



varian
palo alto tube division

TECHNICAL DATA

VA-936B

CW KLYSTRON AMPLIFIER

5.925-6.425 GHz
3 kW CW

DESCRIPTION

VA-936B five-cavity klystron amplifier is for use in CW earth-to-satellite communication systems. The tube is mechanically tunable over the 5.925 to 6.425 gigahertz band and delivers a CW output of at least 3 kilowatts. The tube features an integral "channel tuner" which permits tuning to any of five selected preset frequencies within the 500-megahertz band in seconds. The channel settings may be reset and adjusted in the field. An optional accessory, the VA-1436 Remote Servo Tuner is available for remote channel selection. The VA-936B has a 1-dB bandwidth of about 50 megahertz at 6.4 gigahertz. Over the 500-megahertz range, the 1-dB bandwidth is at least 30 megahertz.

MAXIMUM RATINGS¹

Beam Voltage	10 kVdc
Beam Current	1.1 Adc
Body Current, with drive	50 mAdc
Heater Surge Current	14 A
Reflected Power ²	120 W
Coolant Outlet Temperature, tube	80 °C
Magnet Voltage	150 Vdc
Magnet Current	7 Adc
Hydrostatic Pressure	
Tube	125 lbf/in ² g
Magnet	125 lbf/in ² g
Magnet Coolant Inlet Temperature	65 °C



GENERAL CHARACTERISTICS³

ELECTRICAL

Frequency Range	5.925-6.425 GHz
Tuning Range	±250 MHz
Heater Voltage	6.0±0.5 V
Heater Current, typical	6.5 A
Heater Warm-up Time, minimum ...	5 min
Focusing Magnet	VA-1936B Electromagnet

PHYSICAL

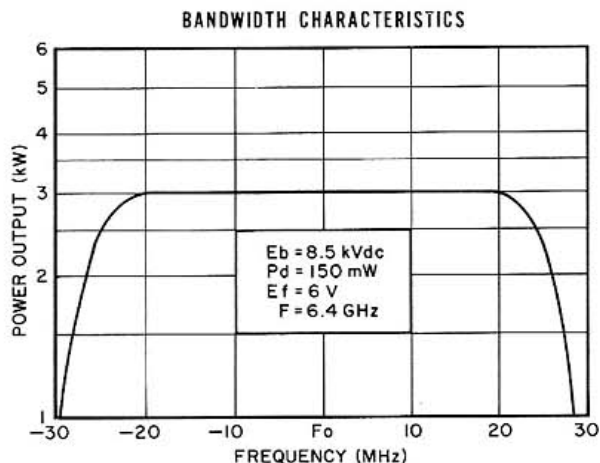
Dimensions	See Outline Drawing
Weight, approximate	
VA-936B	22 lb
VA-1936B	70 lb
Mounting Position	Any
Tuning Method	Channel Selector
Cooling	Liquid and Forced Air
Connectors	See Outline Drawing

TYPICAL OPERATING CONDITIONS³

Frequency	6.395 GHz
Power Output	3.0 kW
Bandwidth, 1-dB	50 MHz
Drive Power	150 mW
Gain	43 dB
Efficiency	41 %
Beam Voltage	8.5 kVdc
Beam Current	0.86 Adc
Body Current, with drive	10 mAdc
Magnet Current	6.4 Adc
Load VSWR	1.05:1

CHARACTERISTIC CURVES

Typical performance values



COOLING

Water Flow, minimum⁴

Body	1 gal/min
Magnet	1 gal/min

Pressure Drop, maximum at 1 gal/min

Body	5 lbf/in ²
Magnet	25 lbf/in ²

Air Flow, minimum⁵

Collector	900 lb/h
Cathode	85 lb/h

Back Pressure, at 900 lb/h 3 in-H₂O

OPERATING HAZARDS

Read the following and take all necessary precautions to protect personnel. Safe operating conditions are the responsibility of the equipment designer and the user.

High Voltage. This tube operates at voltages which can be deadly. Equipment must be designed so personnel cannot come in contact with operating voltages. Enclose high-voltage circuits and terminals and provide fail-safe interlocking switch circuits to open the primary circuits of the power supply and to discharge high-voltage condensers whenever access is required.

Microwave Radiation. Exposure of the human body to microwave radiation in excess of 1 milliwatt per square centimeter is unsafe and can result in blindness or other injury. Personnel must be fully protected from the microwave energy which radiates from this device. All input and output r-f connections, waveguide flanges, and gaskets must be r-f leakproof and

properly engaged. Never operate this device without a microwave-energy-absorbing load attached. Personnel must be prevented from looking into open waveguides or antennas while such a device is energized. (Ref. Proc. IRE, Vol. 49, No. 2, pp. 427-447, Feb. 1961).

X Rays. This device may produce X-ray radiation when energized. Operating personnel must be protected by appropriate shielding. Provide adequate X-ray shielding on all sides of this device, as well as the modulator and pulse transformer tanks. X-ray caution signs or labels must be permanently attached to equipment directing operating personnel never to operate this device without X-ray shielding in place.

Equipment must be designed to fully safeguard all personnel from these hazards. Labels and caution notices must be provided on equipment and in manuals clearly warning of those hazards which cannot be avoided.

- ### OUTLINE DRAWING