



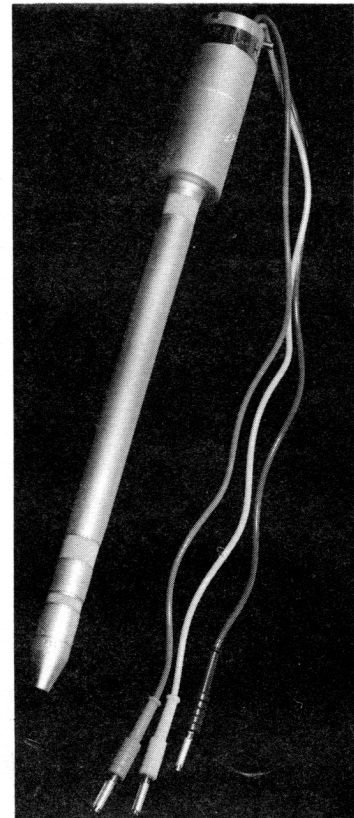
TH 9131 TRAVELING WAVE TUBE

The TH 9131 is a traveling wave tube of metal-ceramic construction designed for continuous wave operation. This power amplifier is designed for S band and can provide a minimum of 6 W in the frequency range of 2670 to 3280 MHz.

Due to its ruggedness, the TH 9131 is designed to operate under severe environmental conditions.

The R.F. input and output fittings mate with N type coaxial connectors or flat waveguides.

The TH 9131 requires the use of the TH 19603 B electromagnet for focusing.



GENERAL CHARACTERISTICS

Electrical

Type of cathode	unipotential oxide coated		
Heating	indirect		
Heater voltage	5.8	V	(1)
Heater current	1	A	
Preheating time	300	s	
Frequency range	2670 - 3280	MHz	

(1) The exact heater voltage is given on the Test Data Sheet of each tube. This voltage is to be observed within $\pm 5\%$.

Mechanical

Envelope	metal ceramic
Connections	flexible leads
Mounting position	any
Weight (approx.)	300 g
Cooling	forced air
Dimensions	see drawings

ABSOLUTE RATINGS

(non simultaneous values)

	min.	max.	
Heater voltage	5.0	6.6	V
Heater current (surge)		2	A
Grid bias	- 100	+ 100	V
Grid power		500	mW
Helix and anode voltage	1900	2500	V
Collector current		100	mA
Helix and anode current		7	mA
Cathode current		120	mA
Collector temperature		160	$^{\circ}$ C
Preheating time	300		s



TYPICAL OPERATION

Helix voltage.....	2100	V
Cathode current.....	57	mA
Grid bias.....	+ 17	V
Saturated power output.....	8	W
Gain at saturated power output.....	23	dB
Frequency range.....	2670 - 3280	MHz
Focusing power.....	85	W

TH 19603 B FOCUS COIL

Cooling.....	forced air	
Approx. weight.....	12	kg
Dimensions.....	see drawing	
Focus coil voltage.....	60	V
Focus coil current.....	2	A

OPERATING INSTRUCTIONS

These operating instructions provide basic information for installing and operating the TH 9131 C.W. traveling wave tube amplifier. Supplementary information is given in the Test Performance sheet which contains test results at specific frequencies for individual tube.

I - Protective measures

This tube should be used in equipment which provides protection as described below. In addition, installation and operating precautions should be observed, and ratings should not be exceeded.

HIGH VOLTAGE

Voltages required for operation of this tube are extremely dangerous ; equipment should be designed with protective interlock circuits to make physical contact with these voltages impossible.

HEATER VOLTAGE

Heater voltage given on the Test Data Sheet should be applied for at least 5 minutes before applying beam voltage. Heater surge current should never exceed 2 amperes.

BEAM VOLTAGE

An overvoltage relay should be provided to limit the beam voltage to 2.5 kV dc. Positive grid voltage may be applied when the normal beam voltage is reached.

A device should be provided to cut off the grid voltage and the beam voltage if the helix current exceeds the maximum rating.

II - Absolute ratings

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 not be possible. Equipment design should allow for voltage and environmental variations so that ratings will never be exceeded.

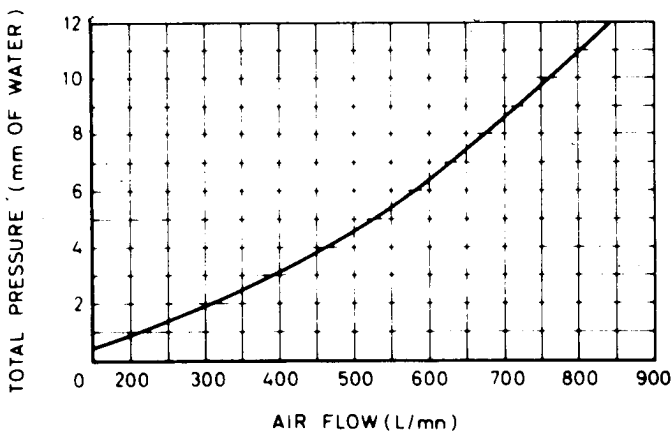
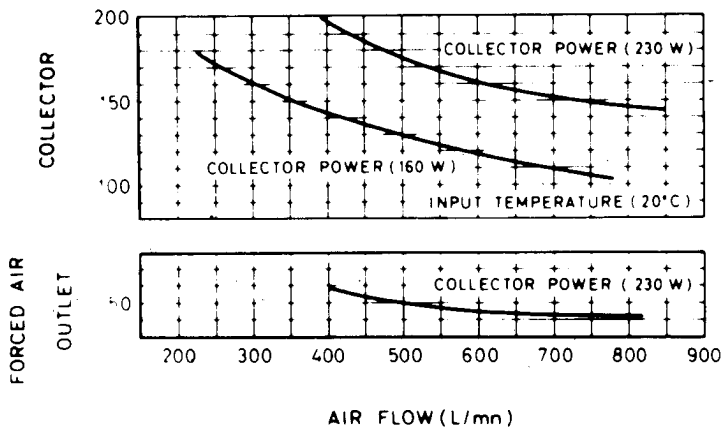


	min.	max.	
Beam voltage.....	1.9	2.5	kV
Helix current.....		7	mA
Grid voltage.....		+ 100	V
Grid power.....		500	mW
Cathode current.....		120	mA
Collector current.....		100	mA
Heater voltage.....	5.0	6.6	V
Heater current.....		2	A
Collector temperature.....		160	°C
Focus coil current.....		2	A
Focus coil voltage.....		60	V
Cathode warm up time.....	5		mn.
Load V.S.W.R.....		1.5:1	

III - Cooling

The tube is forced air cooled. Temperature and air flow characteristics are given in the following chart.

TEMPERATURE °C





IV - Mounting

See the outline drawing for details.

- Mounting the tube in the TH 19603 B electromagnet.

During handling and storage the electromagnet should be kept at least 10 cm away from all magnetic material and 30 cm away from magnet.

- Unscrew the ring of the magnet.
- Carefully guide the tube into the electromagnet, without any side stress, slightly rotate the tube clockwise, until it is seated properly into its normal operating position.
- Insets of the tube and electromagnet cover should be coincident with the matching slot of the electromagnet.
- Bolt the ring to lock in place the tube and cover.

- Electrical connections

The connections are made by flexible leads, and FRB plugs type RCA 2F2.

- Heater : brown
- Heater-cathode : yellow
- Grid : green

The R.F. input and output connectors are coaxial type "N" or flat waveguides.

V - Operation

Check the following conditions before applying voltages to the tube :

- R.F. connectors are connected properly to their mating parts.
- Tube body is grounded by means of the D plug of the electromagnet socket.
- The collector (C plug) is isolated from ground.
- All supplies are connected.
- R.F. load is connected.
- Cooling air is flowing.
- All protective circuits are operating correctly.

Applications of voltages

- 1 - Apply focus coils current.
- 2 - Apply heater voltage (the exact value is given on the Test Performance Sheet of each tube and should not be exceeded) and allow at least 5 minutes for cathode warm-up.
- 3 - Apply beam voltage, step by step, (at least for the first time).
- 4 - Apply voltage to the grid, and at the same time :
- 5 - Adjust the electromagnet focusing.

- Electromagnet adjustment :

The four setting mechanisms are located under a protective plate, upon the electromagnet. Non magnetic tools should be used.

With the gate voltage applied to the grid, adjust the four setting mechanisms to obtain minimum helix current for the given value of the collector current.

A first approximate adjustment is obtained with a reduced collector current. Repeat the operation with gradually increased values of the collector current, until the normal operating current is reached.

- 6 - Apply RF drive power.

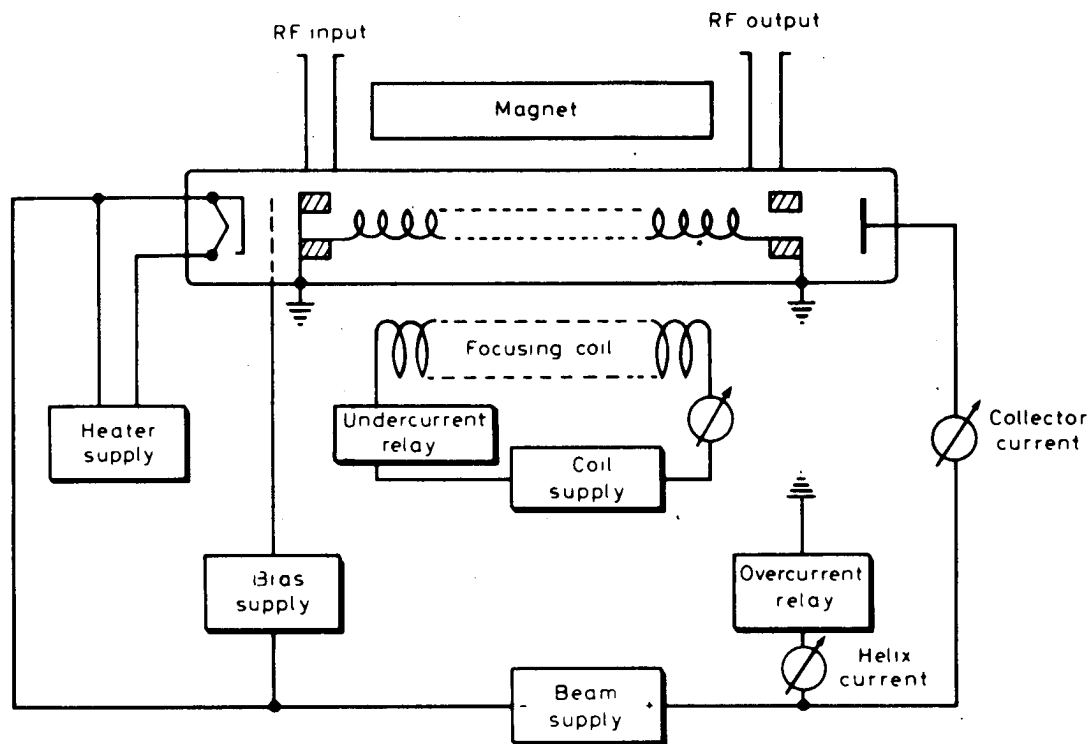


VI - Storing precautions

The tube should be handled and stored in its original shipping crate, it should be kept sheltered from bad weather, at ambient temperature and non corrosive atmosphere.

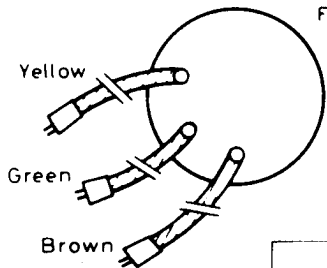
After a six months storage, a periodical check should be performed. The tube is unpacked and tested in the TH 19 603 B electromagnet according to the operating instructions and Test Data Sheet. The performance of the tube should be compared to the values given on the Test Data Sheet of each tube.

CIRCUIT CONNECTIONS

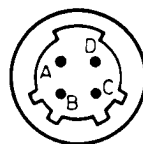


TUBE CONNECTIONS

flexible leads and
FRB plugs (RCA 2F2)



FOCALIZER SOCKET
Pygmy PT 02A84P

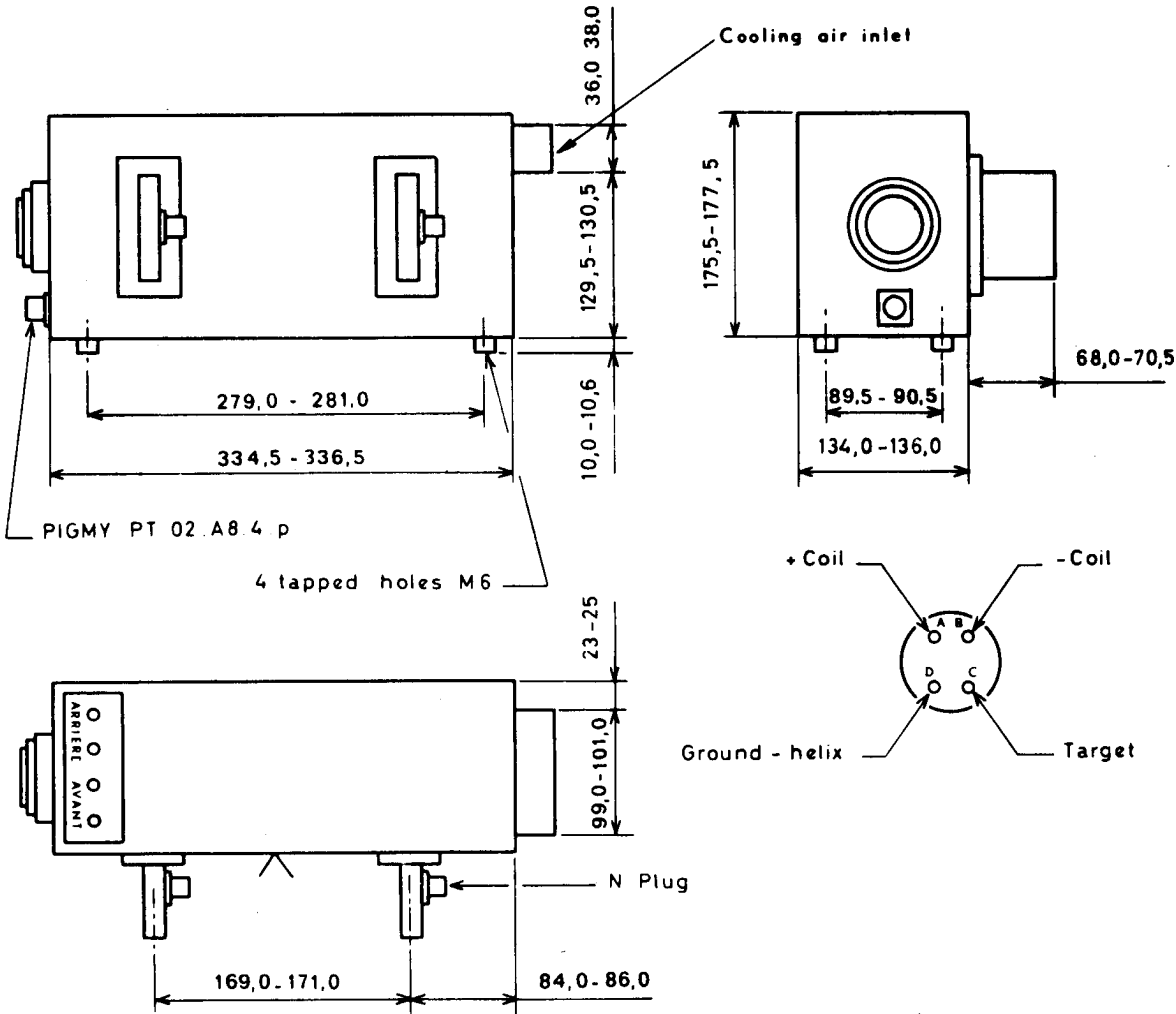


CONNECTIONS	
Brown	Heater
Yellow	Cathode-heater
Green	Grid

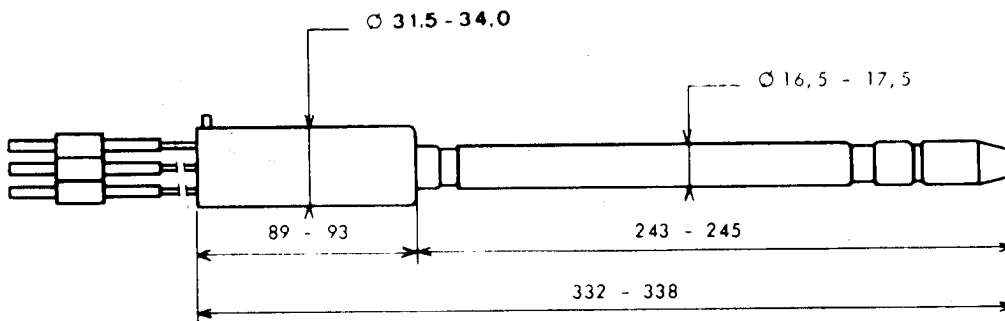
A	Focusing coil +
B	Focusing coil -
C	Collector
D	Helix-ground



TH 19603 B ELECTROMAGNET



OUTLINE DRAWING



CONNECTIONS	
Brown	Heater
Yellow	Cathode-heater
Green	Grid