



varian
palo alto tube division

TECHNICAL DATA

3K210,000LQ

CW KLYSTRON
AMPLIFIER

755-985 MHz
75 kW

DESCRIPTION

The 3K210,000LQ is a three-cavity, klystron amplifier for use in wide-band tropospheric-scatter communication systems. The tube delivers a CW output of at least 75 kilowatts over its tunable frequency range of 755 to 985 megahertz. It has two external cavities and an integral output cavity. The external cavities permit an unlimited number of tuning cycles

without damaging the vacuum seals. The 3K210,000LQ operates within the H-129 R-F Circuit Assembly, which includes the focusing electromagnet, tunable cavities, and load couplers for the input and second cavities. The tube and electromagnet are liquid and forced-air cooled.

MAXIMUM RATINGS¹

Beam Voltage	30 kVdc
Beam Current	8 Adc
Collector Dissipation	210 kW
Body Current	300 mA dc
Getter Current	55 A
Heater Surge Current	21 A
Load VSWR	1.5:1

GENERAL CHARACTERISTICS²

ELECTRICAL

Frequency Range	755 to 985 MHz
Power Output, minimum	75 kW
Gain, minimum	10 dB
Heater Voltage	26 V
Heater Current, typical	10.8 A
Heater Warm-up Time, minimum ..	5 min
Getter Voltage	5.2 V
Getter Current	36 A
Focusing	H-129 R-F Circuit Assembly

PHYSICAL

Dimensions	See Outline Drawing
Weight, approximate	
Tube	370 lb
H-129 R-F Circuit Assembly	600 lb
Mounting Position	Vertical, cathode up
Cooling ³	Liquid and Forced Air
R-F Connectors	See Outline Drawings

TYPICAL OPERATING CONDITIONS²

		Broadband Tuned		
		755	755	985 GHz
Frequency	755	755	755	985 GHz
Power Output	56	78.8	78.8	76.2 kW
Drive Power	1	5	5	5 kW
Gain	17.5	11.9	11.9	11.8 dB
Bandwidth, 3-dB	7	7	7	7 MHz
Beam Voltage	26	28	28	28 kVdc
Beam Current	6.25	7.25	7.25	7.25 Adc
Body Current, with drive	55	80	80	75 mAdc
Cavity Loading				
Input Cavity	0.4	4	4	4 kW
2nd Cavity	2.5	6	6	5 kW
Focus Coil Currents				
Prefocus Coil	2	1.7	1.7	1.7 Adc
Body Coil #1	12	11	11	11 Adc
Body Coil #2	14	17	17	19 Adc
Body Coil #3	12	11	11	10 Adc
Collector Coil	12	11	11	10 Adc
Load VSWR	< 1.2:1	< 1.2:1	< 1.2:1	< 1.2:1

H-129 R-F CIRCUIT ASSEMBLY

	Maximum Values			Maximum Values	
Prefocus Coil Voltage	25 Vdc		Body Coil 2 Current	25 Adc	
Prefocus Coil Current	2 Adc		Body Coil 3 Voltage	35 Vdc	
Body Coil 1 Voltage	75 Vdc		Body Coil 3 Current	15 Adc	
Body Coil 1 Current	15 Adc		Collector Coil Voltage	35 Vdc	
Body Coil 2 Voltage	60 Vdc		Collector Coil Current	15 Adc	

COOLING

The tube and R-F Circuit Assembly require a liquid cooling system capable of dissipating up to 210 kilowatts. Distilled water is the preferred coolant. However, ethylene glycol and water mixtures up to 60 percent ethylene glycol may be used. Metals in the circulating system should be close to copper in the galvanic series.

Also, Cavity 2 forced-air cooling requires about 25 ft³/min against a back pressure of 1 inch of water. For different coolants or operating conditions, contact the nearest Varian Sales Office or the Palo Alto Tube Division, San Carlos, California for recommendations.

	Distilled Water	50/50 Glycol Water
Coolant Flow, min		
Body	6	8 gal/min
Collector	50	65 gal/min

	Distilled Water	50/50 Glycol Water
Pressure Drop, at min flow		
Body	20	30 lbf/in ²
Collector	10	15 lbf/in ²

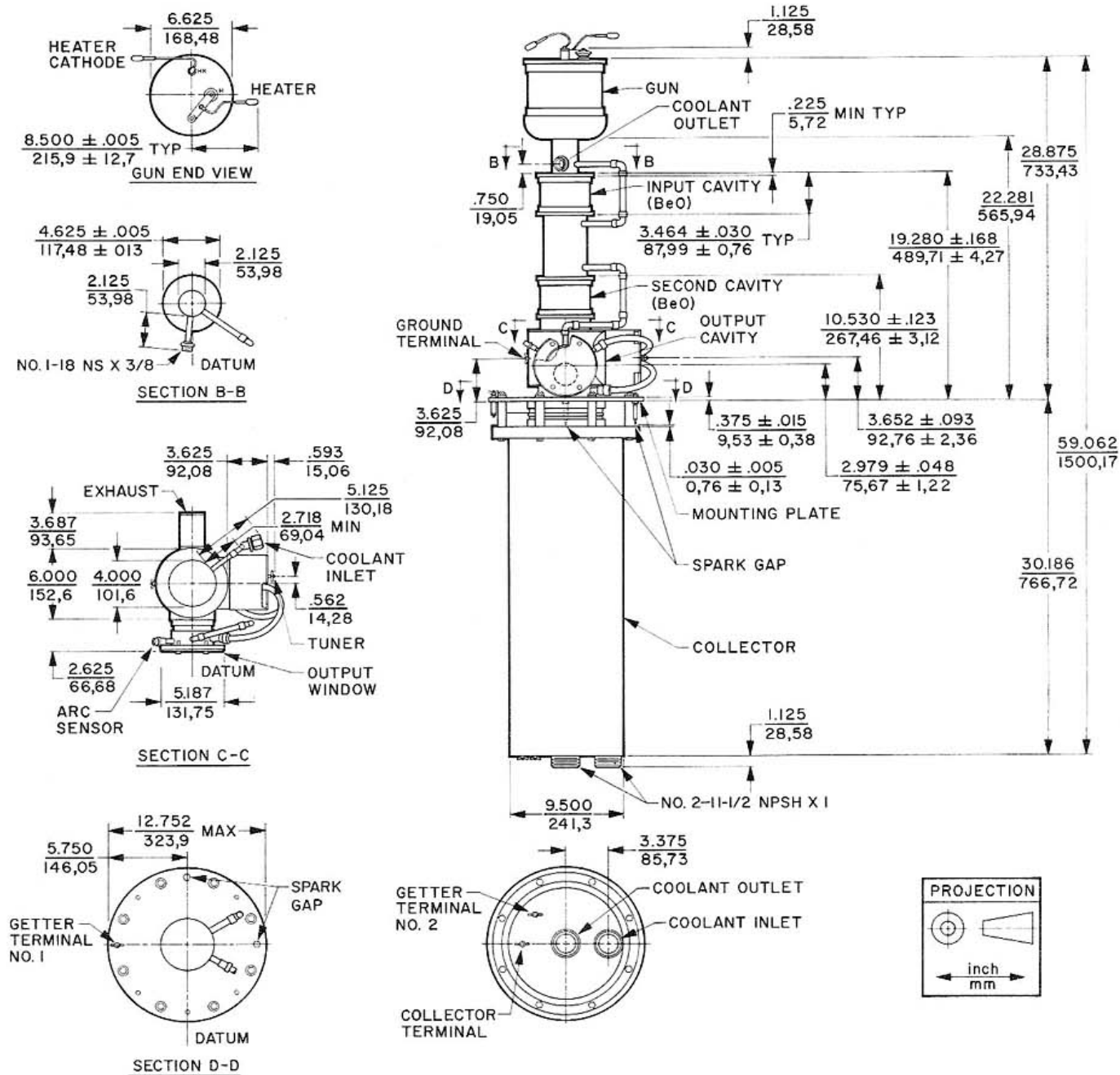
NOTES:

1. Ratings should not be exceeded under continuous or transient conditions. A single rating may be the limitation and simultaneous operation at another rating may not be possible. Equipment design should limit voltage and environmental variation so that ratings will never be exceeded.
2. Characteristics and operating values are based on performance tests. These figures may change without

notice as a result of additional data or product refinement. Varian Associates should be consulted before using this information for equipment design.

3. Convection cooling of the cathode is adequate up to 30 °C ambient air temperature at sea level. At higher altitudes or at higher ambient air temperatures, forced air cooling is required.

OUTLINE DRAWING



3K210,000LQ

OUTLINE DRAWING

