

**EITEL-McCULLOUGH, INC.**  
SAN CARLOS, CALIFORNIA

# X780

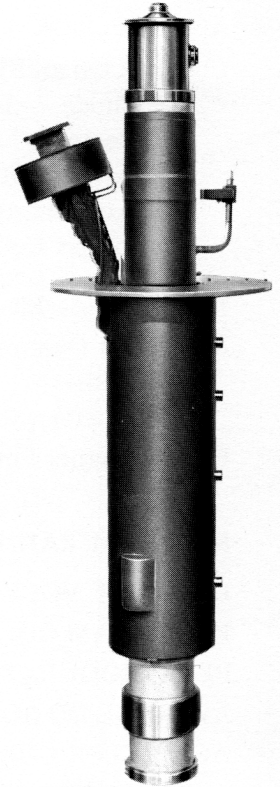
**PULSE AMPLIFIER  
L-BAND KLYSTRON**

The Eimac X780 is a pulse-amplifier klystron designed to operate at frequencies from 1235-1365 megacycles. This klystron will deliver a peak output power of 2.5 megawatts at 75 kilowatts average power, with a minimum saturated gain of 35 decibels. The small signal gain is in excess of 50 decibels.

Four integral cavities are used in the X780. The RF input and output coupling circuits are of the fixed broad-band type, optimized at maximum power. The output window is a thick beryllium oxide disc which will withstand severe abuse. The electron gun utilizes a confined flow configuration which results in a stable beam and non-critical focusing adjustments.

This klystron employs the Eimac Modulating Anode which provides a convenient means for pulse modulating the output power without changing the beam voltage. Also incorporated are two built-in vacuum pumps. One consists of an active titanium getter. The other is an ion pump which maintains a low vacuum pressure and provides for continuous monitoring of this pressure.

A focusing electromagnet and klystron supporting structure, Catalog Number H-145, has been designed for use with the X780.



## CHARACTERISTICS

### ELECTRICAL

Cathode: EMA, Unipotential			
Minimum Heating Time	- - - - -	10	minutes
Heater: Voltage ( ±5% )	- - - - -	7	volts
Current	- - - - -	90	amperes
Maximum Starting Current	- - - - -	180	amperes
Getter: Voltage ( AC nominal )	- - - - -	4	volts
Current	- - - - -	20	amperes
Power Gain ( minimum narrow band )	- - - - -	35	decibels
Peak Power Output	- - - - -	2.5	megawatts
Average Power Output	- - - - -	75	kilowatts
Frequency Range	- - - - -	1235-1365	megacycles
Phase: Beam Voltage Sensitivity	- - - - -	0.006	degree/volt
Ion Pump:			
Voltage DC	- - - - -	4000	volts
Current ( 0.1 megohm limiting resistor )	- - - - -	10	milliamperes
Beam Microperveance	- - - - -	1.5	
Electron Gun Microperveance	- - - - -	2.5	
Input VSWR ( maximum )	- - - - -	1.5:1	



**MECHANICAL**

Operating Position	- - - - -	Vertical, Cathode End Down
RF Input Coupling	- - - - -	EIA standard RS 225, 7/8" rigid coaxial fitting
RF Output Coupling	- - - - -	RG69/U Flange
Approximate Weight (tube only)	- - - - -	400 pounds
Approximate Weight (H-145 Magnetic Circuit)	- - - - -	1500 pounds
Cooling: Oil and Water		
Cathode — Immersed in Oil		<i>Flow Rate</i> <i>Pressure Drop</i>
Collector	- - - - -	60 gpm    40 psi
Klystron Body	- - - - -	5 gpm    25 psi
Electromagnet	- - - - -	2 gpm    30 psi
Fittings: Collector — Hansen B12 HK		
Body     — Hansen B4-K26		
Electromagnet — Hansen B4-H26		
Maximum Overall Dimensions (Klystron & Electromagnet):		
Length	- - - - -	71 inches
Diameter	- - - - -	24 inches
Electromagnet Power Supply Requirements	- - - - -	2.5 kilowatts

**MAXIMUM RATINGS**

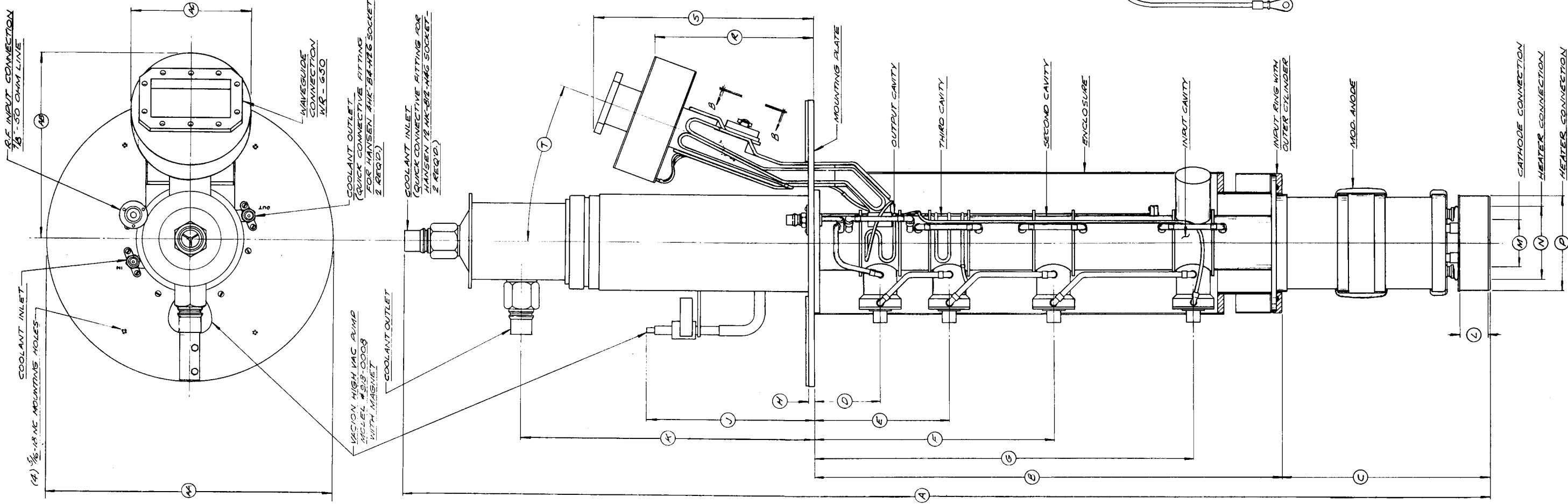
DC BEAM VOLTAGE	- - - - -	120 kilovolts
PEAK BEAM CURRENT	- - - - -	62.5 amperes
PEAK MODULATING ANODE VOLTAGE	- - - - -	88 kilovolts
AVERAGE DC BODY CURRENT	- - - - -	150 milliamperes
AC GETTER CURRENT	- - - - -	45 amperes
COLLECTOR DISSIPATION	- - - - -	250 kilowatts
SEAL TEMPERATURES	- - - - -	175 degrees C
LOAD VSWR	- - - - -	1.5:1

**TYPICAL OPERATION, NARROW-BAND PULSE AMPLIFIER**

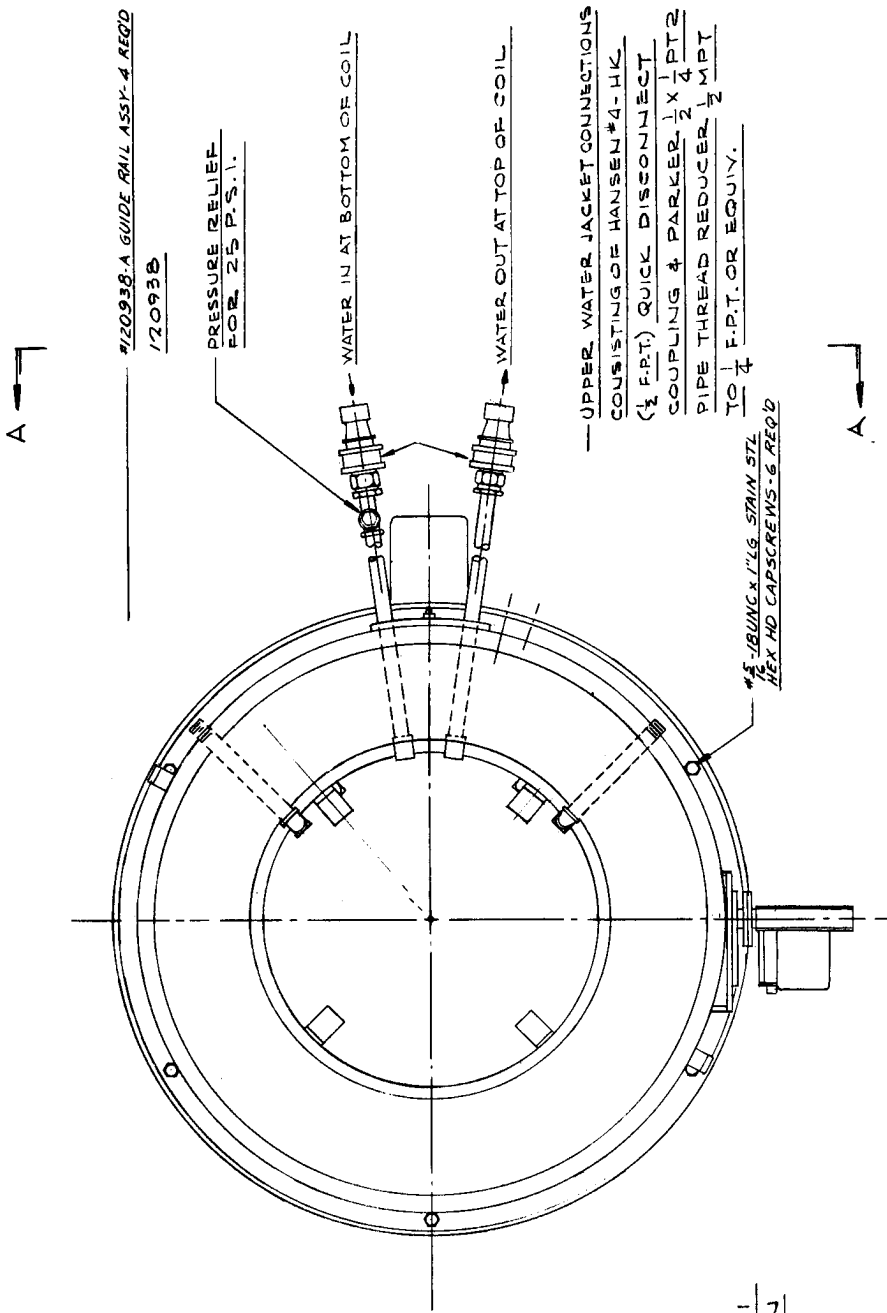
Frequency	- - - - -	1295	1295	megacycles
DC Beam Voltage	- - - - -	100	115	kilovolts
Peak Modulating-Anode Voltage	- - - - -	73.5	83.5	kilovolts
Peak Beam Current	- - - - -	41.8	58.6	amperes
Average DC Body Current	- - - - -	90	100	milliamperes
Peak Output Power	- - - - -	1.485	2.515	megawatts
Average Output Power	- - - - -	89	75.5	kilowatts
Peak Drive Power	- - - - -	0.475	0.790	kilowatts
Power Gain	- - - - -	35	35	decibels
Peak Beam Power Efficiency	- - - - -	35.6	36.8	percent
Pulse Width	- - - - -	2	1	millisecond
Pulse Repetition Rate	- - - - -	30	30	pulses/second
Duty	- - - - -	0.06	0.03	percent

For additional information regarding a specific application, write to Eitel-McCullough, Inc., San Carlos, California.

DIMENSIONAL DATA			
REF.	NOM.	MIN.	MAX.
A	92.625		
B	40.250		
C	17.125		
D	6.000		
E	11.812		
F	20.562		
G	32.312		
H	.500		
J	12.625		
K	24.750		
L	2.375		
M	4.000		
N	6.250		
P	8.000		
R	12.500		
S	17.750		
T	20°		
AA	24.000		
AB	25.000		
AC	70.000		

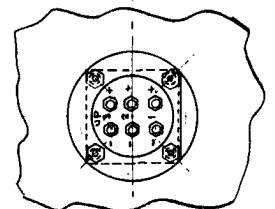
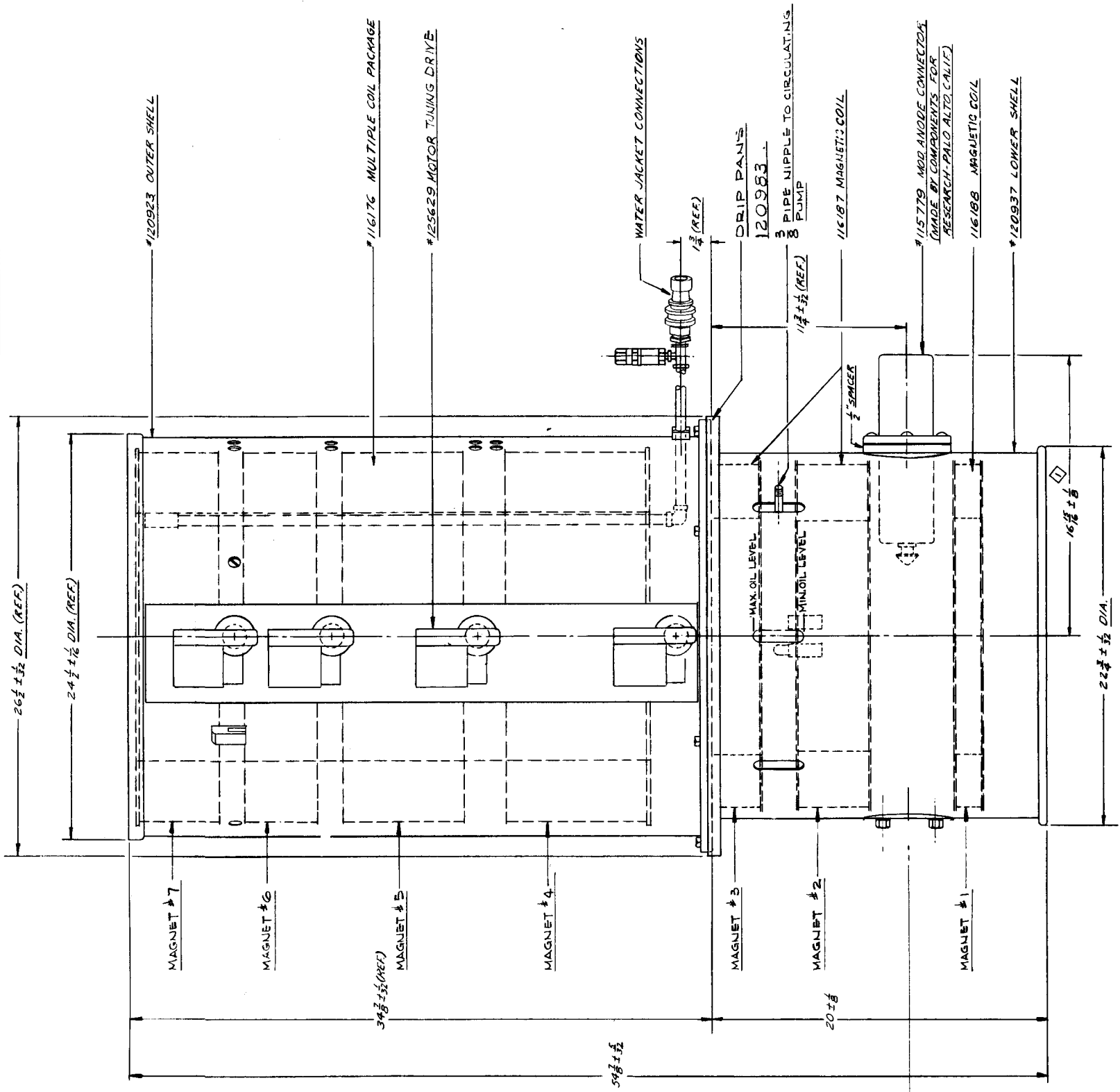
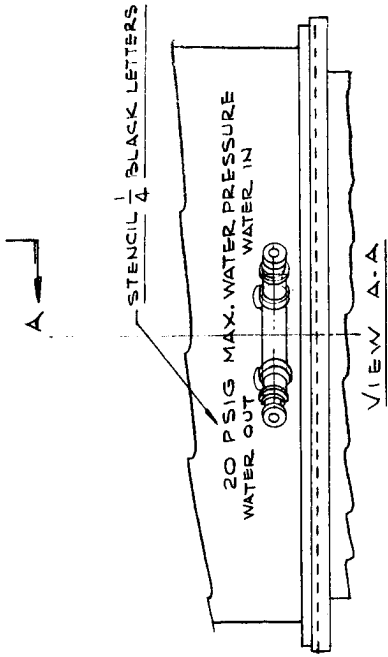


X780 KLYSTRON



OPTIONAL POSITIONS

NOTE:  
MAGNETS ARE TO BE NORTH UP ON ALL EXCEPT MAGNET #1 WHICH IS TO BE NORTH DOWN



H-145 KLYSTRON AMPLIFIER CIRCUIT ASSEMBLY