



TECHNICAL DATA

RADIAL BEAM  
POWER PENTODE

The EIMAC 264/8576 is a ceramic/metal, forced-air cooled, radial beam pentode with a rated maximum plate dissipation of 3000 watts. The tube has very low input capacitance for its power-handling capability. It is well suited for use in broad-band linear amplifiers or in other high-performance Class AB<sub>1</sub> amplifier applications.

GENERAL CHARACTERISTICS<sup>1</sup>

ELECTRICAL

Cathode: Oxide Coated, Unipotential

|                             |             |
|-----------------------------|-------------|
| Heater: Voltage .....       | 6.0 ± 0.3 V |
| Current, at 6.0 volts ..... | 17 A        |

Transconductance (Average):

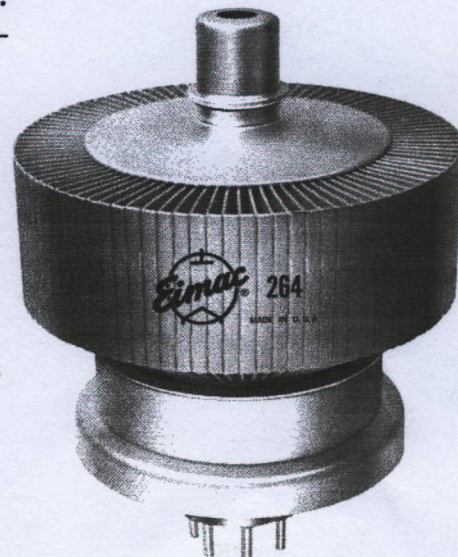
|   |              |
|---|--------------|
| I <sub>b</sub> = 2.0 Adc, E <sub>C2</sub> = 750 Vdc ..... | 37,000 μmhos |
|---|--------------|

Direct Interelectrode Capacitances (grounded cathode)<sup>2</sup>

|                |         |
|----------------|---------|
| Input .....    | 55 pF   |
| Output .....   | 18 pF   |
| Feedback ..... | 0.13 pF |

Frequency of Maximum Rating:

|          |        |
|----------|--------|
| CW ..... | 30 MHz |
|----------|--------|



1. Characteristics and operating values are based upon performance tests. These figures may change without notice as the result of additional data or product refinement. EIMAC Division of Varian should be consulted before using this information for final equipment design.

2. Capacitance values are for a cold tube as measured in a special shielded fixture.

MECHANICAL

Maximum Overall Dimensions:

|                |                     |
|----------------|---------------------|
| Length .....   | 6.188 in; 157.18 mm |
| Diameter ..... | 4.438 in; 112.73 mm |

Net Weight ..... 3.9 lb; 1.77 kg

Operating Position ..... Any

Maximum Operating Temperature:

|                           |        |
|---------------------------|--------|
| Ceramic/Metal Seals ..... | 250 °C |
| Anode Core .....          | 250 °C |

Cooling ..... Forced Air

Base ..... 7-Pin Special

Recommended Air-System Socket ..... EIMAC SK-265A

Recommended Air Chimney (included with SK-265A) ..... EIMAC C-265



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**RADIO FREQUENCY LINEAR AMPLIFIER  
GRID DRIVEN**  
Class AB<sub>1</sub>

MAXIMUM RATINGS:

|                                 |             |
|---------------------------------|-------------|
| DC PLATE VOLTAGE . . . . .      | 5000 VOLTS  |
| DC SUPPRESSOR VOLTAGE . . . . . | 100 VOLTS   |
| DC SCREEN VOLTAGE . . . . .     | 1000 VOLTS  |
| DC GRID VOLTAGE . . . . .       | -250 VOLTS  |
| DC PLATE CURRENT . . . . .      | 2.0 AMPERES |
| PLATE DISSIPATION . . . . .     | 3000 WATTS  |
| SCREEN DISSIPATION . . . . .    | 50 WATTS    |
| GRID DISSIPATION . . . . .      | 2 WATTS     |

1. Adjust to specified zero-signal dc plate current.
2. Except for brief tuneup periods, operation under single tone conditions may not be possible due to excessive screen current.
3. The intermodulation distortion products will be as specified or better for all levels from zero-signal to maximum output power and are referenced against one tone of a two equal tone signal. No degenerative feedback.

TYPICAL OPERATION (Frequencies to 30 MHz)  
Class AB<sub>1</sub>, Grid Driven, Peak Envelope or Modulation  
Crest Conditions

|   |      |      |      |      |
|---|------|------|------|------|
| Plate Voltage . . . . .                             | 4000 | 5000 | 5000 | Vdc  |
| Suppressor Voltage . . . . .                        | 0    | 0    | 0    | Vdc  |
| Screen Voltage . . . . .                            | 650  | 650  | 750  | Vdc  |
| Grid Voltage <sup>1</sup> . . . . .                 | -92  | -93  | -109 | Vdc  |
| Zero-Signal Plate Current . . . . .                 | 400  | 400  | 400  | mAdc |
| Single-Tone Plate Current . . . . .                 | 1.43 | 1.36 | 1.69 | Adc  |
| Two-Tone Plate Current . . . . .                    | 0.95 | 0.91 | 1.09 | Adc  |
| Zero-Signal Screen Current <sup>4</sup> . . . . .   | 7    | 6    | 7    | mAdc |
| Single-Tone Screen Current <sup>2,4</sup> . . . . . | 58   | 55   | 80   | mAdc |
| Two-Tone Screen Current <sup>4</sup> . . . . .      | 26   | 23   | 32   | mAdc |
| Peak rf Grid Voltage <sup>4</sup> . . . . .         | 92   | 90   | 108  | v    |
| Useful Output Power <sup>5</sup> . . . . .          | 3300 | 4400 | 5500 | W    |
| Resonant Load Impedance . . . . .                   | 1350 | 1950 | 1550 | Ω    |
| Intermodulation Distortion Products <sup>3</sup>    |      |      |      |      |
| 3rd Order . . . . .                                 | -28  | -29  | -26  | db   |
| 5th Order . . . . .                                 | -45  | -45  | -40  | db   |

4. Approximate values.
5. Actual power output delivered to the load from a typical amplifier.

**APPLICATION**

**MOUNTING** - The 264/8576 may be operated in any position, and should normally be mounted in the air-system socket EIMAC type SK-265A, with a C-265 chimney. The SK-265A has a built-in bypass capacitor for the screen grid, and the suppressor grid contacts are grounded.

**AIR SYSTEM SOCKET AND CHIMNEY** - The SK-265A socket makes all electrical contacts to the 264/8576 except to the anode. The suppressor grid contact is grounded to the socket shell. An integral screen grid bypass capacitor is included, with a capacitance of 2000 pF and rated for 1000 Vdc maximum.

The C-265 air chimney is designed to mate with the SK-265A socket and guide the cooling air through the anode cooling fins of the tube.

**COOLING** - Forced-air cooling is required in all applications, and the use of an air-system socket, such as the EIMAC SK-265A, with a C-265 chimney, is recommended. Cooling is simplified if air is directed in a base-to-anode direction; when so directed, with full rated anode dissipation and with air at 50°C at sea level, an air flow of 110 cubic feet per minute, with a resultant pressure drop of approximately 0.95 inch of water for the tube/socket/chimney combination, is sufficient to limit the maximum tube temperature to 225°C. If air is not directed in the base-to-anode direction, additional cooling may be required for the base section of the tube.

Cooling air should be supplied before or simultaneously with the application of electrode voltages, including heater, and should normally be maintained for a brief period after electrode voltages are removed to allow for tube cooldown.

**HEATER** - The rated heater voltage for the 264/8576 is 6.0 volts, as measured at the socket or tube base pins. Variations should be restricted to plus or minus 0.3 volts for long tube life and consistent performance.

**GRID OPERATION** - Grid-bias voltage must be obtained from a fixed bias supply in Class AB applications. The internal resistance of the bias source should not exceed 2500 ohms.

**SCREEN OPERATION** - In linear amplifier service, the screen voltage must be obtained from a well regulated source, to prevent excessive screen voltage variations due to changes in screen current which occur between zero-signal and full-signal conditions. The circuit should be arranged so that it is impossible to apply screen voltage without plate voltage. The use of a screen grid over-current relay is recommended, to remove screen voltage immediately in case of excessive screen current due to circuit problems, grid bias failure, or accidental removal of plate circuit loading. The relay should not break the screen-cathode d-c ground return path.

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**PLATE OPERATION** - The maximum rated plate dissipation power for the 264/8576 is 3000 watts. Except for brief periods during circuit adjustment, this maximum value should not be exceeded. Contact to the plate may be made either at the top cap or by means of a circular clamp or spring-finger collet around the outer surface of the anode cooler itself. Points of electrical contact with the anode should be kept clean and free of oxide to minimize rf loss. The anode cooler should be inspected periodically and cleaned when necessary to remove any dirt which might interfere with effective cooling.

**GENERAL OPERATION NOTES** - A metal chassis or equivalent means should be provided to separate the input and output circuits of an rf amplifier employing the 264/8576. Reasonable precautions should be observed in regard to bypassing and shielding of supply leads to prevent coupling between input and output through external circuits. The use of the EIMAC SK-265A air-system socket, with its integral screen grid bypass capacitance built in, is helpful in these respects.

**NEUTRALIZATION FOR RF OPERATION** - For minimum-distortion Class AB1 linear amplifier service, where reaction on the driver circuit should be eliminated completely, it will usually be found advisable to neutralize the small feedback capacitance of the tube.

**SPECIAL APPLICATION** - If it is desired to operate this tube under conditions widely different from those listed here, write to Power Grid Tube Division, EIMAC Division of Varian, 301 Industrial Way, San Carlos, California 94070, for information and recommendations.

NOTE: TYPICAL OPERATION data are obtained from direct measurement or by calculation from published characteristic curves. Adjustment of the rf grid voltage to obtain the specified plate current at the specified bias, screen and plate voltages is assumed. If this procedure is followed, there will be little variation in output power when the tube is changed, even though there may be some variation in grid and screen current. The grid and screen currents which result when the desired plate current is obtained are incidental and vary from tube to tube. These current variations cause no difficulty so long as the circuit maintains the correct voltage in the presence of the variations in current.

**RANGE VALUES FOR EQUIPMENT DESIGN**

|  | <u>Min.</u> | <u>Max.</u> |
|--|-------------|-------------|
| Heater: Current at 6.0 volts . . . . .                                 | 15.5        | 18.5 A      |
| Cathode Warmup Time <sup>1</sup> . . . . .                             | 5           | --- minutes |
| Interelectrode Capacitances <sup>2</sup> (grounded cathode connection) |             |             |
| Input . . . . .  | 51.0        | 61.0 pF     |
| Output . . . . .   | 14.0        | 22.0 pF     |
| Feedback . . . . .   | ---         | 0.16 pF     |

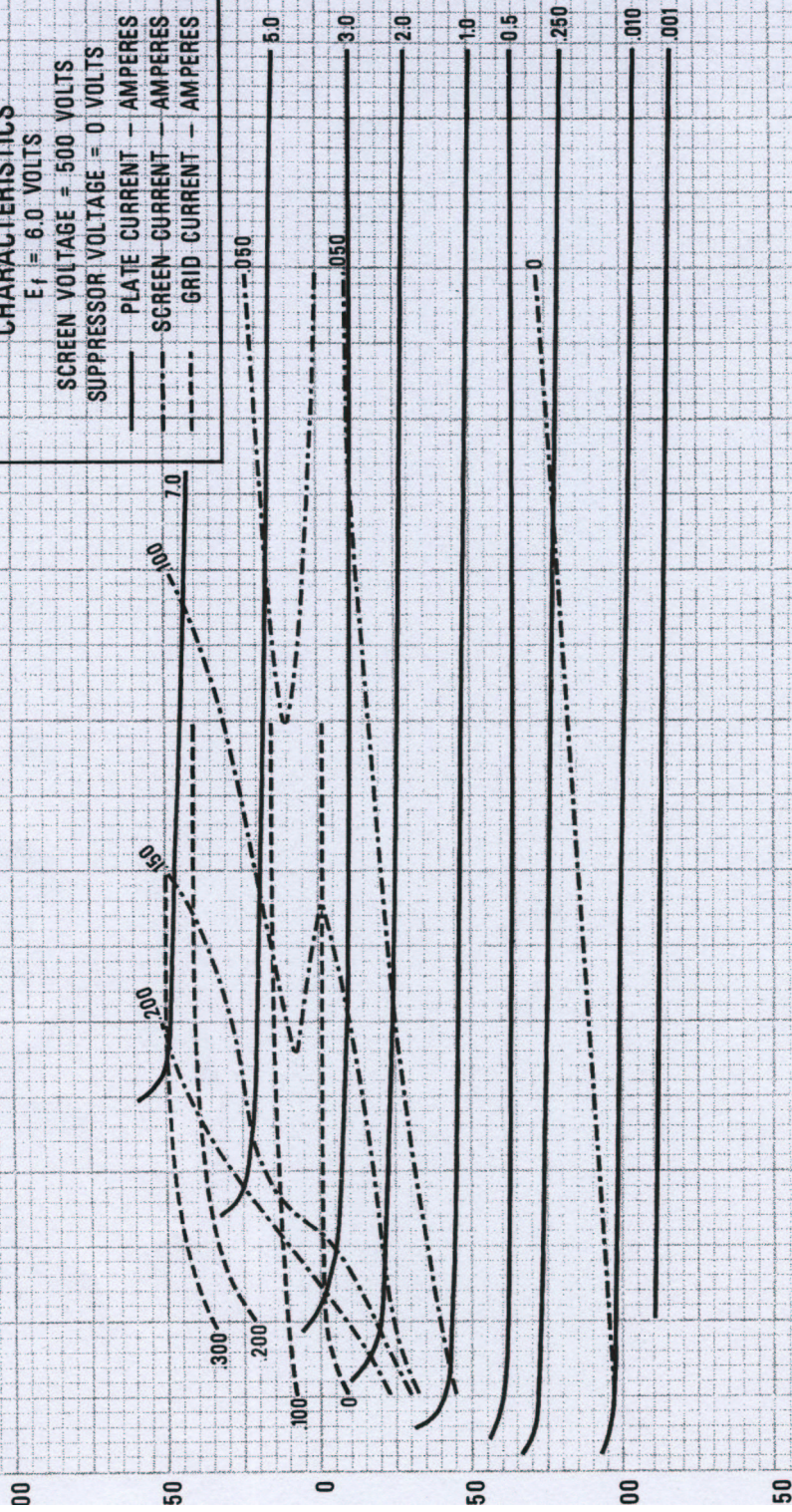
1. Heater voltage should normally be applied for the stated time before voltages are applied to the other tube elements.
2. Capacitance values are for a cold tube as measured in a special shielded fixture.

# EIMAC 264

## TYPICAL CONSTANT CURRENT CHARACTERISTICS

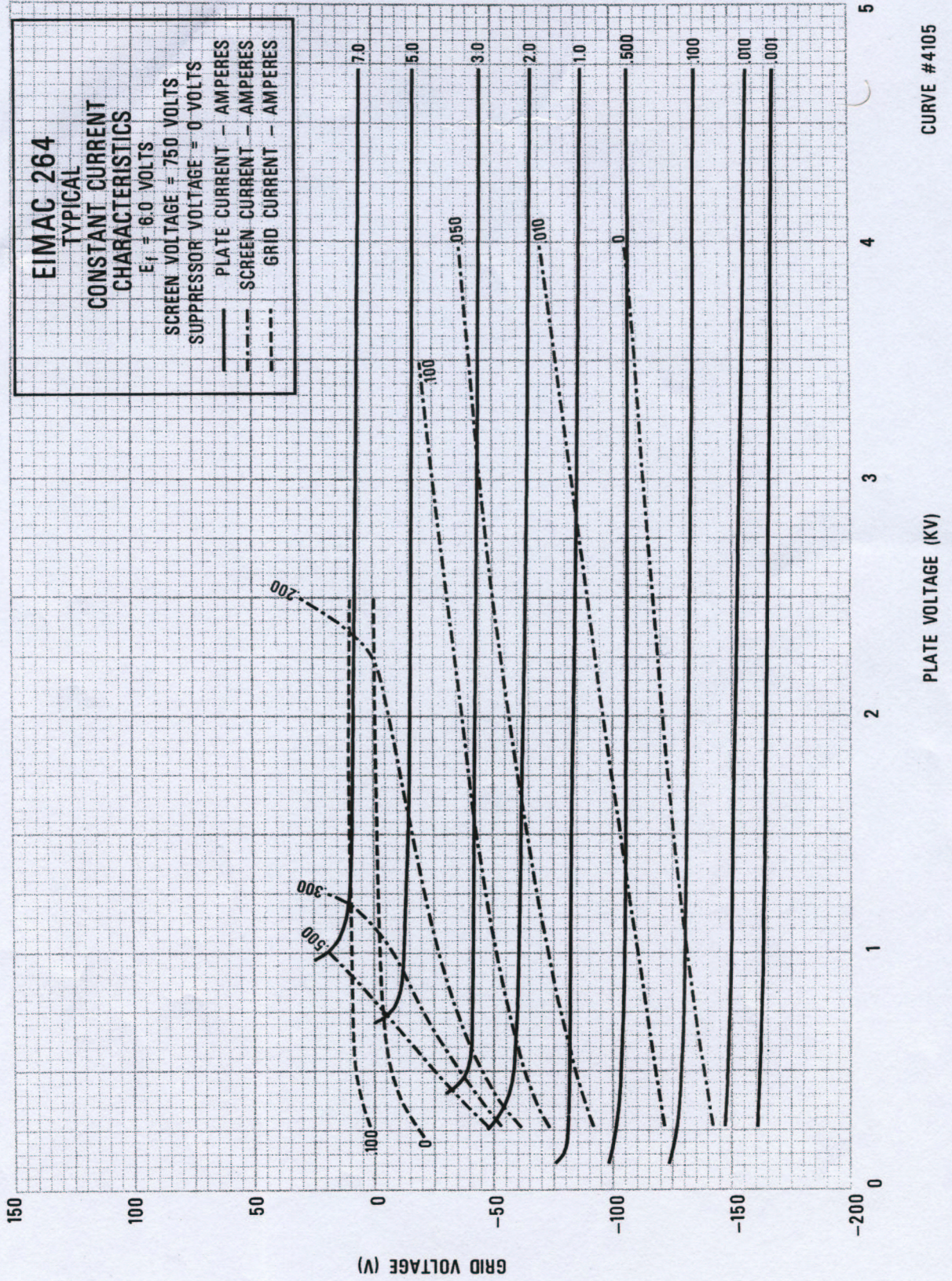
$E_f = 6.0$  VOLTS  
SCREEN VOLTAGE = 500 VOLTS  
SUPPRESSOR VOLTAGE = 0 VOLTS

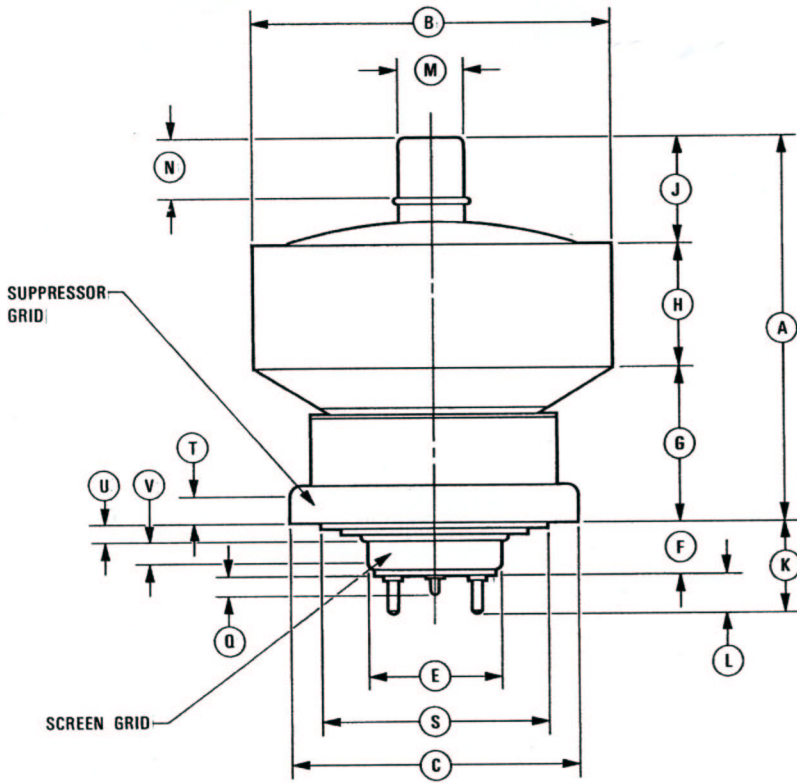
— PLATE CURRENT — AMPERES  
- - - SCREEN CURRENT — AMPERES  
- - - GRID CURRENT — AMPERES



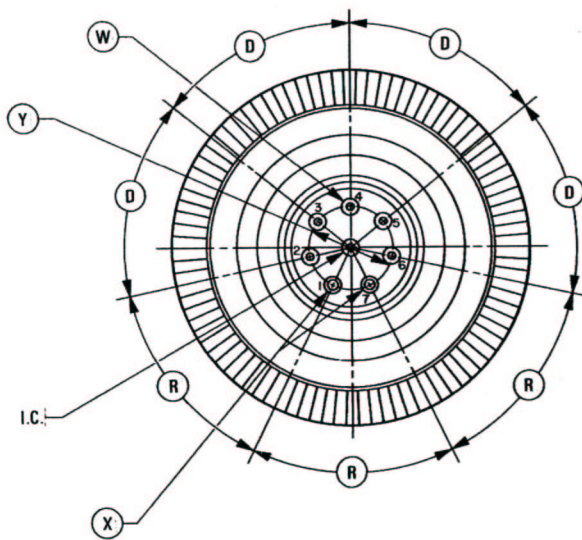


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| DIM.                 | DIMENSIONAL DATA |       |                  |        |
|----------------------|------------------|-------|------------------|--------|
|                      | INCHES           |       | MILLIMETERS      |        |
|                      | MIN.             | MAX.  | MIN.             | MAX.   |
| A                    | —                | 4.828 | —                | 122.63 |
| B                    | 4.374            | 4.438 | 111.09           | 112.72 |
| C                    | 3.484            | 3.516 | 88.49            | 89.31  |
| E                    | 1.615            | 1.630 | 41.02            | 41.40  |
| F                    | 0.625            | 0.750 | 15.87            | 19.05  |
| G                    | 1.813            | 1.937 | 46.05            | 49.20  |
| H                    | 1.530            | 1.560 | 38.86            | 39.62  |
| J                    | 1.219            | 1.343 | 30.96            | 34.11  |
| K                    | 1.160            | 1.360 | 29.46            | 34.54  |
| L                    | 0.540            | 0.600 | 13.72            | 15.24  |
| M                    | 0.805            | 0.819 | 20.45            | 20.80  |
| N                    | 0.688            | —     | 17.47            | —      |
| S                    | —                | 2.812 | —                | 71.42  |
| T                    | 0.350            | —     | 8.89             | —      |
| V                    | 0.220            | —     | 5.60             | —      |
| W                    | 0.122            | 0.128 | 3.10             | 3.25   |
| X                    | 0.149            | 0.159 | 3.78             | 4.04   |
| REFERENCE DIMENSIONS |                  |       |                  |        |
| D                    | 51°              |       | 51°              |        |
| Q                    | 0.205            |       | 5.21             |        |
| R                    | 52°              |       | 52°              |        |
| U                    | 0.250            |       | 6.35             |        |
| Y                    | 1.000 DIA. P. C. |       | 25.40 DIA. P. C. |        |



| PIN CONNECTIONS |           |
|-----------------|-----------|
| PIN NO.         | ELEMENT   |
| 1               | k         |
| 2               | gl        |
| 3               | h         |
| 4               | k         |
| 5               | h         |
| 6               | gl        |
| 7               | k         |
| CENTER PIN      | INT. CON. |
| LOWER RING      | g2        |
| UPPER RING      | g3        |
| CAP             | p         |