

FEDERAL TELECOMMUNICATION LABORATORIES

ELECTRON TUBE

TYPE REGISTRATION

Reservation No: Manufacturers Designation: X190  
Reservation Date: February 3, 1950 Data Bureau Designation: 5929

TRAVELING WAVE AMPLIFIER

General Characteristics

The X-190 is a super-high-frequency traveling wave amplifier tube employing a helical wave-propagating structure. The tube is designed for use as a continuous-wave amplifier in the frequency range 4400 to 5000 megacycles per second; it will transmit any type of modulation.

For the amplifier circuit, 1" x 2" waveguide sections are used. A magnetic field is used to hold the electron beam to constant diameter.

Electrical Data

Heater Voltage	6.3 volts
Heater Current	2.0 amperes
Maximum Frequency	5000 megacycles
Minimum Frequency	4400 megacycles
Cold Transmission Loss	30 decibels

Maximum Ratings, Absolute Values

Accelerator Voltage	3500 volts
Accelerator Current	2 milliamperes
Helix Voltage*	3500 volts
Helix Current	1 milliampere
Collector Voltage	3800 volts
Collector Dissipation	200 watts
Focusing Electrode Voltage	-100 volts

\* Helix voltage to ground should not exceed 1000 volts.

Mechanical Information

Type of Cathode	Coated Unipotential
Base	Medium shell diheptal, 14 pin
Physical Specifications	(See outline drawing)
Base Connections	(See outline drawing)
Mounting Position	Any
Weight	8 Ounces
RF Input and Output	For use with waveguide RG49/U (2"x1" ). Matching sections in amplifier are fitted with choke flanges UGL48/U.

Mechanical Information (Cont.)

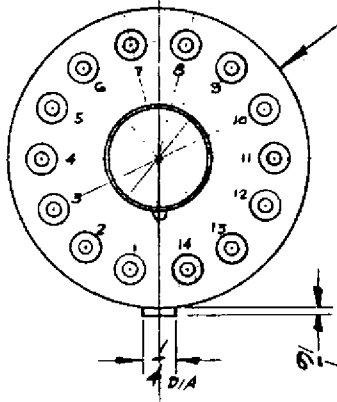
Type of Cooling	Forced Air	
Collector Dissipation - Watts	200	160
Air Flow - Cubic Feet per Minute	20	17
Pressure - Inches of Water	0.20	0.16

Typical Operation

Frequency	4700 megacycles per second	
Heater Voltage	6.3 volts	
Heater Current	2.0 amperes	
Accelerator Voltage	3150 volts	
Accelerator Current	1 milliampere	
Helix Voltage	3150 volts	
Helix Current	1 milliampere	
Collector Voltage	3450 volts	
Collector Current	45 milliamperes	
Focus Cup Voltage (adjusted for maximum beam transmission)	-25 volts	
Power Output	10 watts	
Bandwidth to 3 db points	greater than	600 megacycles
Gain	20 decibels	

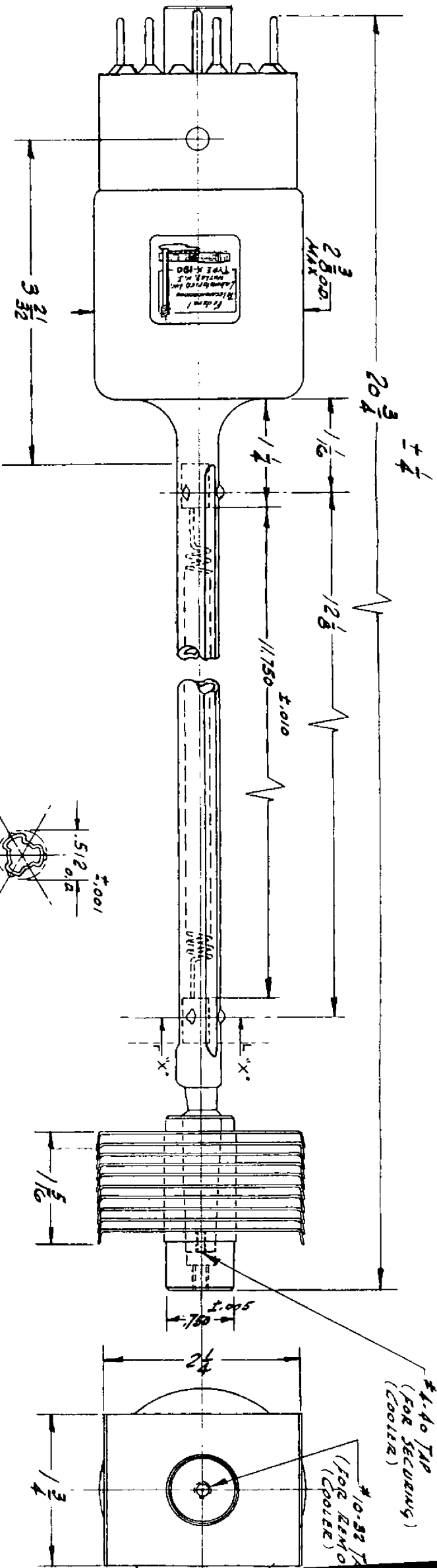
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MEDIUM SHELL DIAPHRAGM  
1/4 PIN BASE  
JETEC #B-14-38



*Bottom View*

- Base Pin*
- 1. HEATER - CATHODE
  - 11. HEILIX
  - 9. ACCELERATOR
  - 7. GETTER
  - 4. HEATER
  - 2. FOCUSING CUP



MATERIAL  
FINISH  
TOLERANCE  
BASIC DIMENSIONS PRACT. DIMENSIONS DEC. DIMENSIONS  
UP TO 6 ± 1/64 ± .008  
ABOVE 6 TO 24 ± 1/32 ± .010  
ABOVE 24 ± 1/16 ± .015  
UNLESS OTHERWISE SPECIFIED

APP'D.	REVISIONS
<i>Fm</i>	<i>F-1-20-50-1/2. REDRAWN &amp; REVISED</i>

USED WITH	DETAILS
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SCALE *Full*

APP'D. *ENG. K.190* DRAWING *UL-1055/12*

OUTLINE DWG.  
K.190