



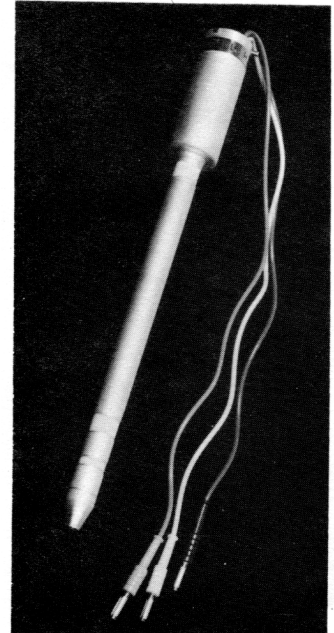
TH 9121 A TRAVELING WAVE TUBE

The TH 9121 A is a traveling wave tube of metal-ceramic construction designed for pulsed wave operation. This power amplifier is designed for S band and can provide a minimum of 30 W in the frequency range of 2700 to 3300 MHz.

Due to its ruggedness, the TH 9121 A 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 9121 A requires the use of the TH 19 603 B electromagnet for focusing.



GENERAL CHARACTERISTICS

Electrical

Cathode	unipotential, oxide coated		
Heating.....	indirect		
Heater voltage (1).....	5.8	V	
Heater current	1	A	
Warm-up time.....	5	mn	
Frequency range	2700 to 3300	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.....	ceramic-metal		
Operating position.....	any		
Cooling	forced-air		
Weight (tube).....	300	g	
Dimensions.....	see drawings		
Connections.....	flexible leads		

ABSOLUTE RATINGS (non simultaneous)

	min.	max.	
Heater surge current.....		2	A
Heater voltage	5	6.6	V
Heater current.....		1.5	A
Warm-up time	300		s
Negative grid bias	- 10	- 100	V
Grid power.....		300	mW
Beam voltage.....	2.0	2.6	kV
Helix current, average.....		5	mA

TH 9121 A



THOMSON-CSF
GROUPEMENT TUBES ELECTRONIQUES

	min.	max.	
Cathode current peak.....		200	mA
Peak grid voltage.....		150	V
Pulse width.....		1000	µs
Duty factor.....		0.1	
Collector temperature.....		160	°C
Grid bias supply resistance.....		10	kΩ
Body temperature.....		70	°C
Cooling air flow.....	0.5		m ³ /mn
Load VSWR.....		1.5:1	
Focus coil current.....		2	A
Focus coil voltage.....		60	V

TYPICAL OPERATION

Beam voltage.....	2300	V
Cathode current, peak.....	150	mA
Grid bias.....	- 20	V
Peak grid voltage.....	+ 40	V
Pulse width.....	10	µs
Duty factor.....	0.1	
Power output, saturated.....	45	W
Gain at saturated power output.....	33	dB
Small signal gain.....	36	dB
Frequency range.....	2700 - 3300	MHz
Focus applied power.....	90	W

TH 19603 B FOCUS COIL

Cooling.....	forced air
Weight, approximate.....	12 kg
Dimensions.....	see drawings
Power supply connections.....	pigmy PT 02A84P
Focus coil voltage.....	60 V
Focus coil current.....	2 A

OPERATING INSTRUCTIONS

These operating instructions provide basic information for installing and operating the TH 9121 A pulsed 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 2.6 kV dc. A device should be provided to cut-off the grid voltage and the beam voltage if the helix current exceeds the maximum rating.

- Grid power supply

The grid power supply should present a low impedance to the grid circuit. This will prevent runaway conditions and oscillations in the grid power supply wiring due to the possibility of the grid presenting a negative resistance to the gating circuit.

The grid gate generator should have a protective circuitry to prevent the pulse duration from exceeding 1 ns. In addition, a suitable protective device (e.g. a spark gap) should be provided to limit the potential difference between grid and cathode to a maximum of 150 volts.

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 environment variations so that ratings will never be exceeded.

III - Mounting

The tube can be mounted in any position. See the outline drawing page 4 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 RCA2F2.

- Heater : brown

- Heater-cathode : yellow

- Grid : green

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

IV - 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 (see test performance sheet)

- 1 - Apply focus coils current.
- 2 - Apply heater 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 mechanism 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 mechanism 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.

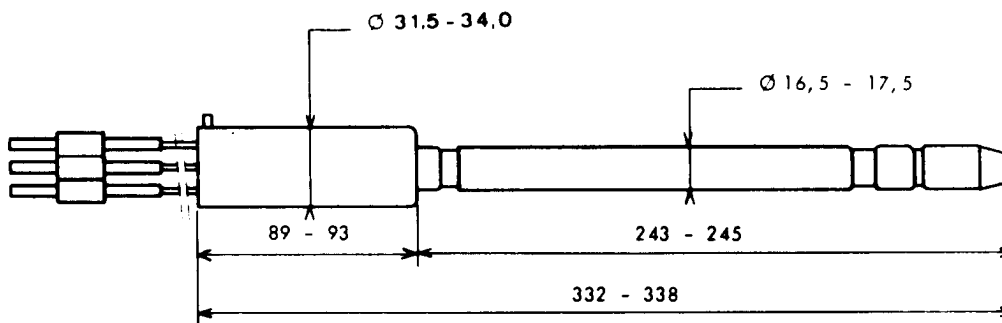
- 6 - Apply R.F. drive power.

V - 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 19603 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.

OUTLINE DRAWING



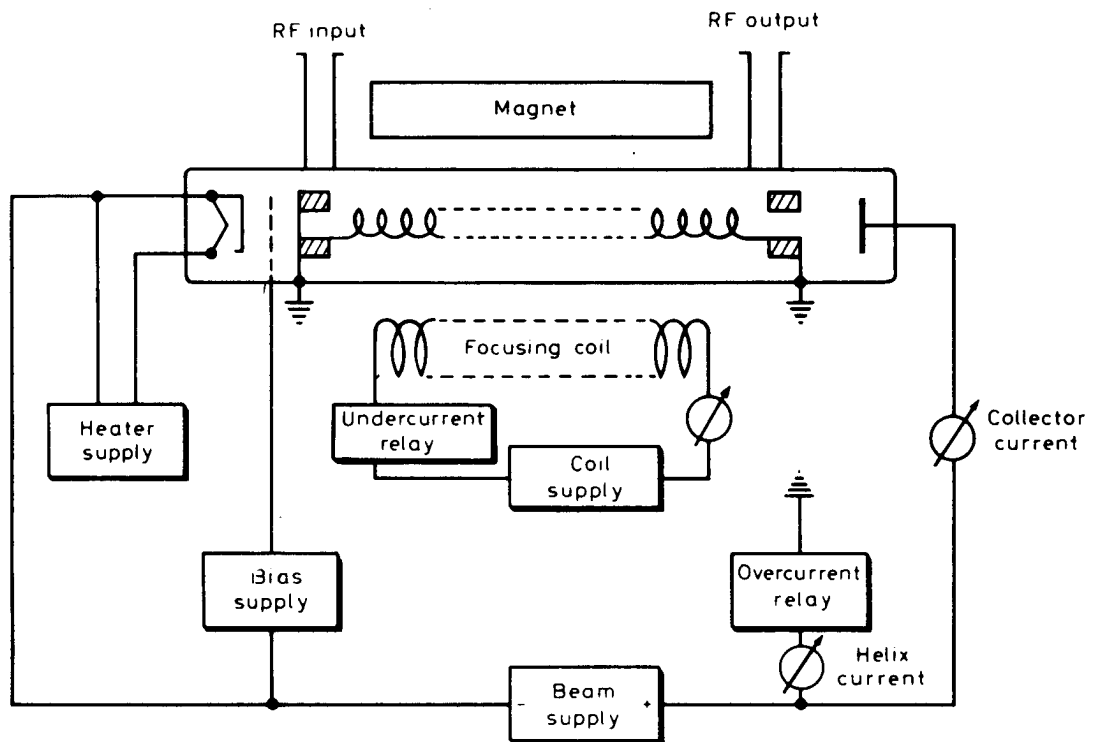
CONNECTIONS	
Brown	Heater
Yellow	Cathode-heater
Green	Grid

Dimensions in mm



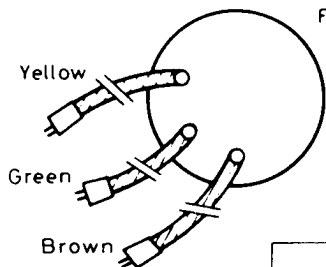


CIRCUIT CONNECTIONS
TUBE AND ELECTROMAGNET



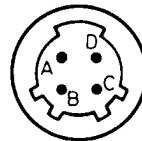
TUBE CONNECTIONS

flexible leads and
FRB plugs (RCA 2F2)



CONNECTIONS	
Brown	Heater
Yellow	Cathode-heater
Green	Grid

FOCALIZER SOCKET
Pygmy PT 02A84P

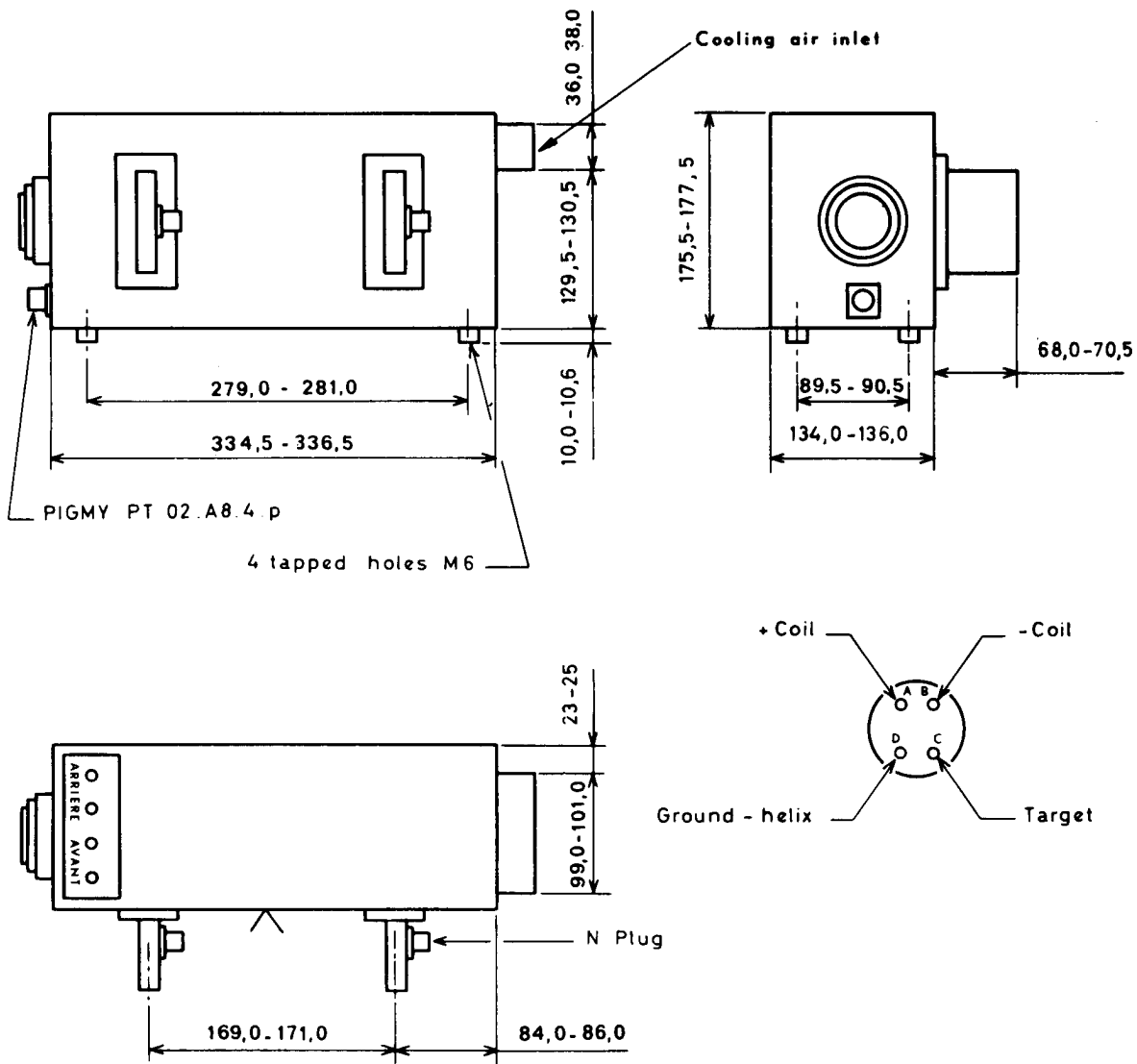


A	Focusing coil +
B	Focusing coil -
C	Collector
D	Helix-ground



OUTLINE DRAWING

TH 19603 B Electromagnet



Dimensions in mm.

