

# FEDERAL POWER TRIODE

## Type F-9C29

20 Kilowatts Plate Dissipation



### GENERAL DATA

#### DESCRIPTION:

The F-9C29 by Federal is a three-electrode tube engineered for modulator use in Class AB<sub>1</sub> circuits. The anode, forced-air-cooled, is capable of dissipating 20 kilowatts. The cathode, a thoriated tungsten multi-strand filament, may be operated on DC, 1 $\phi$ , 3 $\phi$ , or 6 $\phi$  AC excitation. Maximum ratings apply for audio-frequency use only.

#### Electrical:

|                                                                       |                   |
|-----------------------------------------------------------------------|-------------------|
| ► Filament Voltage§                                                   | 15 Volts          |
| ► Filament Current§                                                   | 135 Amperes       |
| ► Filament Starting Current§                                          | 200 Amps. max.    |
| ► Filament Cold Resistance§                                           | .019 Ohms         |
| ► Peak Cathode Current                                                | 45 Amperes        |
| ► Amplification Factor,<br>$E_c = -1600\text{ V}; I_b = 3.0\text{ A}$ | 4.75              |
| ► Interelectrode Capacitances                                         |                   |
| Grid-Plate                                                            | 50 $\mu\text{mf}$ |
| Grid-Filament                                                         | 56 $\mu\text{mf}$ |
| Plate-Filament                                                        | 20 $\mu\text{mf}$ |

§Single phase excitation.

#### Mechanical:

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

Federal's name on a tube means superior high vacuum processing, ratings commensurate with design and application, quality control of materials used in manufacture, and superior craftsmanship. Federal always has made better tubes.

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Federal's F-9C29, air-cooled version of the F-9C28, is designed for use as a modulator in conjunction with the F-9C31.

### Maximum Ratings and Typical Operating Conditions

#### AUDIO-FREQUENCY POWER AMPLIFIER AND MODULATOR—CLASS AB<sub>1</sub>

##### Maximum Ratings, Absolute Values

|                                  |              |
|----------------------------------|--------------|
| DC Plate Voltage                 | 15,000 Volts |
| Maximum Signal DC Plate Current† | 10 Amperes   |
| Maximum Signal Plate Input†      | 50 Kilowatts |
| Plate Dissipation†               | 20 Kilowatts |

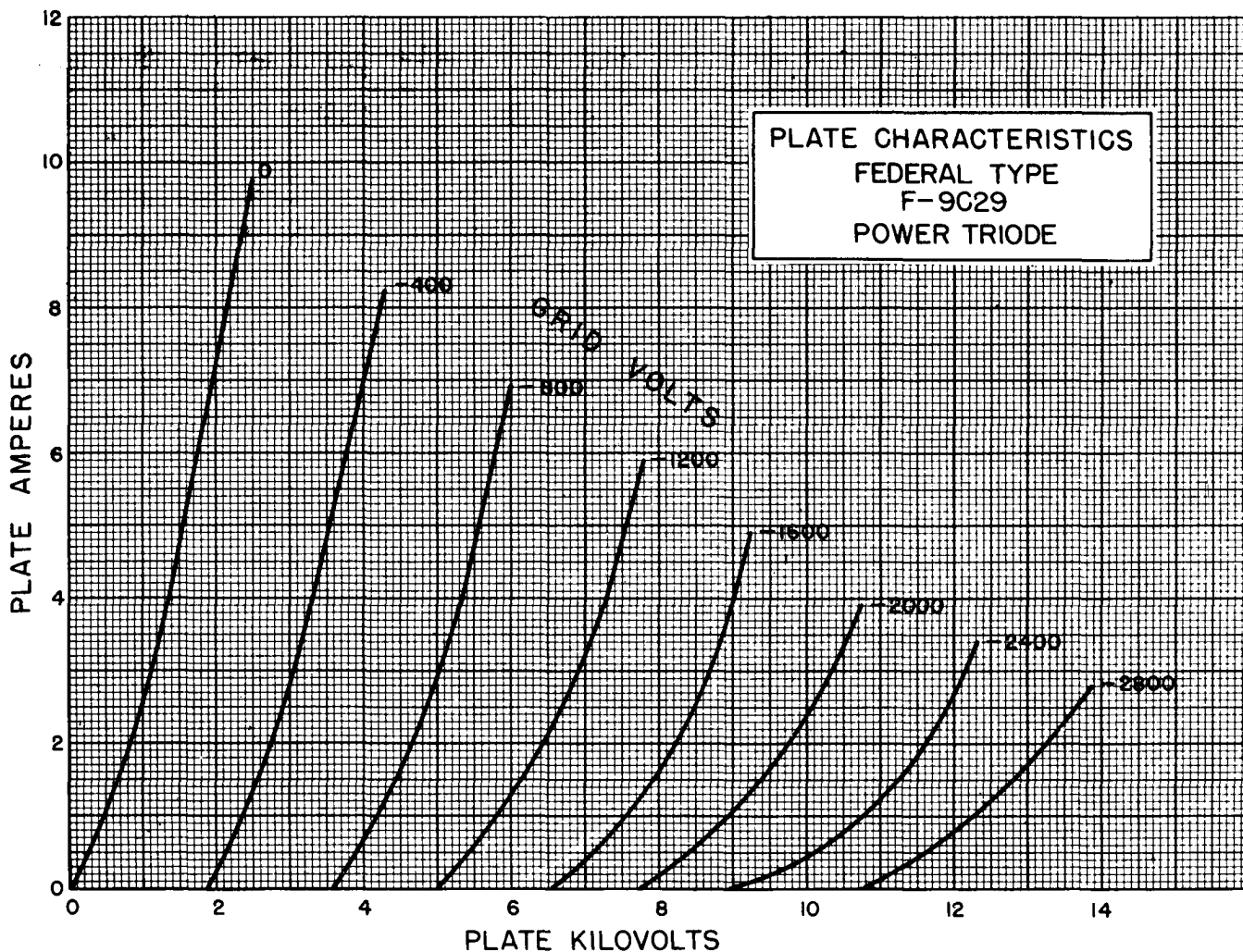
##### Typical Operation

(Unless otherwise specified, values are for two tubes)

|                  |        |              |
|------------------|--------|--------------|
| DC Plate Voltage | 10,000 | 12,000 Volts |
| DC Grid Voltage  | —2,200 | —2,600 Volts |

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

|                                           |       |              |
|-------------------------------------------|-------|--------------|
| Peak A-F Grid to Grid Voltage             | 4,380 | 5,160 Volts  |
| Zero-Signal DC Plate Current              | 1.2   | 1.4 Amperes  |
| Maximum Signal DC Plate Current           | 7.2   | 5.6 Amperes  |
| Effective Load Resistance, Plate to Plate | 2,600 | 4,500 Ohms   |
| Maximum Signal Driving Power              | 0     | 0 Watts      |
| Maximum Signal Power Output               | 39    | 39 Kilowatts |

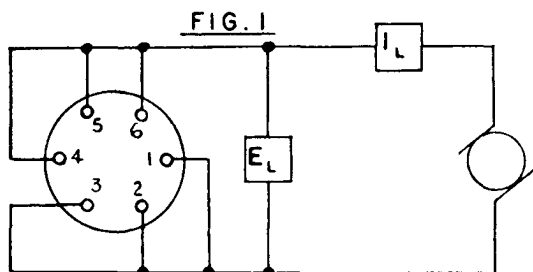


The heavy wall anode of Federal's F-9C29 means a more uniform heat distribution, a more efficient performance.

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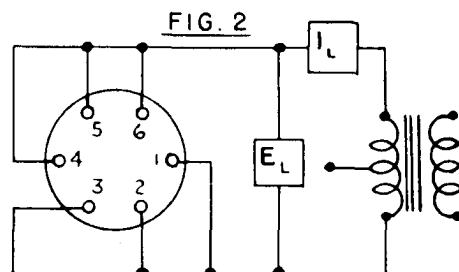
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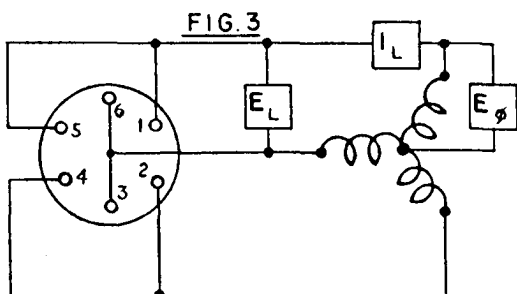
**D.C. CONNECTION**

$E_L = 'X'$  VOLTS D.C.  
 $I_L = 'Y'$  AMPS. D.C.



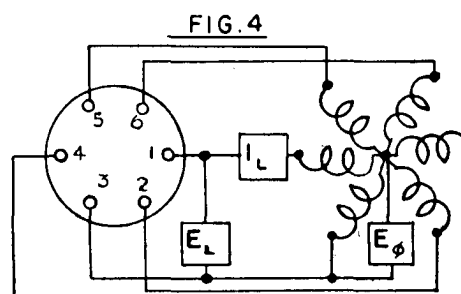
**SINGLE-PHASE A.C. CONNECTION**

$E_L = 'X'$  VOLTS A.C.  
 $I_L = 'Y'$  AMPS. A.C.



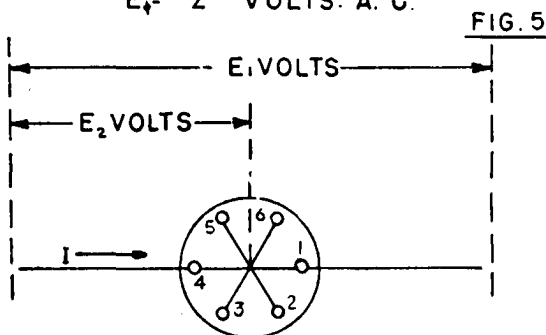
**THREE-PHASE A.C. CONNECTION**

$E_L = 'X'$  VOLTS A.C.  
 $I_L = 'Y'$  AMPS. A.C.  
 $E_\phi = 'Z'$  VOLTS A.C.



**SIX-PHASE A.C. CONNECTION**

$E_L = 'X'$  VOLTS A.C.  
 $I_L = 'Y'$  AMPS. A.C.  
 $E_\phi = 'Z'$  VOLTS A.C.



**INTERNAL CONNECTION OF FILAMENTS**

NUMBERS 1 TO 6 INCLUSIVE ON CONNECTIONS DENOTE BASE TERMINALS.

| FIG. | U  | V   | W  | X   | Y   | Z   |
|------|----|-----|----|-----|-----|-----|
| 1    |    |     |    | 15  | 135 |     |
| 2    |    |     |    | 15  | 135 |     |
| 3    |    |     |    | 13  | 90  | 7.5 |
| 4    |    |     |    | 7.5 | 45  | 7.5 |
| 5    | 15 | 7.5 | 45 |     |     |     |

**MULTI-PHASE FILAMENT CONNECTIONS**

$E_1 = 'U'$  VOLTS D.C. OR A.C.  
TERMINAL TO TERMINAL VOLTAGE.

$E_2 = 'V'$  VOLTS D.C. OR A.C.  
VOLTAGE PER FILAMENT STRAND *i.e.* FROM TERMINAL TO COMMON TERMINAL CONNECTION.

$I = 'W'$  AMPERES CURRENT PER FILAMENT TERMINAL.

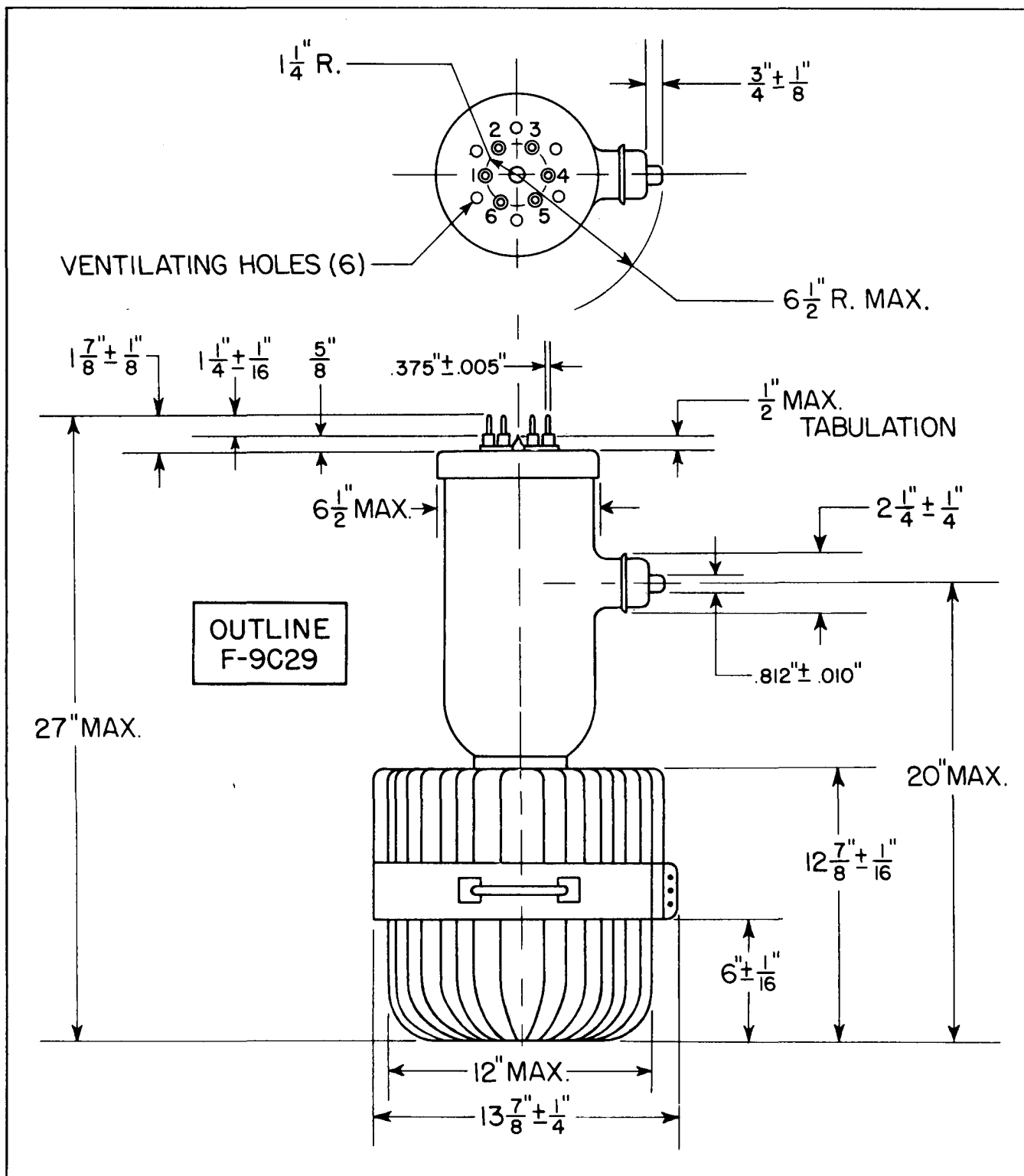
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Federal always has made tubes of the very finest quality.



Form FJ-430. Printed in U. S. A.

