

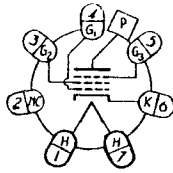
RK-23  
RK-25  
RK-25B

RAYTHEON AMATEUR TUBES

RK-23  
RK-25  
RK-25B

## PENTODE POWER AMPLIFIER OSCILLATOR

The RK-23 and the RK-25 are heater type pentode power amplifier tubes having isolantite bases. The RK-25B is similar to the RK-25 except that the base is of bakelite. These tubes are designed for use as power amplifiers, oscillators or frequency multipliers. They may also be used in circuits employing suppressor or control grid modulation.



BOTTOM VIEW OF SOCKET

### HEATER RATING

|                |        |     |       |
|----------------|--------|-----|-------|
| Heater Voltage | RK-23  | 2.5 | volts |
| Heater Current | RK-23  | 2   | amp   |
|                | RK-25B | 0.9 |       |

### DIRECT INTERELECTRODE CAPACITANCES

|               |     |    |
|---------------|-----|----|
| Grid to Plate | 0.2 | μf |
| Input         | 10  | μf |
| Output        | 10  | μf |

### R-F POWER AMP. OR OSC.—CLASS C

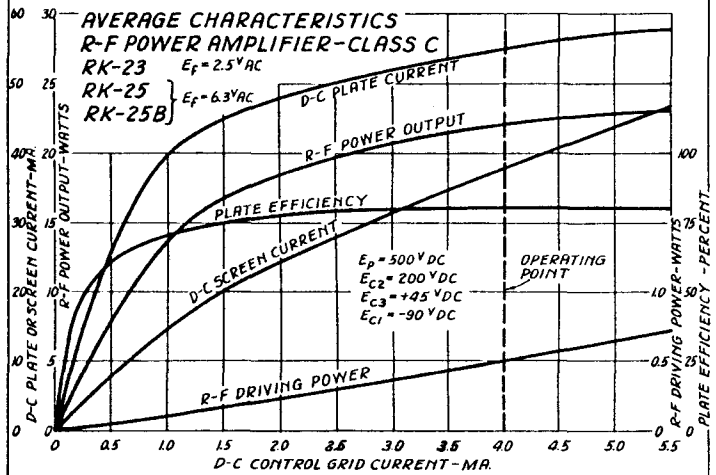
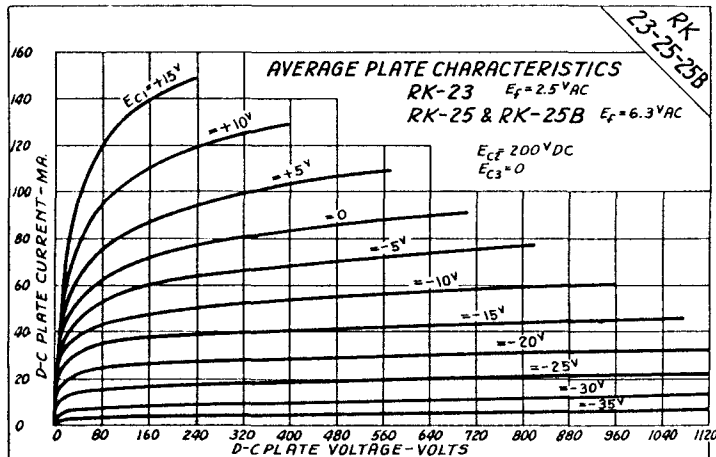
| MAXIMUM RATINGS                   |     |       |  |
|-----------------------------------|-----|-------|--|
| D-C Plate Voltage—Telephony       | 500 | volts |  |
| D-C Plate Voltage—Telephony       | 500 | volts |  |
| With Con. or Sup. Grid Modulation | 400 | volts |  |
| With Plate & Screen Modulation    | 250 | volts |  |
| D-C Screen Voltage                | 60  | ma    |  |
| D-C Plate Current                 | 10  | ma    |  |
| D-C Control Grid Current          | 10  | ma    |  |
| Plate Dissipation                 | 8   | watts |  |
| Screen Dissipation                | 8   | watts |  |

|                       | Telephony Control Grid Modulation | Telephony Suppressor Grid Modulation | Telephony Plate & Screen Modulation | Telephony |       |
|-----------------------|-----------------------------------|--------------------------------------|-------------------------------------|-----------|-------|
| D-C Plate Voltage     | 500                               | 500                                  | 400                                 | 500       | volts |
| D-C Screen Voltage    | 200                               | 200                                  | 150                                 | 200       | volts |
| D-C Sup. Grid Voltage | 0                                 | +45                                  | -45                                 | 0         | volts |
| D-C Con. Grid Volt.   | -125                              | -125                                 | -90                                 | -90       | volts |
| D-C Plate Current     | 32                                | 34                                   | 31                                  | 50        | ma    |
| D-C Screen Current    | 20                                | 20                                   | 39                                  | 40        | ma    |
| D-C Con. Grid Current | 1.5                               | 1.5                                  | 4                                   | 4         | ma    |
| Screen Resistor       | —                                 | —                                    | 8300†                               | —         | ohms  |
| Peak R-F Input Volt.  | 150                               | 150                                  | 135                                 | 135       | volts |
| R-F Driving Power     | 1.2*                              | 1.3*                                 | 0.5                                 | 0.5       | watts |
| Carrier Power Output  | 5.5                               | 6.5                                  | 6                                   | 13.5      | watts |
| Peak A-F Volt.—Plate  | —                                 | —                                    | —                                   | 400*      | volts |
| Peak A-F Volt.—Grid   | 45*                               | 45*                                  | 75*                                 | 150*      | volts |
| A-F Modulating Power  | 0.5*                              | 0.55*                                | 0.3*                                | 14.5      | watts |
| Peak Power Output     | 22*                               | 26*                                  | 24*                                 | 54*       | watts |

### TYPICAL OPERATION

|                       | Telephony Control Grid Modulation | Telephony Suppressor Grid Modulation | Telephony Plate & Screen Modulation | Telephony |       |
|-----------------------|-----------------------------------|--------------------------------------|-------------------------------------|-----------|-------|
| D-C Plate Voltage     | 500                               | 500                                  | 400                                 | 500       | volts |
| D-C Screen Voltage    | 200                               | 200                                  | 150                                 | 200       | volts |
| D-C Sup. Grid Voltage | 0                                 | +45                                  | -45                                 | 0         | volts |
| D-C Con. Grid Volt.   | -125                              | -125                                 | -90                                 | -90       | volts |
| D-C Plate Current     | 32                                | 34                                   | 31                                  | 50        | ma    |
| D-C Screen Current    | 20                                | 20                                   | 39                                  | 40        | ma    |
| D-C Con. Grid Current | 1.5                               | 1.5                                  | 4                                   | 4         | ma    |
| Screen Resistor       | —                                 | —                                    | 8300†                               | —         | ohms  |
| Peak R-F Input Volt.  | 150                               | 150                                  | 135                                 | 135       | volts |
| R-F Driving Power     | 1.2*                              | 1.3*                                 | 0.5                                 | 0.5       | watts |
| Carrier Power Output  | 5.5                               | 6.5                                  | 6                                   | 13.5      | watts |
| Peak A-F Volt.—Plate  | —                                 | —                                    | —                                   | 400*      | volts |
| Peak A-F Volt.—Grid   | 45*                               | 45*                                  | 75*                                 | 150*      | volts |
| A-F Modulating Power  | 0.5*                              | 0.55*                                | 0.3*                                | 14.5      | watts |
| Peak Power Output     | 22*                               | 26*                                  | 24*                                 | 54*       | watts |

\*At the peak of the a-f cycle with 100% modulation.  
†Connected to plate end of modulation trans. and by-passed for r.f. only.



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

### MAXIMUM RATINGS

|                              |     |       |
|------------------------------|-----|-------|
| D-C Plate Voltage            | 500 | volts |
| D-C Screen Voltage           | 250 | volts |
| D-C Plate Current (Carrier)  | 35  | ma    |
| Plate Dissipation (Carrier)  | 10  | watts |
| Screen Dissipation (Carrier) | 8   | watts |

### TYPICAL OPERATION

|                             |       |       |
|-----------------------------|-------|-------|
| D-C Plate Voltage           | 500   | volts |
| D-C Screen Voltage          | 200   | volts |
| D-C Suppressor Grid Voltage | 0     | volts |
| D-C Control Grid Voltage    | -38   | volts |
| D-C Plate Current           | 30    | ma    |
| D-C Screen Current          | 12    | ma    |
| Peak R-F Input Voltage      | 80 *  | volts |
| R-F Driving Power           | 0.24* | watts |
| Carrier Power Output        | 5     | watts |
| Peak Power Output           | 20 *  | watts |

\*At the peak of the a-f cycle with 100% modulation.

### OPERATING NOTES

#### FREQUENCY RANGE

The RK-23, RK-25 and RK-25B may be operated at the maximum ratings at frequencies up to 30 megacycles. Above 30 megacycles the reduced efficiency realized requires that the plate voltage be lowered to prevent the plate dissipation from exceeding the maximum rated value.

#### EXCITATION

The Class C amplifier characteristic curves show the power output, plate current and screen current plotted vs. excitation as denoted by the d-c control grid current in milliamperes. The power output flattens off around 4 or 5 ma. of grid current with very little gained beyond these values. The screen dissipation increases with excitation and for this reason the excitation should be kept at a reasonable value.

#### SCREEN VOLTAGE

The screen voltage may be obtained either from a separate source or through a dropping resistor from the plate supply. The screen should always be bypassed to the cathode for r.f.

#### SHIELDING

Shielding of the grid input tuning system from the plate tuning apparatus is desirable and will provide improved stability. If a shield is applied to the RK-23, RK-25 or RK-25B, it should enclose the base and extend to the lower internal shield and should clear the glass bulb by at least 1/16".

#### Bias

At least 25 volts of fixed bias should be used with 500 volts on the plate to protect the tube in case of failure of the bias or excitation. Additional bias may be obtained by the use of a grid or cathode resistor.

#### CRYSTAL OSCILLATOR

Using crystal control, 20 watts of r-f power output may be obtained without overheating the crystal.

#### PLATE TEMPERATURE

The plate of the RK-23, RK-25 or RK-25B will not show color when operated at the rated plate dissipation. Dissipations above the rated value should be avoided.

