ADVANCE DATA

MECHANICAL DATA

Bulb: T-12
Base: Large Octal Low Loss Phenolic, 5-Pin
Outline: See Drawing
Basing: ST
Cathode: Coated Filament
Mounting Position: Vertical

DURABILITY CHARACTERISTICS

Impact Acceleration (1 msec duration) 450 G Max.
Fatigue (Vibrational Acceleration for Extended Periods) 2.5 G Max.

ELECTRICAL DATA

FILAMENT CHARACTERISTICS

Filament Voltage: 5.0 Volts
Filament Current: 3.0 Amperes

RATINGS (Design Maximum)

Rectifier Service

Peak Inverse Plate Voltage: 1700 Volts Max.
AC Plate Supply Voltage Each Plate, RMS (See Rating Chart I) 600 Volts Max.
DC Output Current: See Rating Chart I
Steady State Peak Plate Current Each Plate (See Rating Chart II) 1.1 Amperes Max.
Transient Peak Plate Current Each Plate (See Rating Chart III) 5.1 Amperes Max.

AVERAGE CHARACTERISTICS

Tube Voltage Drop: 47 Volts
Tube Conducting: 275 Ma Each Plate

TYPICAL OPERATION

Full Wave Rectifier—Capacitor Input Filter

AC Plate Supply Voltage Each Plate, RMS 330 500 Volts
Filter Input Capacitor 40 40 µF
Effective Plate-Supply Resistance Each Plate 21 67 Ohms
DC Output Current 330 310 Ma
DC Output Voltage at Filter Input 320 520 Volts

from EIA release #883A, Oct. 10, 1960

QUICK REFERENCE DATA

The reliable Type 5931 is a filamentary, full-wave high vacuum rectifier intended for commercial and industrial applications where a high degree of reliability is required. It is characterized by long life and stable performance under conditions of severe shock and vibration.
TYPICAL OPERATION (Cont'd)

Full Wave Rectifier--Choke Input Filter

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC Plate Supply Voltage Each Plate, RMS(\hat{v})</td>
<td>600 Volts</td>
</tr>
<tr>
<td>Filter Input Choke</td>
<td>10 Henrys</td>
</tr>
<tr>
<td>DC Output Current</td>
<td>275 Ma</td>
</tr>
<tr>
<td>DC Output Voltage at Filter Input</td>
<td>160 Volts</td>
</tr>
</tbody>
</table>

NOTES:
1. Horizontal Operation is permitted if Pins 1 and 4 are in a vertical plane.
2. See "Interpretation of Rating Charts".
3. For use with sinusoidal supply voltages within the frequency range of 25 to 1000 cps.
4. AC plate voltage is measured without load.

INTERPRETATION OF RATING CHARTS

To simplify the application of the maximum ratings to circuit design, the Design-Maximum ratings are presented in chart form as Rating Charts I, II, & III. Operating points should be so selected that the boundary limits on Rating Charts I, II, & III are not exceeded with a bogy tube under the worst probable operating conditions with respect to supply-voltage variation, equipment component variation, equipment control adjustment, and environment conditions.

A brief description of each of the Rating Charts is given below. The values of a-c voltage as presented refer to the unloaded supply voltages per plate.

Rating Chart I

Rating Chart I presents the maximum ratings for a-c plate supply voltage and d-c output current. The boundary FABCDEG defines the limits for capacitor-input filter operation and the boundary FABCDG defines the limits for choke-input filter operation.

Rating Chart II

Rating Chart II provides a convenient method for checking conformance with the maximum steady-state peak-plate-current rating. Rating Chart II applies to capacitor-input filter operation only.

Rating Chart III

Rating Chart III shows the minimum value of plate supply resistance (Rs) required to remain within the transient peak-plate-current rating. The value of Rs should be such that it lies to the left of the line on the Rating Chart at the highest probable value of line voltage. Rating Chart III applies to capacitor-input filter operation only.

\[
Rs = N^2 \frac{N_{pri}}{N_{sec}} + R_{sec} + Ra
\]

Where: \( N = \) Voltage step up ratio of plate transformer. \( N = \frac{N_{sec}}{N_{pri}} = 1/2\) wave
\( N = \frac{N_{sec}}{2N_{pri}} = \) Full Wave

\( R_{pri} = \) DC resistance of transformer primary
\( R_{sec} = \) Average DC resistance of transformer secondary per section.
\( Ra = \) Added series resistance.

Plate supply voltages are measured with the rectifier tube non-conducting, e.g., with the transformer unloaded. This unloaded voltage is used when calculating rectification efficiency.

The rectification efficiency is defined as:

\[
\text{DC Output Voltage} \div \sqrt{2 \times \text{RMS Supply Voltage Per Plate}}
\]

The DC output voltage is measured at the input to the filter.
RATING CHART I

MAX OPERATING VALUES
WITH CHOKE INPUT

MAX OPERATING VALUES
WITH CAPACITOR INPUT

DC OUTPUT CURRENT
MA EACH PLATE

AC PLATE SUPPLY VOLTS (RMS)
EACH PLATE (WITHOUT LOAD)