

TOP. 117 TRAVELING WAVE TUBE

The TOP.117 is a traveling wave tube capable of delivering a CW power output in excess of 1 kW over a 25 % instantaneous bandwidth in the X-band region.

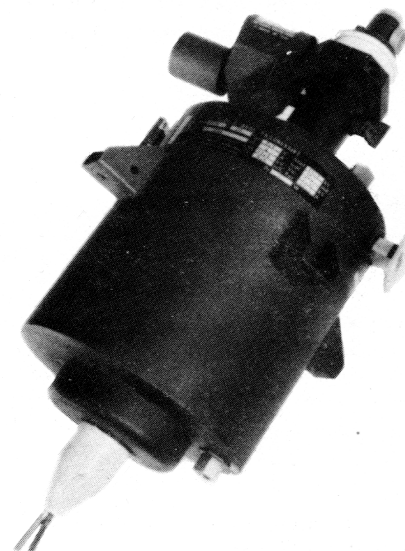
The tube is built with a severed circuit, consisting of two sections of helix delay line, both being terminated on internal matched loads. The tube interaction circuit is cooled by liquid circulation. Both helices are brazed on dielectric rods to evacuate the heat generated by electron bombardment and RF losses. Heat dissipation capability has been significantly increased by a special brazing technique, resulting in lower operating temperature and longer life expectancy.

Input and output ports are of the waveguide type. The output window is an original THOMSON-CSF development.

A solenoid focusing system has been chosen because of the importance of optimizing the beam transmission through the interaction circuit at this power level. The gun is of the convergent type and uses an impregnated cathode operating at low current density (1.4 amp/cm²). An ion pump is permanently attached to the tube, and the tube technology is entirely metal-ceramic.

High voltage connections are flying leads and the gun insulator is potted in plastic.

Due to the wideband characteristics of the delay line, this tube is particularly well suited for military or civilian applications, such as satellite telecommunications, troposcatter or television broadcasting.



GENERAL CHARACTERISTICS

Electrical (1)

	min.	typical	max.	
Frequency range	25 % at X-band			
Heater voltage	-	7	-	V
Heater current	-	4	-	A
Output power	1	-	-	kW
Small signal gain	-	35	-	dB
Helix voltage	10.4	10.9	11.3	kV
Helix current	-	10	20	mA
Anode voltage	7.0	7.8	8.5	kV
Anode current	-	0.1	3.0	mA
Collector voltage	10.4	10.9	11.4	kV
Cathode current	-	760	850	mA

(1) All voltages are referenced to the cathode.



Mechanical

Operating position	any
Weight (approximate)	75 lbs
RF input and output waveguide	RG 52/U
RF input and output flange	UG 39/U
Electrical connections	flying leads
Cooling	water

ABSOLUTE RATINGS

	min.	max.	
Heater voltage (note 2)	-1.5	+1.5	%
Warm-up time	5	-	mn
Vibrations	-	25 Hz ± 40 mils	
Shocks	-	15 g 4 ms	
Water flow	5	-	gpm

	min.	max.	
Helix voltage	10.4	11.4	kV
Helix current	-	20	mA
Anode voltage	7.2	8.5	kV
Anode current	-	3	mA
Collector voltage	10.4	11.4	kV
Cathode current	-	850	mA
Collector dissipation	-	9	kW
Drive power	-	6	W
Load VSWR	-	1.55 : 1	
Frequency range	-	30 % at X-band	

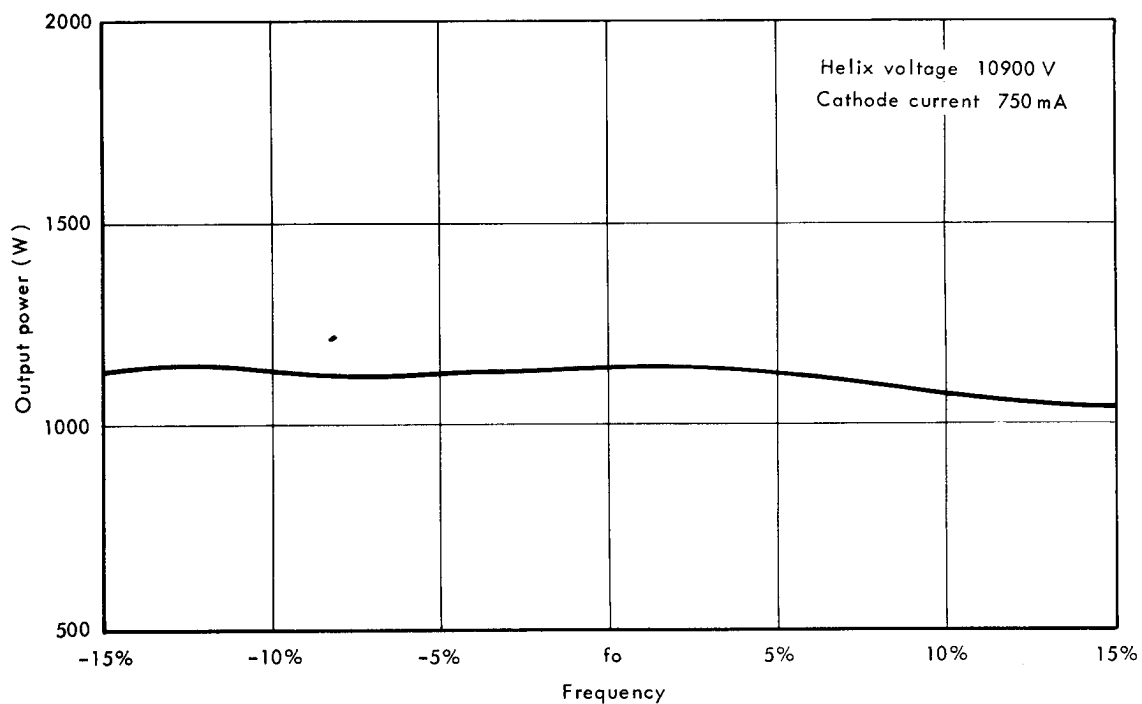
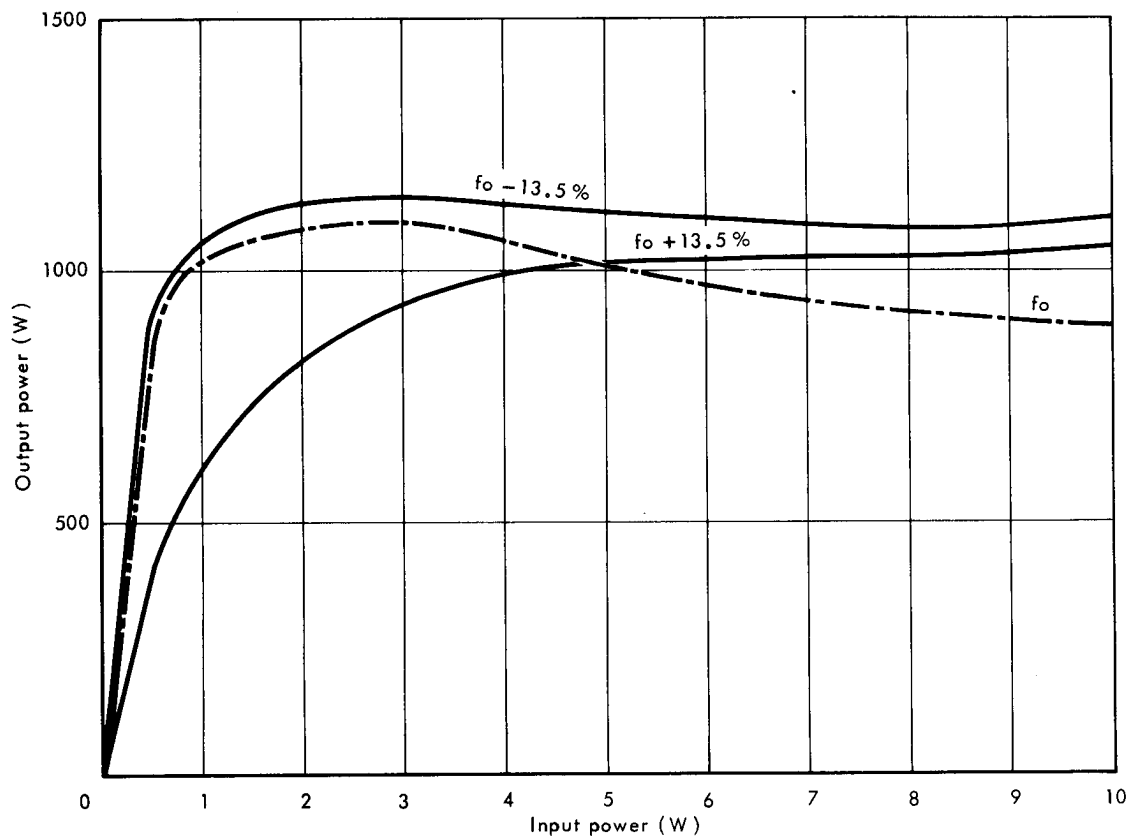
(2) of the value indicated in the Test Data Sheet.

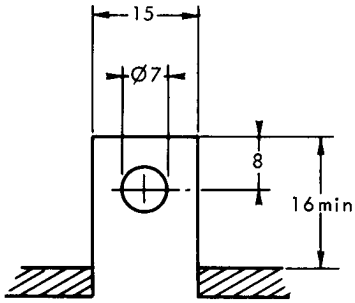
TYPICAL OPERATION

	25 % at X-Band	
Frequency range		
Heater voltage	7	V
Heater current	4	A
Output power	1150	W
Gain	See curve	
Helix voltage	10.9	kV
Helix current	10	mA
Anode voltage	7.8	kV
Anode current	0.1	mA
Cathode current	760	mA
Collector voltage	10.9	kV
Collector current	750	mA
Electromagnet current	39	A
Electromagnet voltage	41	V
Noise figure	35	dB
Ion pump voltage	4.5	kV
Ion pump current	1	μA

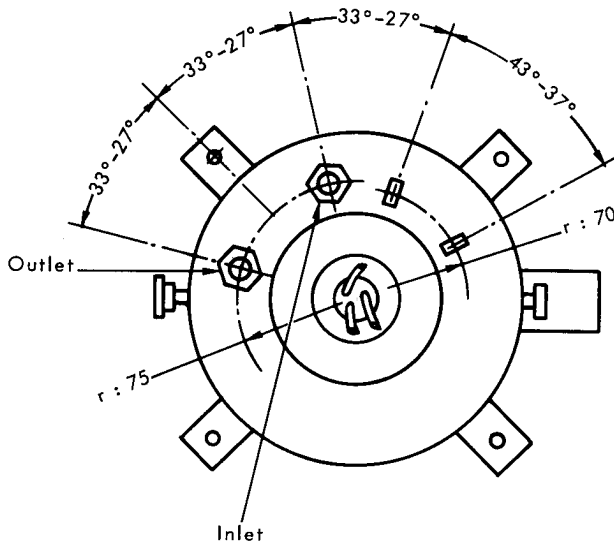


OPERATING CHARACTERISTICS

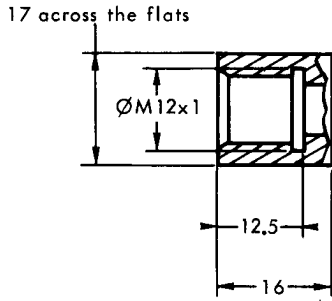




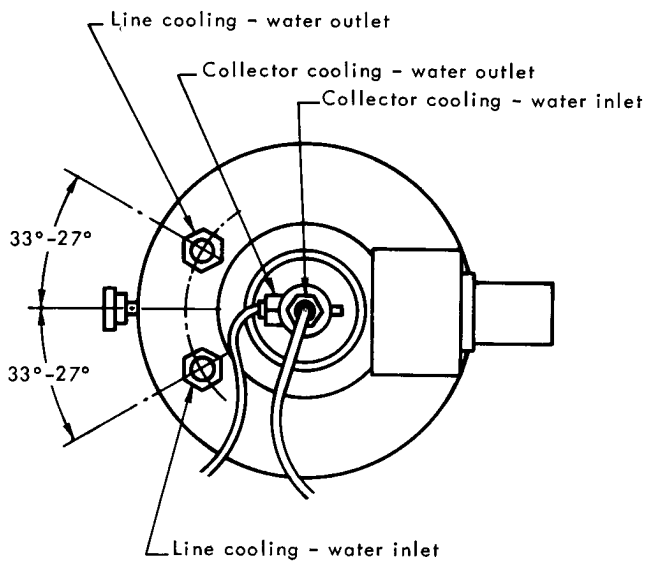
Focus connections



View A



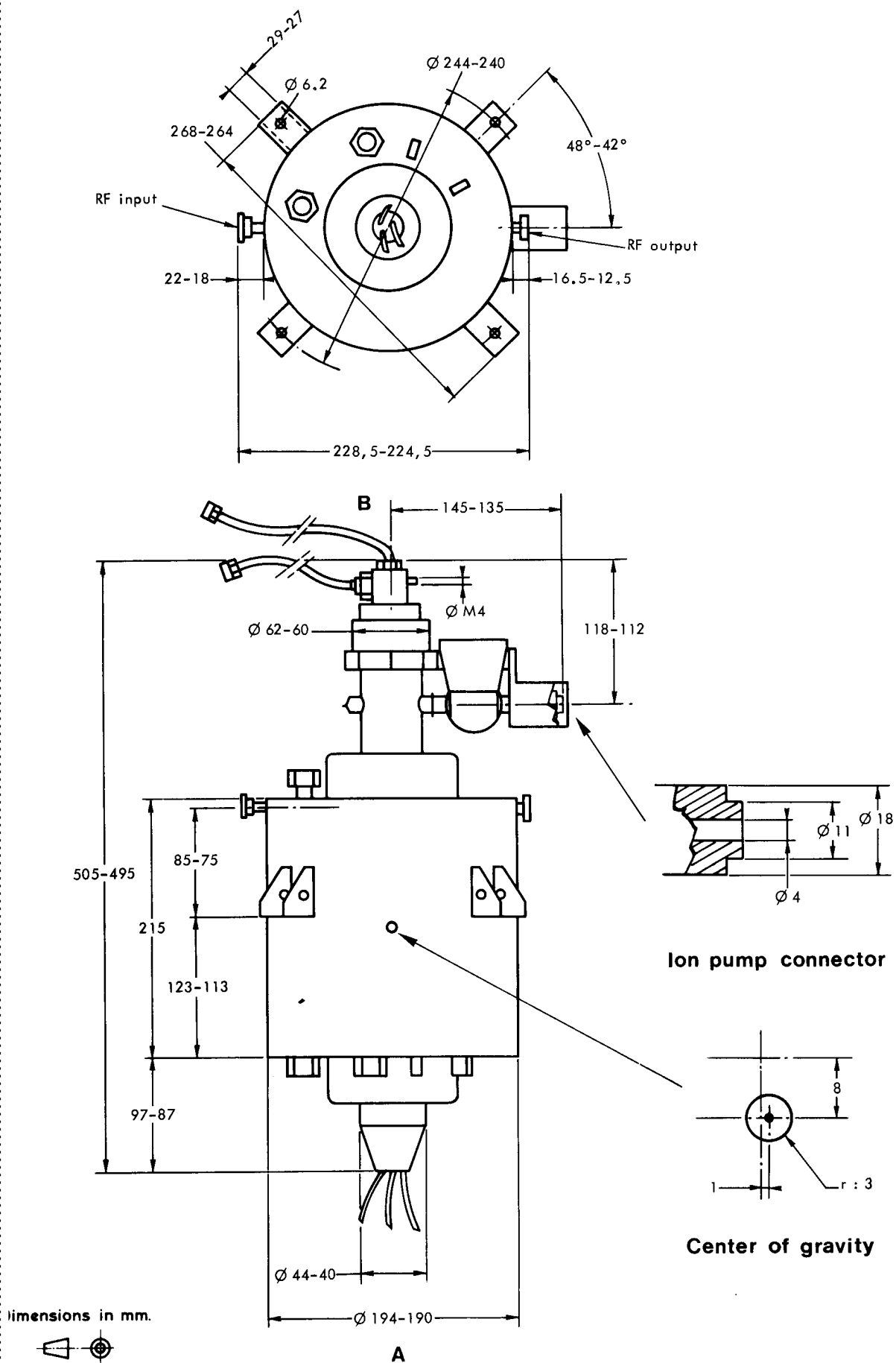
Water pipe union for collector



View B



OUTLINE DRAWING





THOMSON-CSF

HYDRAULIC LINE TUBES ELLIOTTORBITAL