



varian
palo alto tube division

TECHNICAL DATA

**VA-953A/B
VA-954A/B
VA-955A/B**
CW KLYSTRON AMPLIFIERS
470-890 MHz

DESCRIPTION

VA-953A/B, VA-954A/B, and VA-955A/B are five-cavity, vapor-cooled klystrons for use as final amplifier tubes in both visual and aural sections of UHF-TV transmitters. When used in the visual socket, each tube will deliver peak-of-sync output of up to 58 kilowatts over its tunable range. These three klystrons cover the frequency range of 470 to 890 megahertz in three consecutive segments. Gain is at least 47.6 decibels, permitting optimum performance with very low drive power. A beam control electrode enables each tube to operate also in the aural section of the transmitter at reduced output level using the same beam supply as the visual section. Each tube uses an electromagnet for focusing and is self-centering in its magnet. Installation is simplified by rollers on the tube body which engage tracks in the electromagnet.

FEATURES

High Power --

Output up to 58 kilowatts for reliable, long-life performance.

High Gain --

Gain of at least 47.6 dB produces an output of 55 kW with less than 1.00 watt of drive power.

Ample Bandwidth --

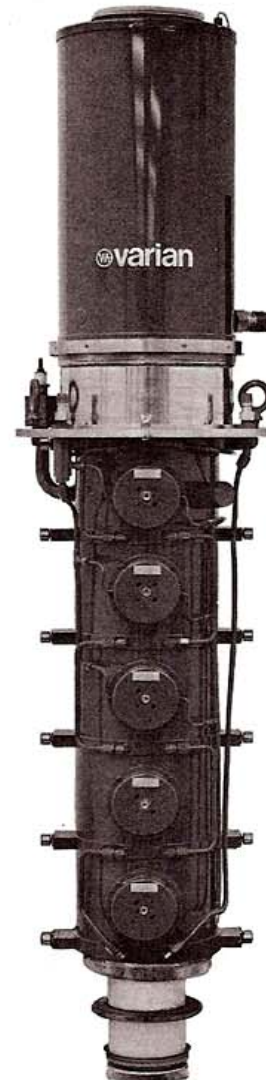
One-dB bandwidth is at least 8 MHz over the tuning range.

Vapor Cooling --

Reduces equipment size, noise, and cost; only 2.0 gal/min collector water flow required.

Simple Installation and Operation --

Each tube can be furnished factory tuned to a specified frequency if desired, but is tunable over its entire frequency range. The electromagnet operates from a single power supply. Installing the tube is made easy by rollers on the tube which mate with channels in the electromagnet.



VA-953A/B, VA-954A/B, VA-955A/B

GENERAL CHARACTERISTICS¹

ELECTRICAL

Frequency Range	470 to 890 MHz
VA-953A/B.....	470 to 566 MHz
VA-954A/B.....	566 to 698 MHz
VA-955A/B.....	694 to 890 MHz
Heater Voltage	7.0 to 7.7 V
Heater Current, typ	18 A
Heater Warm-up Time, min	5 min
Focusing	Electromagnet

PHYSICAL

Dimensions	See Outline Drawings
Weight, approx.	220 lb
Mounting Position	Cathode Down
Cooling	Water Vapor and Forced Air
Collector Water Flow, min	2.0 gal/min
Body Water Flow, min	2.5 gal/min
Body Pressure Drop,	
at min flow, max	60 lbf/in ²
Inlet Temperature, max	70 °C
Air Flow, free delivery	50 ft ³ /min

OPERATING CONDITIONS AND RATINGS^{1,2}

	Typical Operation	Maximum Ratings	
Frequency, visual	519	---	MHz
Output, peak-of-sync ³	58	---	kW
Drive Power, peak-of-sync	700	---	mW
Gain, peak-of-sync	49.2	---	dB
Efficiency, peak-of-sync	31	---	%
Bandwidth, 1-dB	8	---	MHz
Beam Voltage	24	25	kVdc
Beam Current	7.8	8.3	Adc
Body Current	75	250	mAdc
Mod Anode Voltage	24	25	kVdc
Mod Anode Current	1.5	10	mAdc
Focusing Current	30	32	Adc
Load VSWR	< 1.1:1	1.5:1	
Collector Temperature ⁴	130	145	°C

ELECTROMAGNET, VA-1953A, VA-1954A, VA-1955A

Total Power, max	
Voltage	150 Vdc
Current	32 Adc
Dimensions	See outline drawings
Weight, max	590 lb

Cooling	
Water Flow, min	2.0 gal/min
Inlet Temperature, max	70 °C
Pressure Drop,	
at min flow, max	35 lbf/in ²

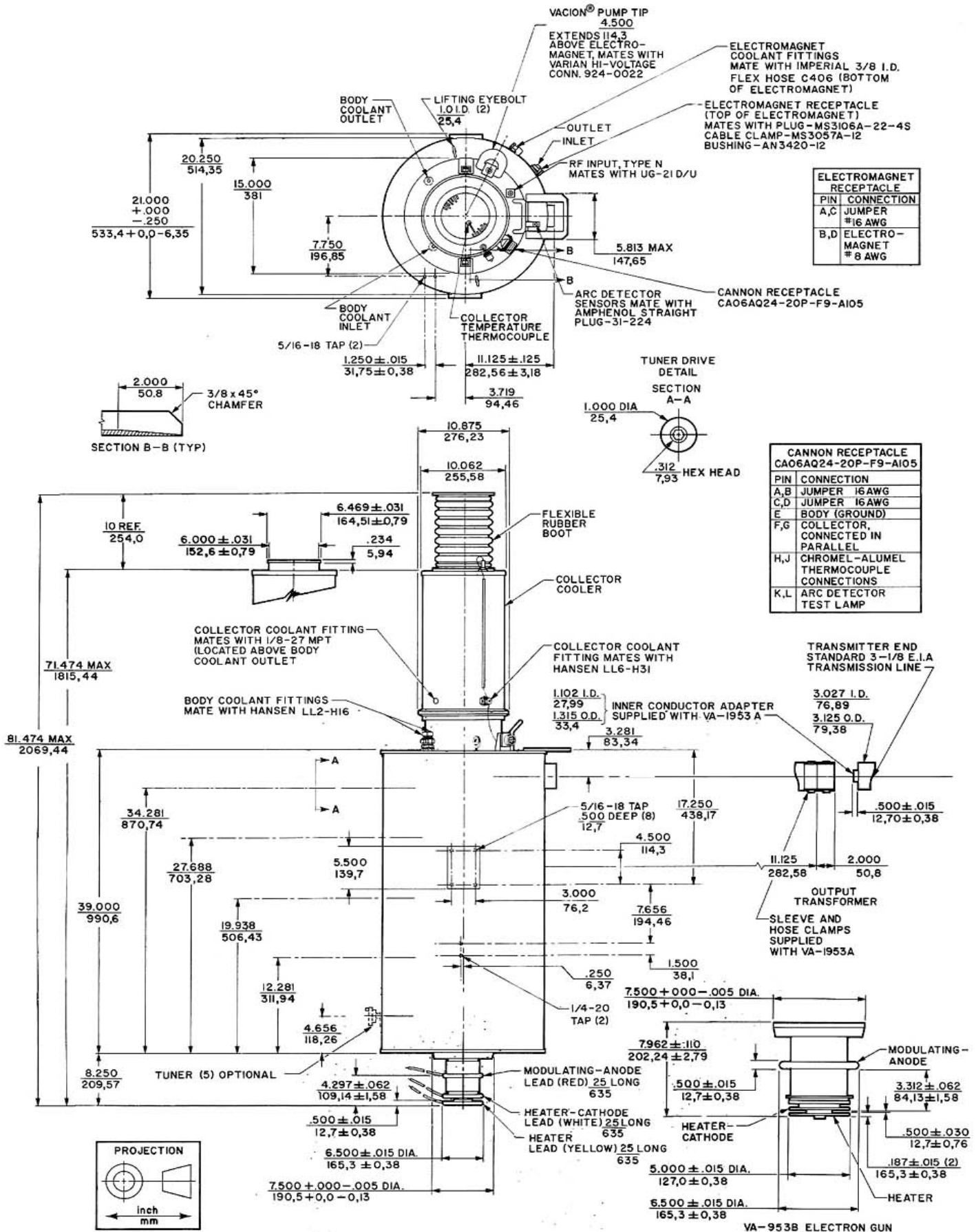
NOTES:

1. Characteristics and operating values are based on performance tests. These figures may change without notice as a result of additional data or product refinement. Consult Varian before using this information for final equipment design.
2. Ratings should not be exceeded under continuous or transient conditions. A single rating may be the limitation and simultaneous operation at more than one rating may damage the tube. Equipment design should

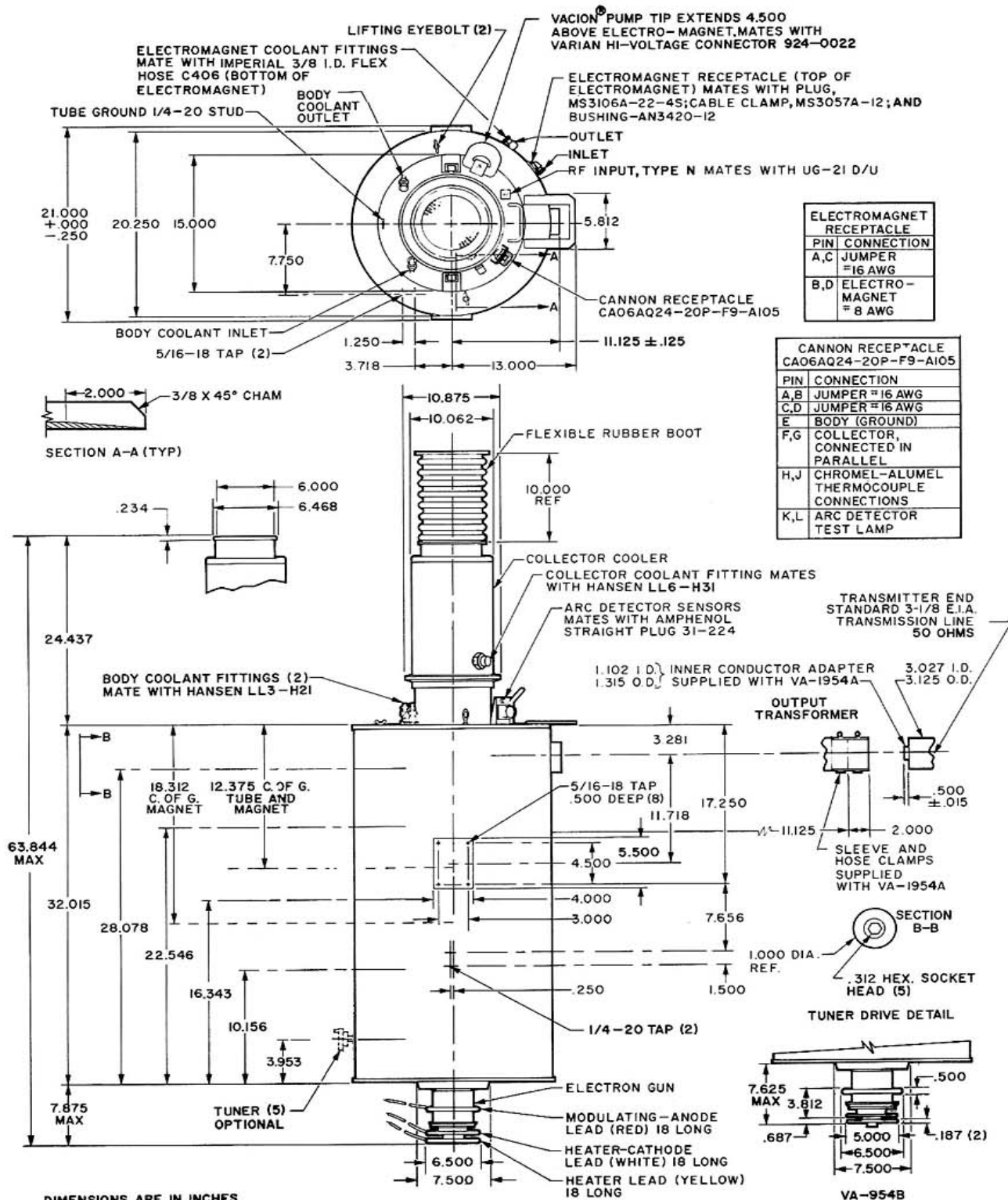
limit voltage and environmental variations so that the ratings will never be exceeded.

3. With pre-emphasized drive power applied.
4. The collector temperature is monitored by the chromel-alumel thermocouple attached to each tube at the point indicated on the outline drawing.
5. For electromagnet VA-1955A, the maximum current is 30 Adc.

OUTLINE DRAWING VA-953A/B IN VA-1953A ELECTROMAGNET



OUTLINE DRAWING **VA-954A/B IN VA-1954A ELECTROMAGNET**



DIMENSIONS ARE IN INCHES

OUTLINE DRAWING VA-955A/B IN VA-1955A ELECTROMAGNET

