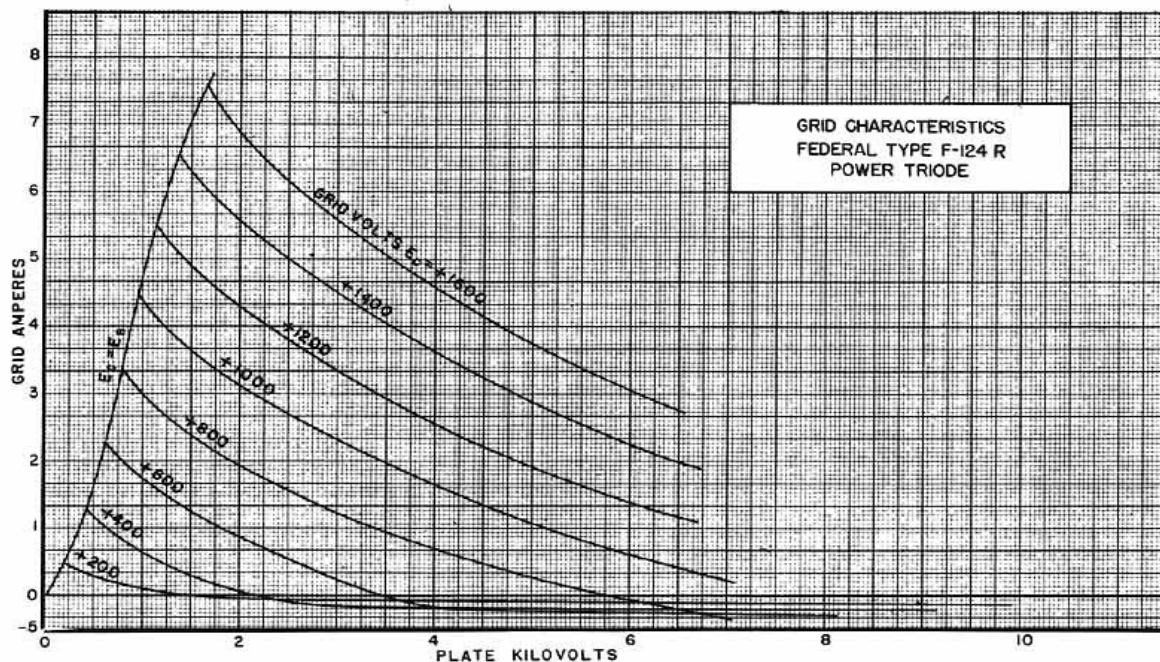


Precision craftsmanship in the manufacture of power tubes was practiced by Federal at the birth of the industry; Federal has continued the habit ever since.

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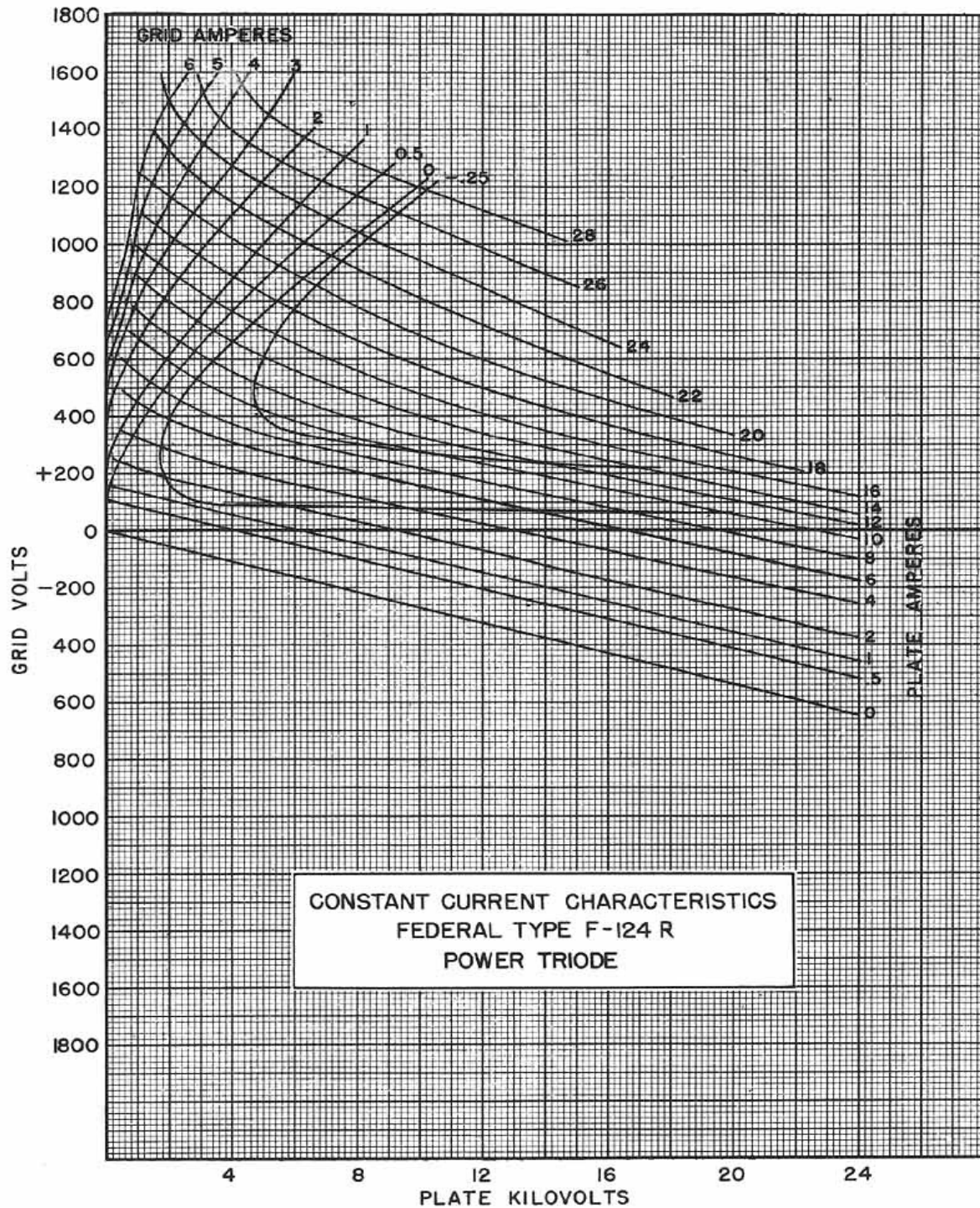


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Over and over again, Federal sales tell the factual story of Federal's tube achievements and success in unusual applications.



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