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# 6156/4-250A

## BEAM POWER TUBE

FORCED-AIR COOLED

Useful with full input up to 75 Mc  
and with reduced input up to 120 Mc

### GENERAL DATA

#### Electrical:

Filament, Thoriated Tungsten:

Voltage. . . . . 5.0 . . . . . ac or dc volts

Current at 5.0 volts . . . 14.1 . . . . . amp

Mu-Factor, Grid No.2 to Grid No.1

for plate volts = 3000, grid-No.2

volts = 500, and plate ma. = 100 . . . . . 5.1

Direct Interelectrode Capacitances:

Grid No.1 to plate . . . . . 0.14 max.  $\mu\text{f}$ Grid No.1 to filament and grid No.2. . . . . 13  $\mu\text{f}$ Plate to filament and grid No.2. . . . . 4.6  $\mu\text{f}$ 

#### Mechanical:

Operating Position . . . . . Vertical, base down or up

Maximum Overall Length . . . . . 5-29/32"

Seated Length. . . . . 5"  $\pm$  1/4"

Maximum Diameter . . . . . 3-7/16"

Weight (Approx.) . . . . . 6 oz

Cap. . . . . Small

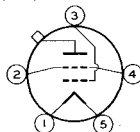
Base . . . . . Special-Button Giant 5-Pin

Basing Designation for BOTTOM VIEW . . . . . 5BK

Pin 1-Filament

Pin 2-Grid No.2

Pin 3-Grid No.1

Pin 4-Grid No.2,  
Internal  
ShieldPin 5-Filament  
Cap-Plate

Forced-Air Cooling . . . . . 5 cfm

Under any condition of operation, adequate cooling of the bulb must be provided to limit the seal temperatures to their specified maximum values. At frequencies above 30 Mc, special attention should be given to adequate cooling of the bulb and seals. The use of a heat-radiating plate connector is recommended.

Seal Temperature:

Plate. . . . . 220 max.  $^{\circ}\text{C}$ Grid No.2, grid No.1, and filament . . . 180 max.  $^{\circ}\text{C}$ 

### AF POWER AMPLIFIER & MODULATOR — Class AB<sub>1</sub>

Maximum CCS\* Ratings, Absolute Values:

DC PLATE VOLTAGE . . . . . 4000 max. volts

DC GRID-No.2 (SCREEN-GRID) VOLTAGE . . . . . 600 max. volts

DC GRID-No.1 (CONTROL-GRID) VOLTAGE. . . . . -500 max. volts

\* : See next page.



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|                               |          |       |
|-------------------------------|----------|-------|
| MAX.-SIGNAL DC PLATE CURRENT* | 350 max. | ma    |
| MAX.-SIGNAL PLATE INPUT*      | 750 max. | watts |
| MAX.-SIGNAL GRID-No.2 INPUT*  | 35 max.  | watts |
| PLATE DISSIPATION*            | 250 max. | watts |

## Typical CCS Operation:

*Values are for 2 tubes*

|                                            |       |       |       |       |       |
|--------------------------------------------|-------|-------|-------|-------|-------|
| DC Plate Voltage                           | 1500  | 2000  | 2500  | 3000  | volts |
| DC Grid-No.2 Voltage <sup>□</sup>          | 500   | 500   | 500   | 500   | volts |
| DC Grid-No.1 Voltage <sup>▲</sup>          | -85   | -88   | -91   | -94   | volts |
| Peak AF Grid-No.1-to-Grid-No.1 Voltage     | 167   | 173   | 178   | 184   | volts |
| Zero-Signal DC Plate Current               | 100   | 100   | 100   | 100   | ma    |
| Max.-Signal DC Plate Current               | 300   | 300   | 310   | 310   | ma    |
| Effective Load Resistance (Plate to plate) | 10000 | 14500 | 18000 | 22000 | ohms  |
| Max.-Signal Driving Power                  | 0     | 0     | 0     | 0     | watts |
| Max.-Signal Power Output (Approx.)         | 265   | 390   | 510   | 635   | watts |

AF POWER AMPLIFIER & MODULATOR — Class AB<sub>2</sub><sup>‡</sup>

## Maximum CCS\* Ratings, Absolute Values:

|                                     |           |       |
|-------------------------------------|-----------|-------|
| DC PLATE VOLTAGE                    | 4000 max. | volts |
| DC GRID-No.2 (SCREEN-GRID) VOLTAGE  | 600 max.  | volts |
| DC GRID-No.1 (CONTROL-GRID) VOLTAGE | -500 max. | volts |
| MAX.-SIGNAL DC PLATE CURRENT*       | 350 max.  | ma    |
| MAX.-SIGNAL PLATE INPUT*            | 1000 max. | watts |
| MAX.-SIGNAL GRID-No.2 INPUT*        | 35 max.   | watts |
| PLATE DISSIPATION*                  | 250 max.  | watts |

## Typical CCS Operation:

*Values are for 2 tubes*

|                                                   |      |      |      |       |       |
|---------------------------------------------------|------|------|------|-------|-------|
| DC Plate Voltage                                  | 1500 | 2000 | 2500 | 3000  | volts |
| DC Grid-No.2 Voltage <sup>□</sup>                 | 300  | 300  | 300  | 300   | volts |
| DC Grid-No.1 Voltage <sup>**</sup>                | -45  | -49  | -51  | -55   | volts |
| Peak AF Grid-No.1-to-Grid-No.1 Voltage            | 323  | 328  | 306  | 280   | volts |
| Zero-Signal DC Plate Current                      | 100  | 100  | 100  | 100   | ma    |
| Max.-Signal DC Plate Current                      | 694  | 694  | 624  | 550   | ma    |
| Zero-Signal DC Grid-No.2 Current                  | 0    | 0    | 0    | 0     | ma    |
| Max.-Signal DC Grid-No.2 Current                  | 116  | 110  | 88   | 69    | ma    |
| Effective Load Resistance (Plate to plate)        | 4550 | 6600 | 9200 | 14000 | ohms  |
| Max.-Signal Driving Power (Approx.) <sup>oo</sup> | 8    | 8    | 5.8  | 3.8   | watts |
| Max.-Signal Power Output (Approx.)                | 660  | 975  | 1140 | 1240  | watts |

↓, ●, \*, □, ▲, ‡, \*\*, oo: See next page.



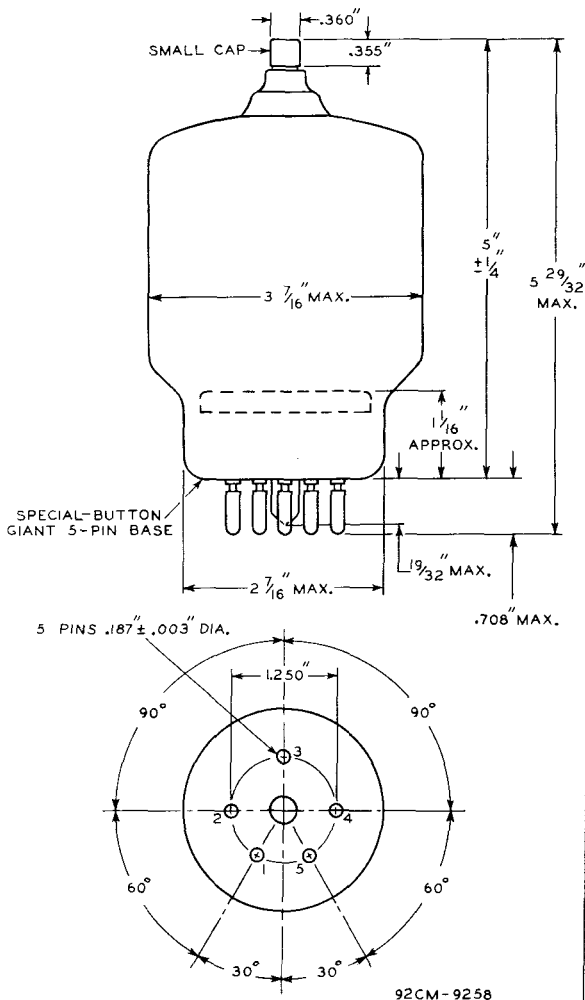
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## BEAM POWER TUBE

| MAXIMUM RATINGS vs OPERATING FREQUENCY                                         |     |     |     |    |
|--------------------------------------------------------------------------------|-----|-----|-----|----|
| FREQUENCY                                                                      | 75  | 100 | 120 | Mc |
| MAX.—PERMISSIBLE PERCENTAGE OF<br>MAX.—RATED PLATE VOLTAGE AND<br>PLATE INPUT: |     |     |     |    |
| Class B telephony                                                              | 100 | 80  | 60  | %  |
| Class C telephony                                                              | 100 | 80  | 60  | %  |
| Class C telegraphy                                                             | 100 | 80  | 60  | %  |

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## RF POWER AMPLIFIER — Class B Telephony

*Carrier conditions per tube for use with a max. modulation factor of 1.0*

## Maximum CCS\* Ratings, Absolute Values:

|                                              |           |       |
|----------------------------------------------|-----------|-------|
| DC PLATE VOLTAGE . . . . .                   | 4000 max. | volts |
| DC GRID-No.2 (SCREEN-GRID) VOLTAGE . . . . . | 600 max.  | volts |
| DC PLATE CURRENT . . . . .                   | 210 max.  | ma    |
| PLATE INPUT . . . . .                        | 400 max.  | watts |
| GRID-No.2 INPUT . . . . .                    | 23 max.   | watts |
| PLATE DISSIPATION . . . . .                  | 250 max.  | watts |

## Typical CCS Operation:

|                                               |      |      |      |       |
|-----------------------------------------------|------|------|------|-------|
| DC Plate Voltage . . . . .                    | 2500 | 3500 | 4000 | volts |
| DC Grid-No.2 Voltage . . . . .                | 500  | 500  | 500  | volts |
| DC Grid-No.1 (Control-Grid) Voltage . . . . . | -84  | -90  | -100 | volts |
| Peak RF Grid-No.1 Voltage . . . . .           | 66   | 61   | 55.5 | volts |
| DC Plate Current . . . . .                    | 150  | 125  | 94   | ma    |
| DC Grid-No.2 Current . . . . .                | 0    | 0    | 0    | ma    |
| DC Grid-No.1 Current (Approx.) . . . . .      | 0    | 0    | 0    | ma    |
| Driving Power (Approx.)* . . . . .            | 0.75 | 0.25 | 0.06 | watt  |
| Power Output (Approx.) . . . . .              | 125  | 125  | 126  | watts |

## PLATE-MODULATED RF POWER AMPLIFIER — Class C Telephony

*Carrier conditions per tube for use with a max. modulation factor of 1.0*

## Maximum CCS\* Ratings, Absolute Values:

|                                               |           |       |
|-----------------------------------------------|-----------|-------|
| DC PLATE VOLTAGE . . . . .                    | 3200 max. | volts |
| DC GRID-No.2 (SCREEN-GRID) VOLTAGE . . . . .  | 600 max.  | volts |
| DC GRID-No.1 (CONTROL-GRID) VOLTAGE . . . . . | -500 max. | volts |
| DC PLATE CURRENT . . . . .                    | 275 max.  | ma    |
| DC GRID-No.1 CURRENT . . . . .                | 20 max.   | ma    |
| PLATE INPUT . . . . .                         | 825 max.  | watts |
| GRID-No.2 INPUT . . . . .                     | 35 max.   | watts |
| PLATE DISSIPATION . . . . .                   | 165 max.  | watts |

## Typical CCS Operation:

|                                                              |      |      |       |
|--------------------------------------------------------------|------|------|-------|
| DC Plate Voltage . . . . .                                   | 2500 | 3000 | volts |
| DC Grid-No.2 Voltage† . . . . .                              | 400  | 400  | volts |
| DC Grid-No.1 Voltage . . . . .                               | -200 | -310 | volts |
| Peak AF Grid-No.2 Voltage<br>(For 100% modulation) . . . . . | 350  | 350  | volts |
| Peak RF Grid-No.1 Voltage . . . . .                          | 326  | 484  | volts |
| DC Plate Current . . . . .                                   | 200  | 225  | ma    |
| DC Grid-No.2 Current . . . . .                               | 30   | 30   | ma    |
| DC Grid-No.1 Current (Approx.) . . . . .                     | 9    | 9    | ma    |
| Driving Power (Approx.) . . . . .                            | 3    | 4.4  | watts |
| Power Output (Approx.) . . . . .                             | 375  | 510  | watts |

♣, ●, \*, □, ▲, ♣, \*\*, ∞, ★, †: See next page.



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## BEAM POWER TUBE

RF POWER AMPLIFIER & OSCILLATOR — Class C Telephony♦  
and

RF POWER AMPLIFIER — Class C FM Telephony

## Maximum CCS\* Ratings, Absolute Values:

|                                              |           |       |
|----------------------------------------------|-----------|-------|
| DC PLATE VOLTAGE . . . . .                   | 4000 max. | volts |
| DC GRID-No.2 (SCREEN-GRID) VOLTAGE . . . . . | 600 max.  | volts |
| DC GRID-No.1 (CONTROL-GRID) VOLTAGE. . . . . | -500 max. | volts |
| DC PLATE CURRENT . . . . .                   | 350 max.  | ma    |
| DC GRID-No.1 CURRENT . . . . .               | 20 max.   | ma    |
| PLATE INPUT. . . . .                         | 1250 max. | watts |
| GRID-No.2 INPUT. . . . .                     | 35 max.   | watts |
| PLATE DISSIPATION. . . . .                   | 250 max.  | watts |

## Typical CCS Operation:

|                                          |      |      |      |       |
|------------------------------------------|------|------|------|-------|
| DC Plate Voltage . . . . .               | 2500 | 3000 | 4000 | volts |
| DC Grid-No.2 Voltage . . . . .           | 500  | 500  | 500  | volts |
| DC Grid-No.1 Voltage . . . . .           | -150 | -180 | -225 | volts |
| Peak RF Grid-No.1 Voltage. . . . .       | 264  | 327  | 374  | volts |
| DC Plate Current . . . . .               | 300  | 345  | 312  | ma    |
| DC Grid-No.2 Current . . . . .           | 60   | 60   | 45   | ma    |
| DC Grid-No.1 Current (Approx.) . . . . . | 9    | 10   | 9    | ma    |
| Driving Power (Approx.) . . . . .        | 2.4  | 3.3  | 3.4  | watts |
| Power Output (Approx.) . . . . .         | 575  | 800  | 1000 | watts |

♦ Subscript 1 indicates that grid-No.1 current does not flow during any part of the input cycle.

• Continuous commercial service.

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

□ Obtained from a fixed supply.

▲ Total effective grid-No.1-circuit resistance should not exceed 0.25 megohm.

⊕ Subscript 2 indicates that grid-No.1 current flows during some part of input cycle.

\*\* Obtained from fixed supply having a dc resistance not exceeding 250 ohms.

○○ Driver stage should be capable of supplying the No.1 grids of the class AB<sub>2</sub> stage with the specified driving power at low distortion. The effective resistance per grid-No.1 circuit of the AB<sub>2</sub> stage should be held at a low value.

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

† Obtained preferably from a separate source modulated along with the plate supply, or from the modulated plate supply through a series resistor.

♦ Key-down conditions per tube without amplitude modulation. Amplitude modulation essentially negative may be used if the positive peak of the audio-frequency envelope does not exceed 115% of the carrier conditions.



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## AVERAGE CONSTANT-CURRENT CHARACTERISTICS

