



# TECHNICAL DATA

## Y-831

Planar Triode

The Y831 is a planar triode of ceramic/metal construction and rugged design for use especially in highly linear amplifier operations up to 1.5 GHz.

The Y831 may be used as an amplifier or an oscillator in the CW as well as the grid or plate-pulsed mode. In TV translator service, simultaneously transmitting video and aural signals in the same channel, the intermodulation distortion level is better than -52 dB.



### GENERAL CHARACTERISTICS<sup>1</sup>

#### ELECTRICAL

Cathode: Oxide Coated, Unipotential

Heater: Voltage .....	5.7 ± 0.15V
Current, at 5.7 volts .....	3.3A
Transconductance (average):	
I <sub>b</sub> =350 mA .....	120 mmhos
Amplification Factor (average):.....	80
Direct Interelectrode Capacitance (grounded cathode) <sup>2</sup>	
C <sub>in</sub> .....	17 pF
C <sub>out</sub> .....	0.07 pF
C <sub>gp</sub> .....	8.2 pF
Frequency of Maximum Rating.....	1.5 GHz

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

<sup>2</sup>Capacitance values are for a cold tube as measured in a special shielded fixture. When the cathode is heated to the proper temperature, the grid-cathode capacitance will increase from the cold value by approximately 2 pF due to thermal expansion of the cathode.



**MECHANICAL**

Maximum Overall Dimensions:

Length .....	3.188 in; 81.0 mm
Diameter .....	3.180 in; 80.8 mm
Net Weight .....	35.3 oz; 1000 gm
Operating Position .....	Any
Maximum Operating Temperature:	
Ceramic/Metal Seals .....	250°C
Cooling .....	forced air

**RANGE VALUES FOR EQUIPMENT DESIGN**

	<b>Min.</b>	<b>Max.</b>
Heater: Current at 5.7 volts .....	3.0	3.5
Cathode Warmup Time .....	120	---sec.
Interelectrode Capacitance* (grounded cathode connection)		
C <sub>in</sub> .....	15.0	19.0 pF
C <sub>out</sub> .....	---	0.07 pF
C <sub>gp</sub> .....	7.7	8.7 pF

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

**AMPLIFIER OR OSCILLATOR**

ABSOLUTE MAXIMUM RATINGS:

DC PLATE VOLTAGE .....	3000 V
PEAK PULSE PLATE VOLTAGE .....	3500 V
DC GRID VOLTAGE .....	-150 V
INSTANTANEOUS PEAK GRID-CATHODE VOLTAGE	
Grid negative to cathode .....	300 v
Grid positive to cathode .....	30 v
DC PLATE CURRENT .....	0.6 A
DC GRID CURRENT .....	0.05 A
AVERAGE PLATE DISSIPATION	
Forced Air Cooling .....	1500 W
GRID DISSIPATION (average) .....	1.5 W

**TYPICAL OPERATION**

Class A linear amplifier in TV translator service, aural and video signal simultaneously.

Frequency .....	760 MHz
Heater Voltage .....	5.7 V
DC Plate Voltage .....	2400 V
DC Grid Voltage (approximate) .....	22 V
DC Plate Current .....	350 mA
Gain .....	16 dB
Power Output (Peak Sync) .....	200 W
IMD (3-Tone Test) .....	-54dB*

\*Typically, IMD 3-tone test data observed are -55 to -57dB depending on the cavity/circuit and adjustments made.



## APPLICATION

For general application information please refer to the Planar Triode Operating Instructions booklet. These operating instructions should be consulted before designing new applications around the Y831 tube. For unusual and special applications consult the nearest Varian Electron Device Group Sales Office, or the Product Manager, Varian EIMAC, Salt Lake City, Utah.

The cathode and grid flanges should not be altered in any way such as by machining or filing, since the final seal could be damaged.

This tube type has a heater-cathode design with high efficiencies. Due to this fact the heater current is lower than that found in comparable tube types. This must be taken into consideration when installing tubes into existing equipment.

**ABSOLUTE MAXIMUM RATINGS:** Values shown for each type of service are based on the "absolute system" and are not to be exceeded under any service conditions. These ratings are limiting values outside which the serviceability of the tube may be impaired. In order not to exceed absolute ratings, the equipment designer has the responsibility of determining an average design value for each rating below the absolute value of that rating by a safety factor so that the absolute values will never be exceeded under any usual conditions of supply voltage variation in the equipment itself. It does not necessarily follow that combinations of absolute maximum ratings can be attained simultaneously.

**HIGH VOLTAGE:** Normal operating voltages used with this tube are deadly. Equipment must be designed properly and operating precautions must be followed. Design all equipment so that no one can come in contact with high voltages. All equipment must include safety enclosures for high-voltage circuits and terminals, with interlock switches to open primary circuits of the power supply and to discharge high-voltage capacitors whenever access doors are opened. Interlock switches must not be bypassed or "cheated" to allow operation with access doors open. Always remember that **HIGH VOLTAGE CAN KILL.**

**INTERELECTRODE CAPACITANCE:** The actual internal interelectrode capacitance of a tube is influenced by many variables in most applications such as stray capacitance to the chassis, capacitance added by the socket used, stray capacitance between the tube terminals, and wiring effects. To control the actual capacitance values with the tube as the key component involved, the industry and military services use a standard test procedure as described in Electronic Industries Association Standard RS-191. This requires the use of specially constructed test fixtures which effectively shield all external tube leads from each other and eliminate any capacitance reading to "ground". The test is performed on a cold tube. Other factors being equal, controlling internal tube capacitance in this way normally assures good interchangeability of tubes over a period of time, even if the tube is made by different manufacturers. The capacitance values shown in the manufacturer's technical data, or test specifications, normally are taken in accordance with Standard RS-191.

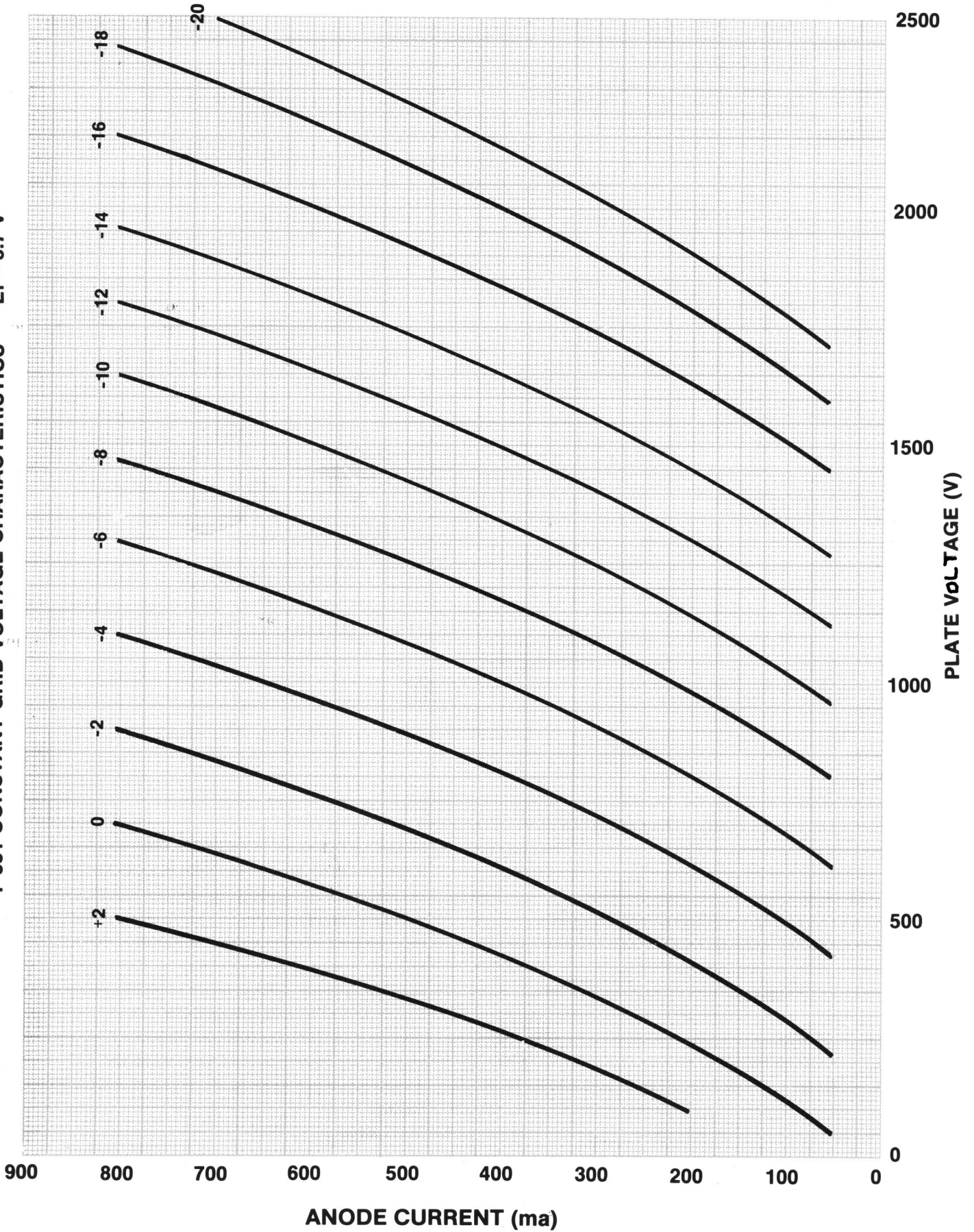
The equipment designer is, therefore, cautioned to make allowance for the actual capacitance values which will exist in any normal application. Measurements should be taken with the socket and mounting which represent approximate final layout if capacitance values are highly significant in the design.

**GRID OPERATION:** Maximum control grid dissipation is 5 watts, determined approximately by the product of the dc grid current and the peak positive grid voltage.



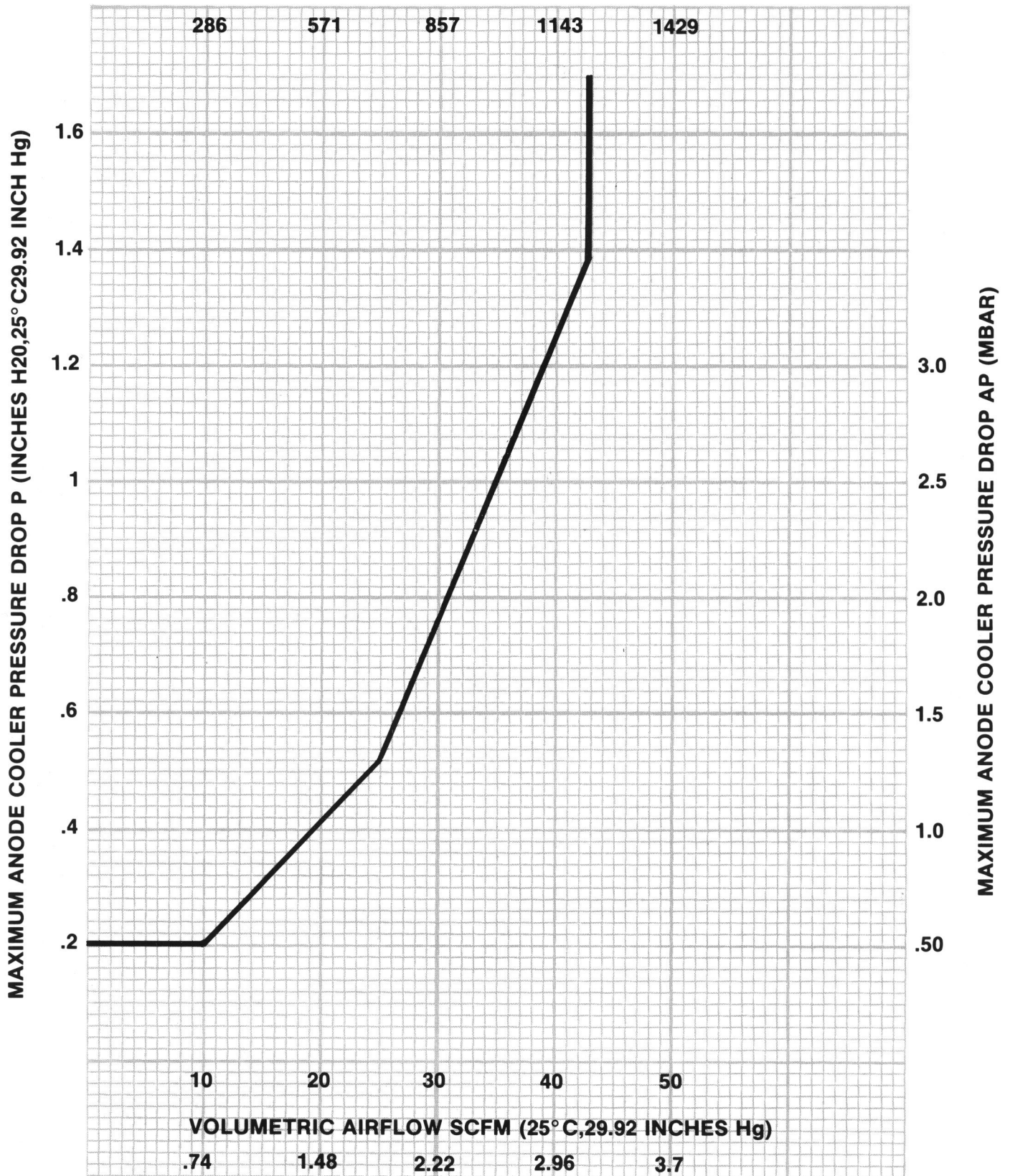
Y-831

Y-831 CONSTANT GRID VOLTAGE CHARACTERISTICS  $E_f = 5.7 \text{ V}$





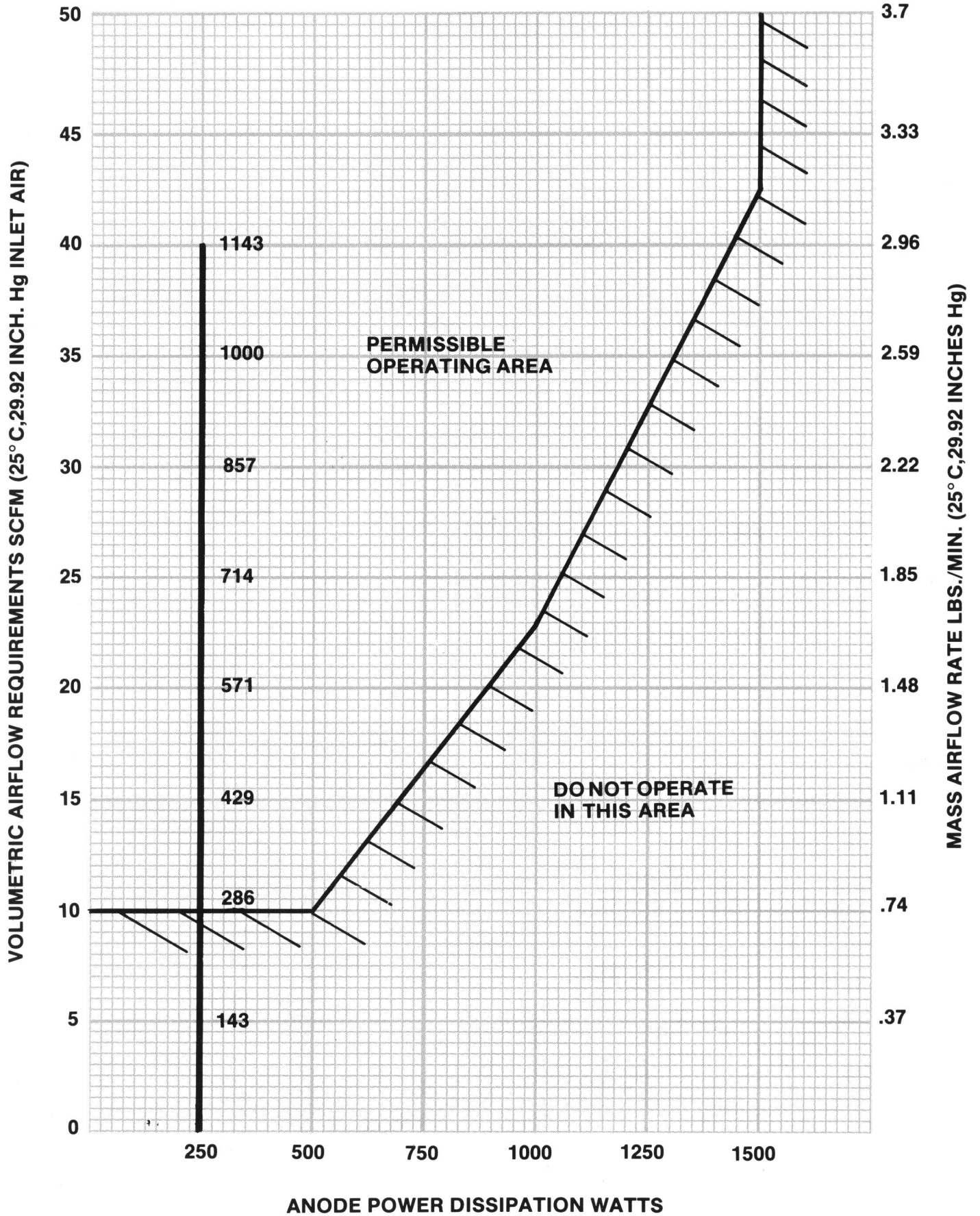
VOLUMETRIC AIRFLOW RATE LITERS/MIN. (25° C IATM)



MASS AIRFLOW LBS./MIN. (25° C, 29.92 INCHES Hg)



Y-831



DIMENSIONAL DATA						
DIM.	INCHES			MILLIMETERS		
	MIN.	MAX.	REF.	MIN.	MAX.	REF.
A		3.189			81.00	
B	2.100	2.122		53.34	53.90	
C	1.240	1.260				
D	.865	.885				
E	3.120	3.200		79.25	81.28	
F	.205	.268		5.21	6.80	
G	.115	.125		2.92	3.18	
H	.275			6.98		
J	.275			6.98		
K	.707	.747		17.96	18.97	
L	1.181	1.260		30.0	32.0	
M			3.125			79.38
S	1.415	1.436		35.94	36.47	
T	1.795	1.825		45.59	46.35	
W	.515	.535		13.08	13.59	

**NOTES:**

1. REF DIMENSIONS ARE FOR INFO ONLY & ARE NOT REQUIRED FOR INSPECTION PURPOSES.

2. (\*) CONTACT SURFACE

