



EITEL-McCULLOUGH, INC.  
 SAN BRUNO, CALIFORNIA

TENTATIVE DATA  
 4KM100LA  
 POWER AMPLIFIER  
 L-BAND KLYSTRON

The Eimac 4KM100LA is a four-cavity, magnetically focused, power-amplifier klystron designed for use at frequencies from 470 to 610 megacycles. Intended primarily for television visual service, it is also suitable for aural TV, or for tropospheric-scatter communications service.

When adjusted for narrow-band CW operation the 4KM100LA will deliver a minimum output power of 35 kilowatts with a power gain of 45 decibels. In television visual service it will provide more than 25 kilowatts of peak synchronizing power, with a power gain of 30 decibels, and 1db bandwidth of 8 megacycles. Random AM noise is more than 60db below black level.

The electron gun of this klystron utilizes a semi-confined flow field which minimizes focusing adjustments and produces a very stable beam. The cathode loading of only 100 milliamperes per square centimeter, at a beam voltage of 18 kilovolts, is ultra conservative in the interest of long life. Effective protection from internal arcs is provided by the Eimac Modulating Anode.

All tuning is accomplished outside of the vacuum envelope by means of external resonant cavities which enclose the cylindrical ceramic windows of the klystron. Load couplers are provided to permit external loading of these cavities for extreme wide-band operation. However, external cavity loading is not ordinarily required in TV visual service.

The 4KM100LA incorporates a built-in vacuum pump in the form of a titanium getter. This getter should be energized whenever heater power is applied. Its normal operating voltage is 3.7 volts at approximately 20 amperes. When a new tube is first placed in operation the getter should be flashed for 5 minutes at a voltage of 7.5 volts ( $\pm 5\%$ ) which produces a current of approximately 33 amperes. The getter should also be flashed whenever a tube exhibits symptoms of high gas pressure.

Eimac Klystron Amplifier Circuit Assembly H133 has been designed for use with the 4KM100LA to cover the specified frequency range. This assembly includes a klystron supporting structure, magnetic focusing coils, tuning cavities, and adjustable load couplers for each cavity.

CHARACTERISTICS

ELECTRICAL

Heater:	Voltage	-	-	-	26.0	volts
	Current	-	-	-	11.5	amperes
	Maximum Starting Current	-	-	-	23	amperes
Cathode:	EMA, Unipotential					
	Heating Time	-	-	-	5	minutes
Getter	(Operating):					
	A-C Voltage ( $\pm 5\%$ )	-	-	-	3.7	volts
	A-C Current	-	-	-	20	amperes
Getter	(Flash):					
	A-C Voltage ( $\pm 5\%$ )	-	-	-	7.5	volts
	A-C Current	-	-	-	33	amperes
Power Gain:	Narrow Band	-	-	-	45	decibels
	Television Visual Service	-	-	-	30	decibels
Output Power:	Narrow Band	-	-	-	35	kilowatts
	Television Visual Service	-	-	-	25	kilowatts
Frequency Range (H133 Assembly)		-	-	-	470 to 610	megacycles

## MECHANICAL

Operating Position	-	-	-	Axis vertical, cathode up
RF Coupling:				
Input	-	-	-	Type "N" coaxial fitting
Output	-	-	-	3-1/8 inch, 50-ohm line
Input and 2nd Cavity Loading	-	-	-	Type "N" coaxial fitting
3rd Cavity Loading	-	-	-	1-5/8 inch, 50-ohm line
Shipping Weights:				
Klystron Only	-	-	-	119 lbs (Net)
H-133 RF Circuit Assembly	-	-	-	1188 lbs (Net)
Cooling: Water and Forced Air				
			<u>Flow Rate</u>	<u>Pressure Drop</u>
Cathode	-	-	*5 cfm	-----
Cavity	-	-	50 cfm	TBS
Klystron Body (5 drift-tube sections, in series)			2 gpm	35 psi
Klystron Collector	-	-	30 gpm	7.5 psi

## MAGNETIC-COIL POWER-SUPPLY REQUIREMENTS

Each of Four Body Coils and Collector Coil:

Voltage	-	-	-	0 to 50	volts
Current	-	-	-	0 to 10	amperes

## MAXIMUM RATINGS

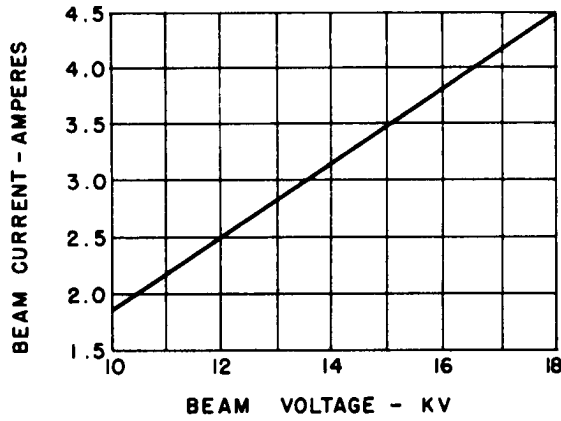
D-C BEAM VOLTAGE	-	-	-	20	KILOVOLTS
D-C BEAM CURRENT	-	-	-	6.0	AMPERES
D-C BODY CURRENT	-	-	-	150	MILLIAMPERES
COLLECTOR DISSIPATION	-	-	-	100	KILOWATTS
INLET WATER PRESSURE	-	-	-	100	PSI

## TYPICAL OPERATION

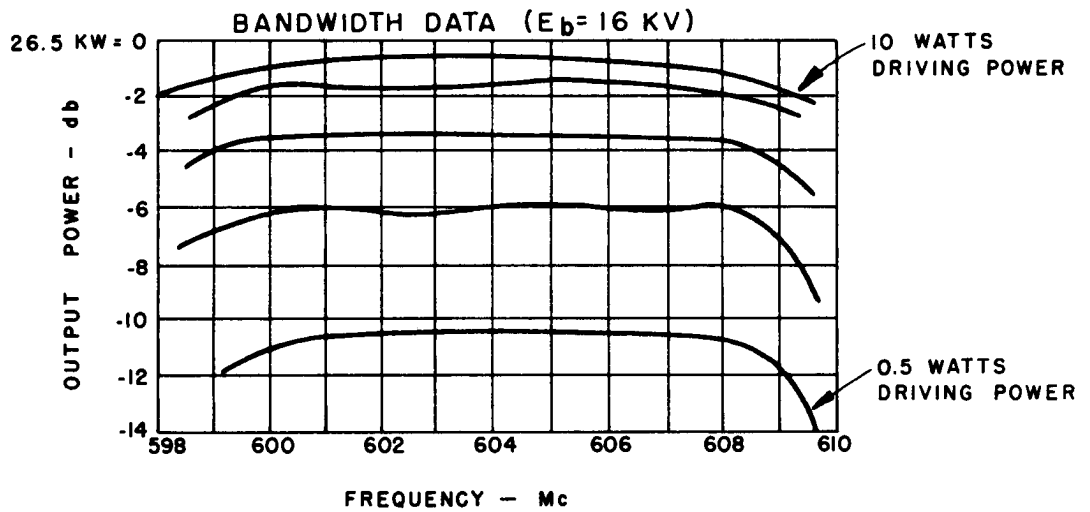
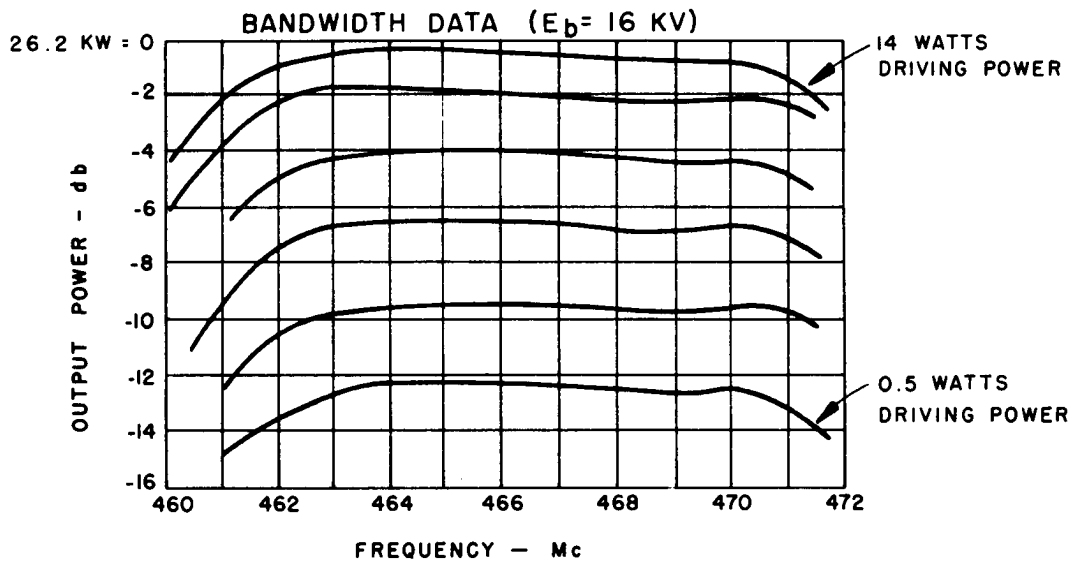
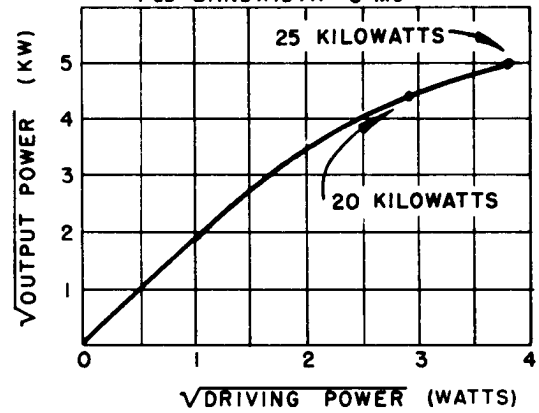
		<u>TV Visual Amplifier</u>	<u>Narrow Band CW</u>	
Frequency	-	550	550	megacycles
Output Power	-	26.4 (peak sync.)	35.4	kilowatts
Driving Power	-	20 " "	1.0	watts
Power Gain	-	31 " "	45	decibels
D-C Beam Voltage	-	16	18	kilovolts
D-C Beam Current	-	3.82	4.54	amperes
Beam Power Efficiency	-	43 (peak sync.)	43.3	percent
D-C Body Current	-	--	90	milliamperes
1 db Bandwidth	-	8	--	megacycles
Magnetic Coil Currents:				
First Body Coil	-	9.0	9.0	amperes
Second Body Coil	-	9.0	9.2	amperes
Third Body Coil	-	8.6	9.8	amperes
Fourth Body Coil	-	7.1	6.0	amperes
Collector Coil	-	3.3	6.3	amperes

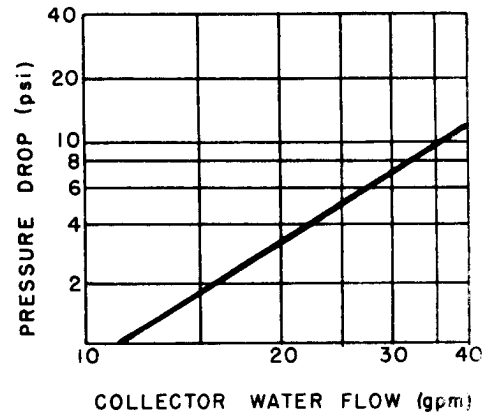
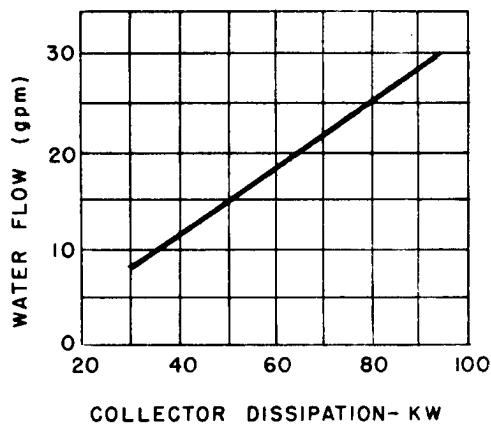
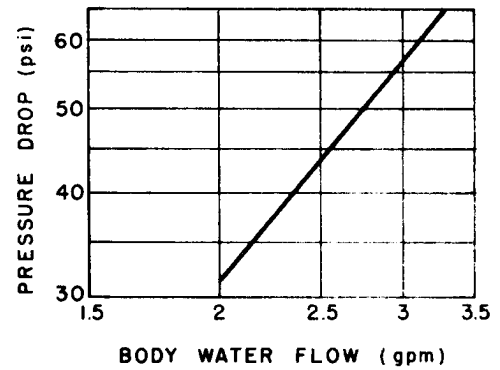
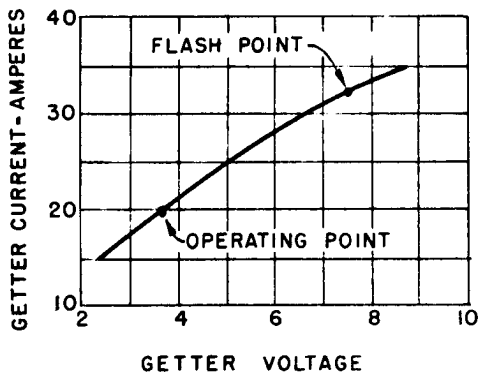
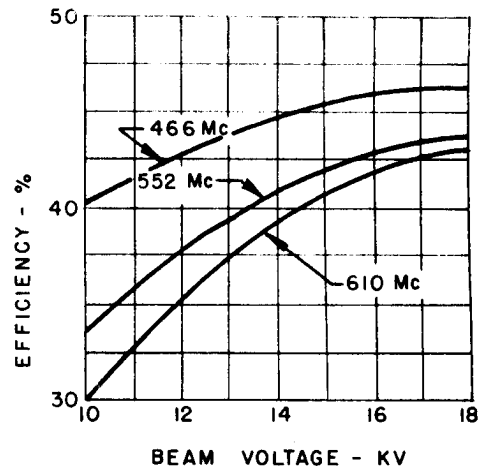
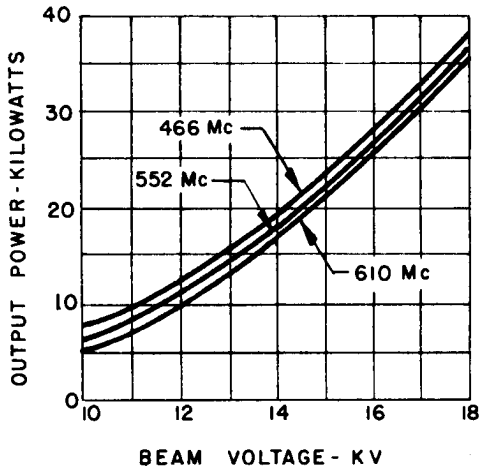
\* Required only if ambient air temperature exceeds 25° C.

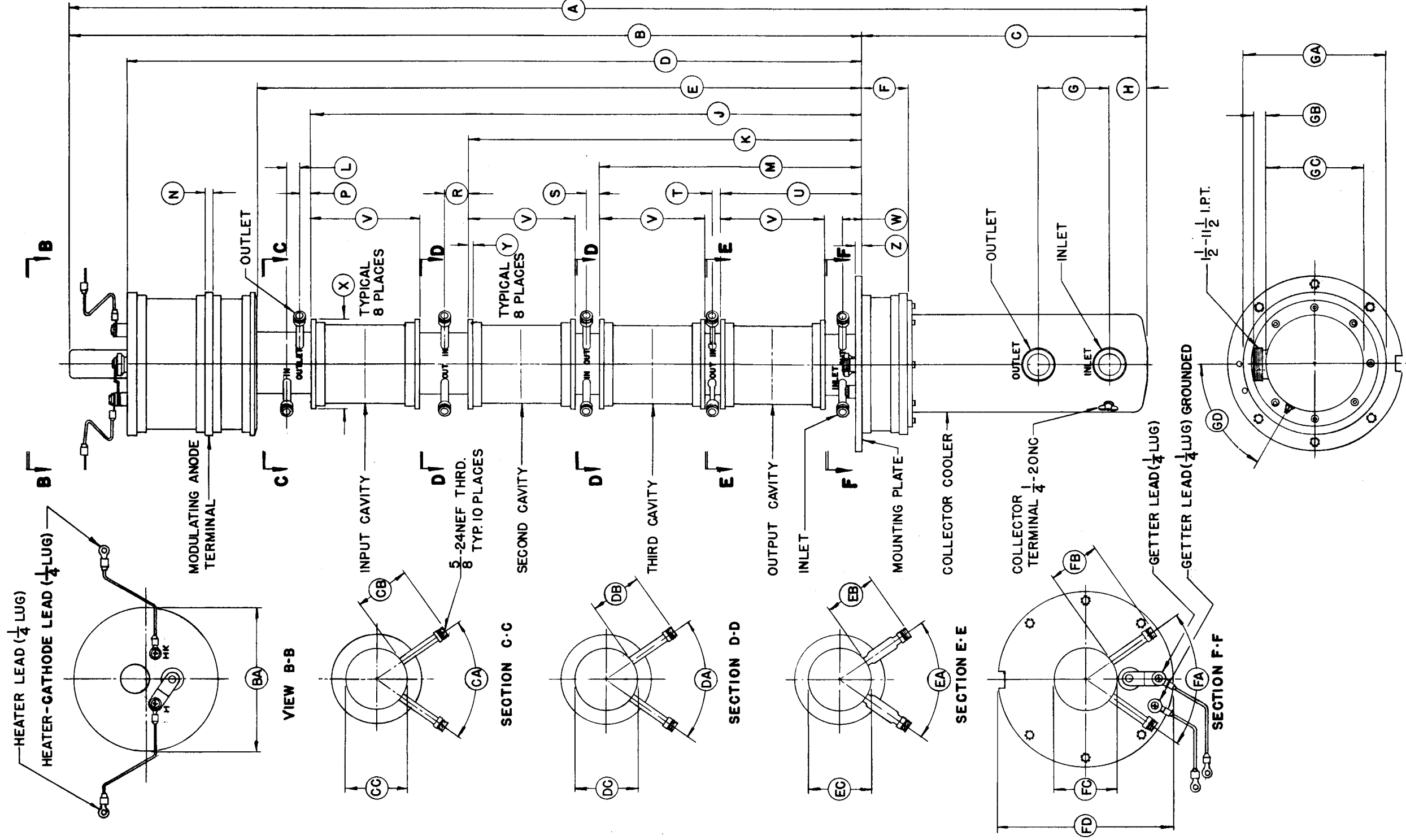
For additional information or information regarding a specific application, write to Eitel-McCullough, Inc., San Bruno, California.



**LINEARITY DATA**  
 $E_b = 16 \text{ KV}$   $F = 470 \text{ Mc}$   
 1 db BANDWIDTH = 8 Mc

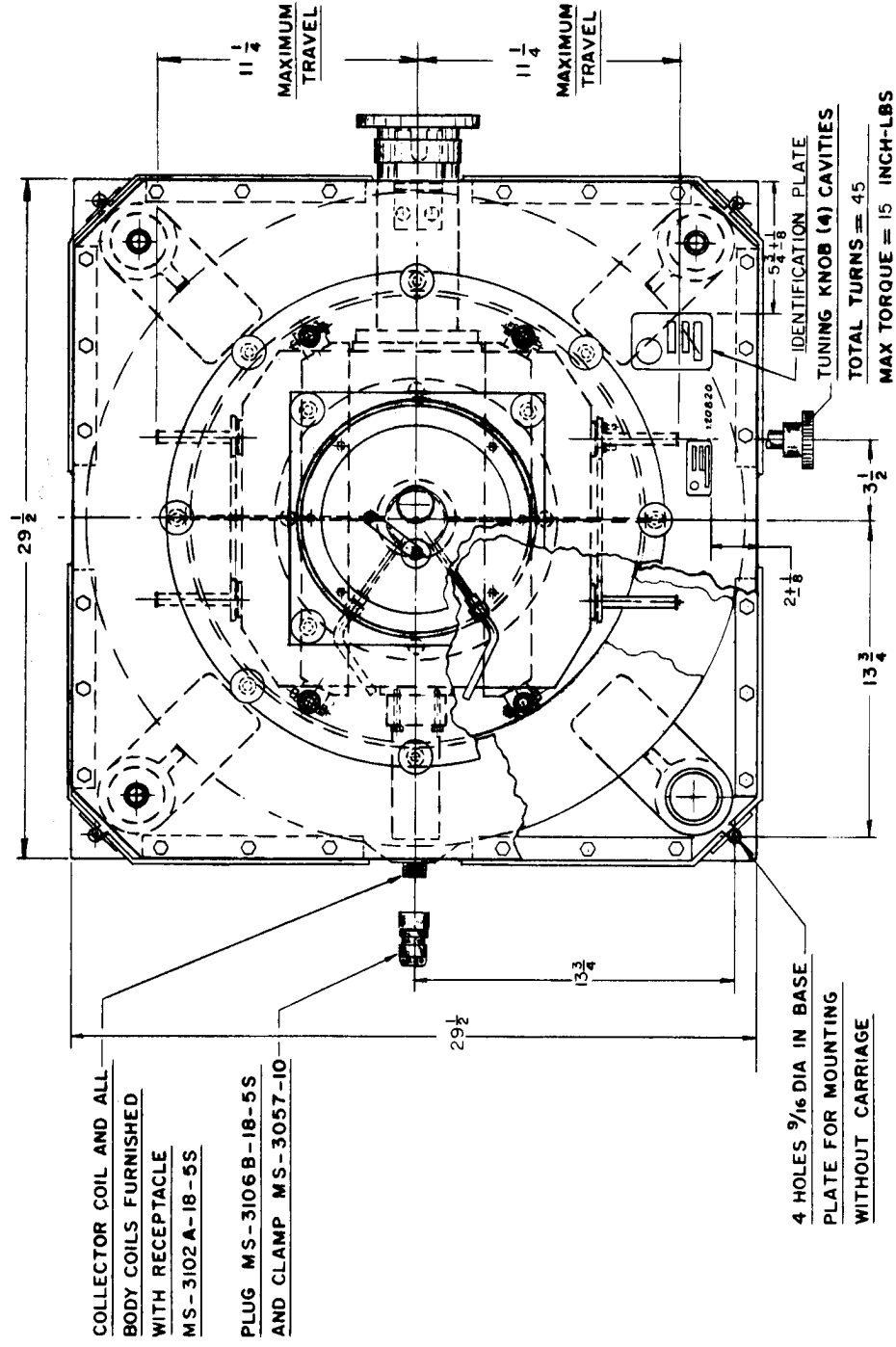






DIMENSION DATA			
REF.	NOMINAL	MINIMUM	MAXIMUM
A	61.625		
B	45.150		
C	16.475		
D	41.900		
E	34.467		
F	2.600		
G	4.000		
H	2.125		
J	31.341		
K	22.499		
L	.625		
M	14.999		
N	.375		
P	.636		
R	1.433		
S	.875		
T	.453		
U	8.124		
V	6.000		
W	1.124		
X	5.125		
Y	.250		
Z	.375		
BA	8.125 DIA		
CA	70°		
CB	3.000		
CC	3.500 DIA		
DA	70°		
DB	3.000		
DC	3.500 DIA		
EA	70°		
EB	3.000		
EC	3.500 DIA		
FA	70°		
FB	3.000		
FC	3.500 DIA		
FD	10.000 DIA		
GA	8.125 DIA		
GB	.843		
GC	5.500 DIA		
GD	60°		

4KM100 LA KLYSTRON

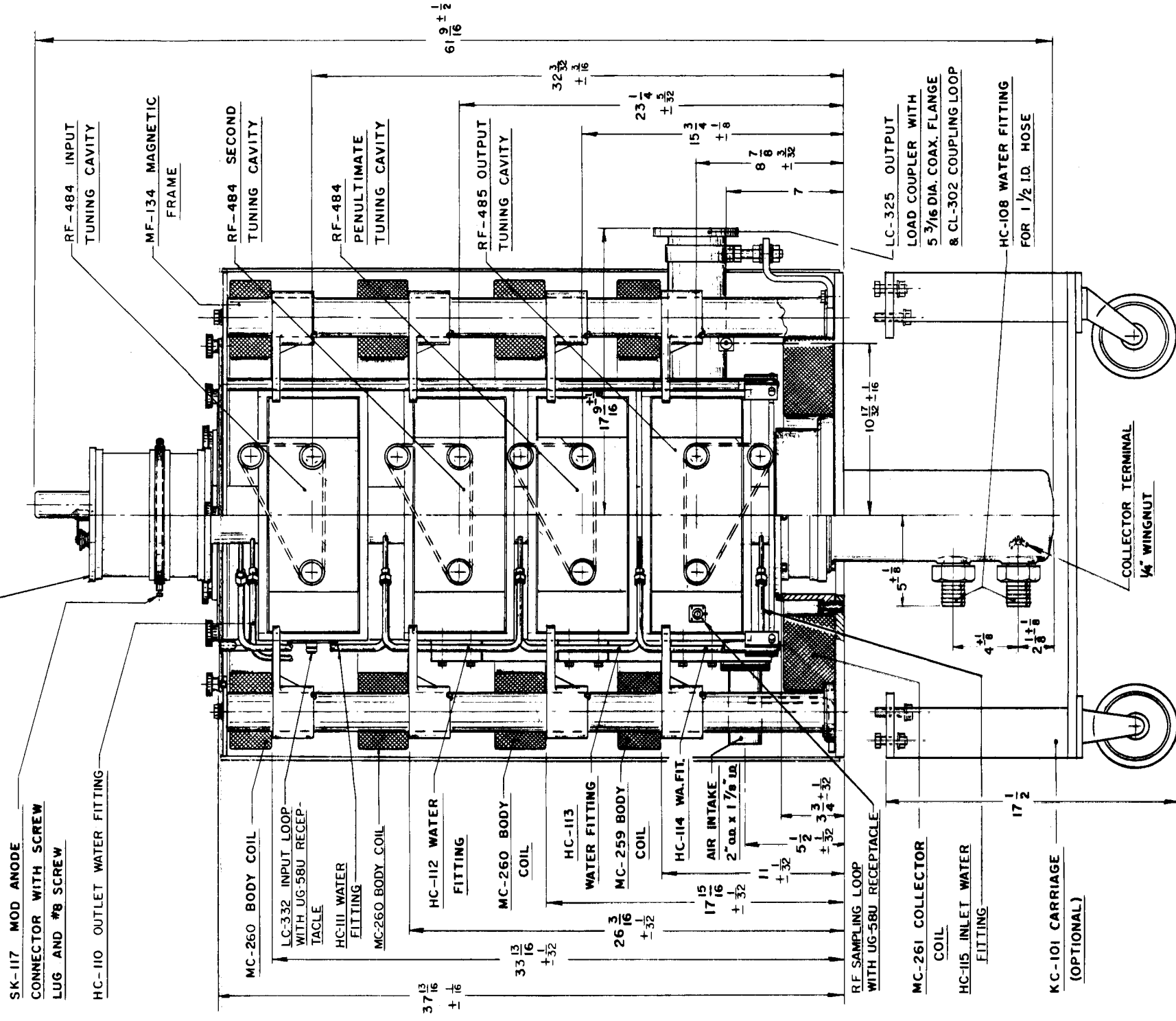


**NOTES**

**PARTS NOT SHOWN**

1. CP-100 (3) COVER PLATES
2. TL-103 (ONE) TUBE LIFT
3. HT-101 (ONE) WRENCH
4. HT-104 (ONE) WRENCH
5. LC-313A (ONE) LOAD COUPLER (OPTIONAL-USED ON PENULTIMATE TUNING CAVITY)
6. LC-333 (TWO) COUPLING LOOPS (OPTIONAL-USED ON INPUT & SECOND TUNING CAVITIES)

4KM100LA KLYSTRON-SHOWN FOR CLARITY- NOT INCLUDED IN H-133



H-133 KLYSTRON AMPLIFIER CIRCUIT ASSEMBLY



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

TENTATIVE DATA

**4KM100LA**

**POWER-AMPLIFIER  
L-BAND KLYSTRON**

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The electron gun of this klystron utilizes a semi-confined flow field which minimizes focusing adjustments and produces a very stable beam. The cathode loading of only 100 milliamperes per square centimeter, at a beam voltage of 18 kilovolts, is ultra conservative in the interest of long life. Effective protection from internal arcs is provided by the Eimac Modulating Anode.

All tuning is accomplished outside of the vacuum envelope by means of external resonant cavities which enclose the cylindrical ceramic windows of the klystron. Load couplers are provided to permit external loading of these cavities for extreme wideband operation. However, external cavity loading is not ordinarily required in TV visual service.

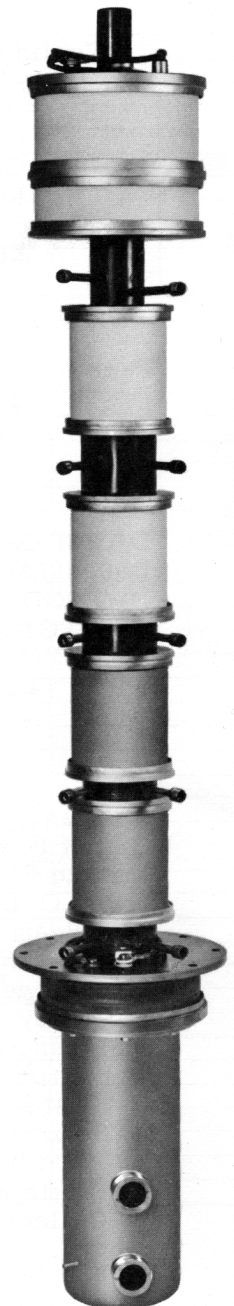
The 4KM100LA incorporates a built-in vacuum pump in the form of a titanium getter. This getter should be energized whenever heater power is applied. Its normal operating voltage is 3.7 volts at approximately 20 amperes. When a new tube is first placed in operation the getter should be flashed for 5 minutes at a voltage of 7.5 volts ( $\pm 5\%$ ) which produces a current of approximately 33 amperes. The getter should also be flashed whenever a tube exhibits symptoms of high gas pressure.

Eimac Klystron Amplifier Circuit Assembly H-133 has been designed for use with the 4KM100LA to cover the specified frequency range. This assembly includes a klystron supporting structure, magnetic focusing coils, tuning cavities, and adjustable load couplers for each cavity.

#### CHARACTERISTICS

##### ELECTRICAL

Heater:	Voltage	-	-	-	-	26.0	volts
	Current	-	-	-	-	11.5	amperes
	Maximum Starting Current					23	amperes
Cathode:	EMA, Unipotential						
	Heating Time	-	-	-		5	minutes
Getter (Operating):							
	A-C Voltage ( $\pm 5\%$ )	-	-			3.7	volts
	A-C Current	-	-	-		20	amperes
Getter (Flash):							
	A-C Voltage ( $\pm 5\%$ )	-	-			7.5	volts
	A-C Current	-	-	-		33	amperes
Power Gain:	Narrow Band	-	-			45	decibels
	Television Visual Service					30	decibels
Output Power:	Narrow Band	-	-			35	kilowatts
	Television Visual Service					25	kilowatts
Frequency Range (H-133 Assembly)						470 to 610	megacycles





## MECHANICAL

Maximum Height of Klystron and H-133 Assembly including KC-101 Carriage						67 inches
Operating Position	-	-	-	-	-	Axis vertical, cathode up
R-F Coupling:						
Input	-	-	-	-	-	Type "N" coaxial fitting
Output	-	-	-	-	-	3-1/8 inch, 50-ohm line
Input and 2nd Cavity Loading	-	-	-	-	-	Type "N" coaxial fitting
3rd Cavity Loading	-	-	-	-	-	1-5/8 inch, 50-ohm line
Weights:						
Klystron Only	-	-	-	-	-	119 pounds
H-133 RF Circuit Assembly	-	-	-	-	-	1188 pounds
Cooling:	Water and Forced Air					

					<u>Flow Rate</u>	<u>Pressure Drop</u>
Cathode	-	-	-	-	*5 cfm	-----
Cavity	-	-	-	-	50 cfm	TBS
Klystron Body (5 drift-tube sections, in series)					2 gpm	35 psi
Klystron Collector	-	-	-	-	30 gpm	7.5 psi

## MAGNETIC-COIL POWER-SUPPLY REQUIREMENTS

Each of Four Body Coils and Collector Coil:

Voltage	-	-	-	-	0 to 50	volts
Current	-	-	-	-	0 to 10	amperes

## MAXIMUM RATINGS

D-C BEAM VOLTAGE	-	-	-	-	20	KILOVOLTS
D-C BEAM CURRENT	-	-	-	-	6.0	AMPERES
D-C BODY CURRENT	-	-	-	-	150	MILLIAMPERES
COLLECTOR DISSIPATION	-	-	-	-	100	KILOWATTS
INLET WATER PRESSURE	-	-	-	-	100	PSI

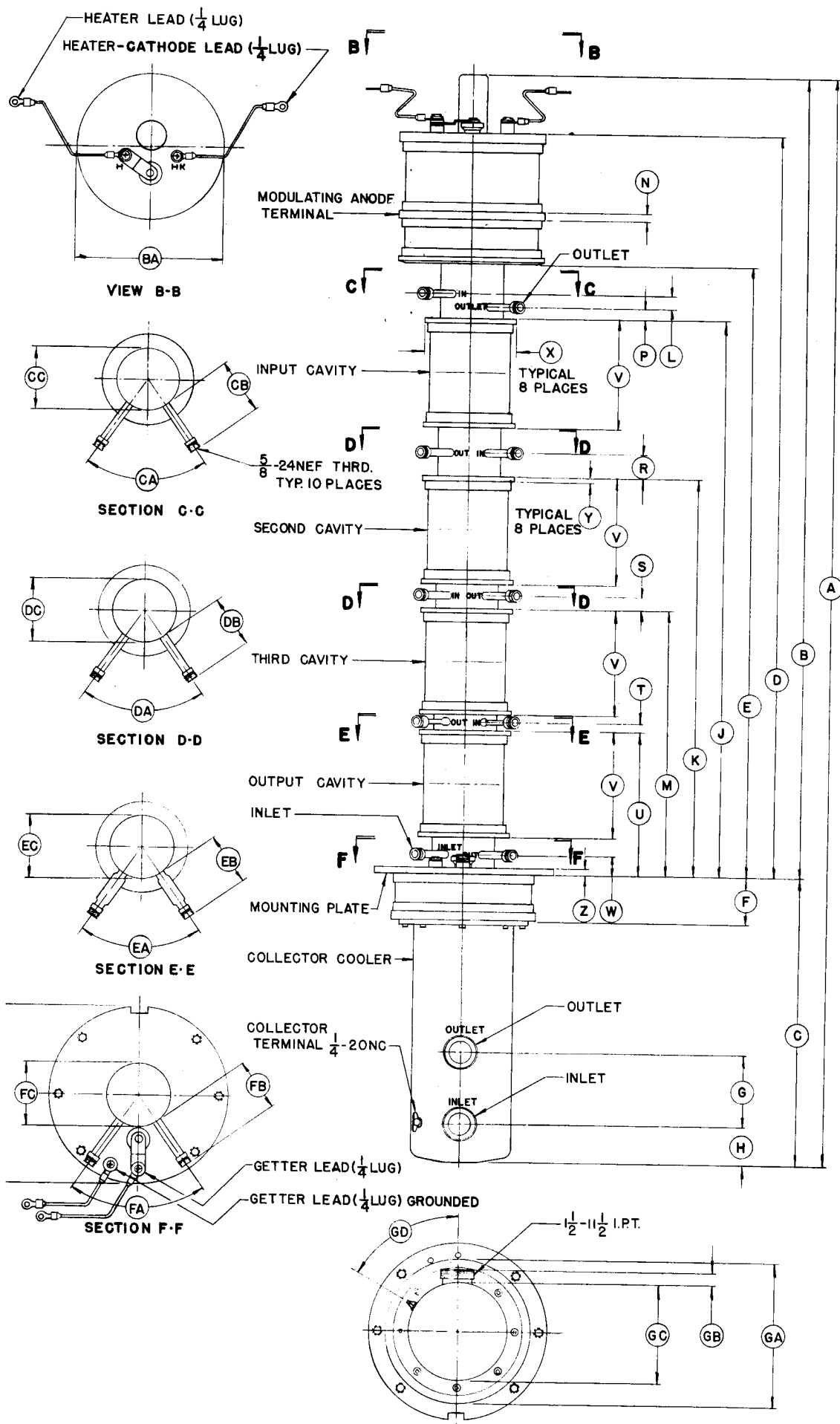
## TYPICAL OPERATION

			<u>TV Visual Amplifier</u>	<u>Narrow Band CW</u>	
Frequency	-	-	550	550	megacycles
Output Power	-	-	26.4(peak sync.)	35.4	kilowatts
Driving Power	-	-	20 " "	1.0	watts
Power Gain	-	-	31 " "	45	decibels
D-C Beam Voltage	-	-	16	18	kilovolts
D-C Beam Current	-	-	3.82	4.54	amperes
Beam Power Efficiency	-	-	43(peak sync.)	43.3	percent
D-C Body Current	-	-	--	90	milliamperes
1 db Bandwidth	-	-	8	--	megacycles
Magnetic-Coil Currents:					
First Body Coil	-	-	9.0	9.0	amperes
Second Body Coil	-	-	9.0	9.2	amperes
Third Body Coil	-	-	8.6	9.8	amperes
Fourth Body Coil	-	-	7.1	6.0	amperes
Collector Coil	-	-	3.3	6.3	amperes

\* Required only if ambient air temperature exceeds 25°C.

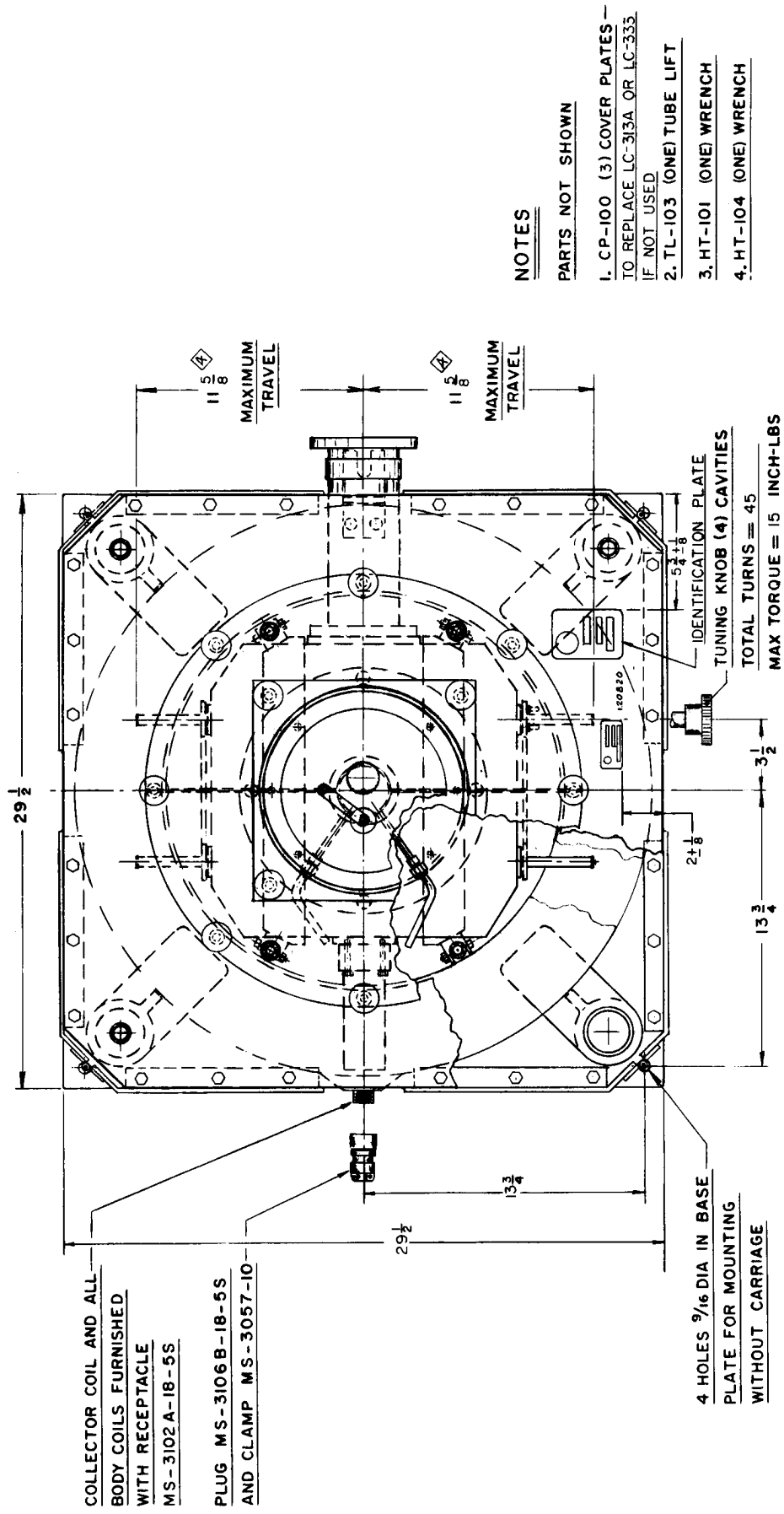
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DIMENSION DATA			
REF.	NOMINAL	MINIMUM	MAXIMUM
A	61.625		
B	46.150		
C	16.475		
D	41.900		
E	34.467		
F	2.600		
G	4.000		
H	2.125		
J	31.341		
K	22.499		
L	.625		
M	14.999		
N	.375		
P	.636		
R	1.433		
S	.875		
T	.453		
U	8.124		
V	6.000		
W	1.124		
X	5.125		
Y	.250		
Z	.375		
BA	6.125 DIA		
CA	70°		
CB	3.000		
CC	3.500 DIA		
DA	70°		
DB	3.000		
DC	3.500 DIA		
EA	70°		
EB	3.000		
EC	3.500 DIA		
FA	70°		
FB	3.000		
FC	3.500 DIA		
FD	10.000 DIA		
GA	6.125 DIA		
GB	.843		
GC	5.500 DIA		
GD	60°		

COLLECTOR END VIEW  
**4KM100LA KLYSTRON**



**NOTES**

**PARTS NOT SHOWN**

1. CP-100 (3) COVER PLATES TO REPLACE LC-313A OR LC-333 IF NOT USED
2. TL-103 (ONE) TUBE LIFT
3. HT-101 (ONE) WRENCH
4. HT-104 (ONE) WRENCH

4KM100LA KLYSTRON-SHOWN FOR CLARITY- NOT INCLUDED IN H-133

SK-117 MOD ANODE CONNECTOR WITH SCREW LUG AND #8 SCREW

HC-110 OUTLET WATER FITTING

RF-484 INPUT TUNING CAVITY

MF-134 MAGNETIC FRAME

RF-484 SECOND TUNING CAVITY

RF-484 PENULTIMATE TUNING CAVITY

LC-333 LOAD COUPLER WITH UG-58U RECEPTACLE

RF-485 OUTPUT TUNING CAVITY

LC-313A LOAD COUPLER WITH 3/2 DIA COAX FLANGE

RF SAMPLING LOOP WITH UG-58U RECEPTACLE

MC-261 COLLECTOR COIL

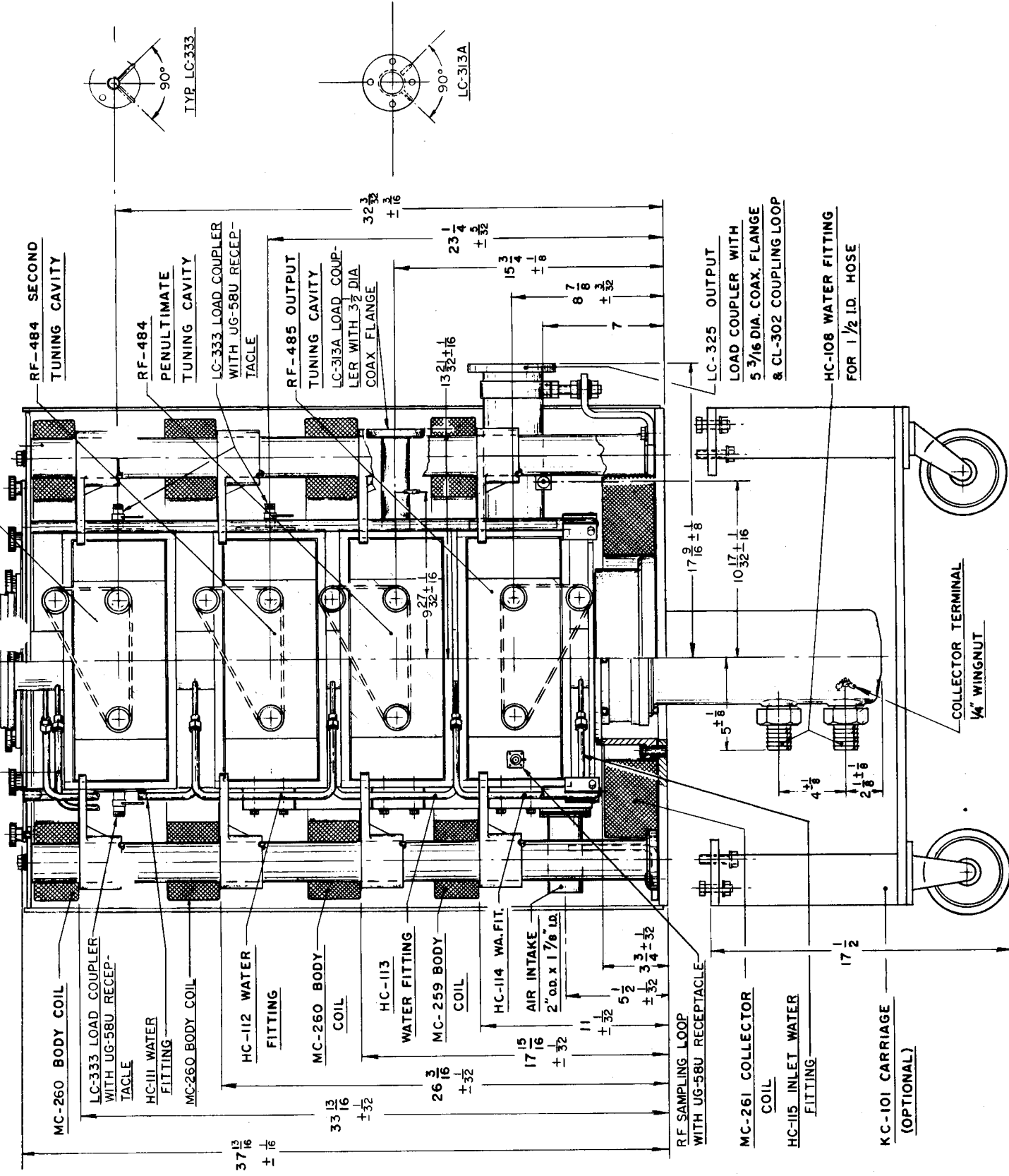
HC-115 INLET WATER FITTING

KC-101 CARRIAGE (OPTIONAL)

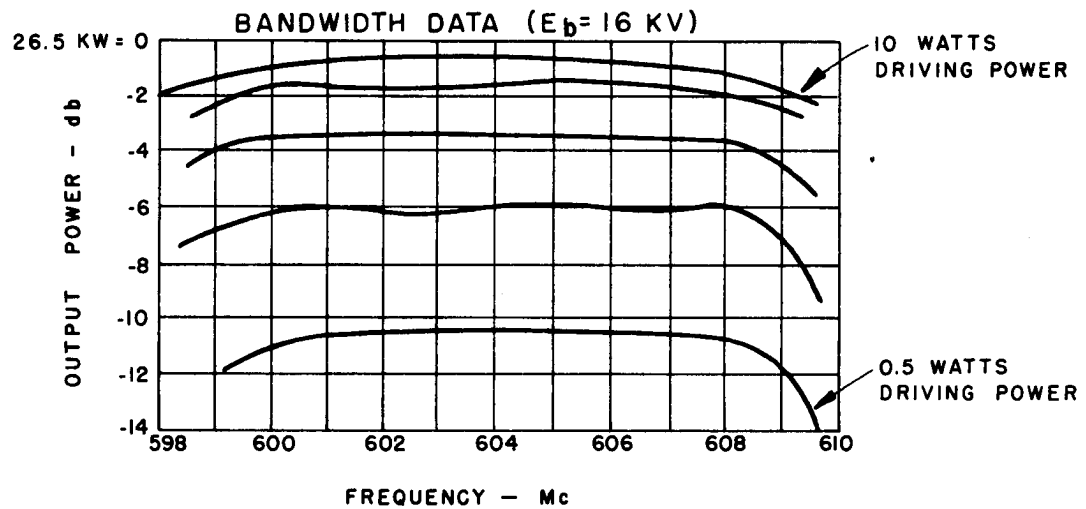
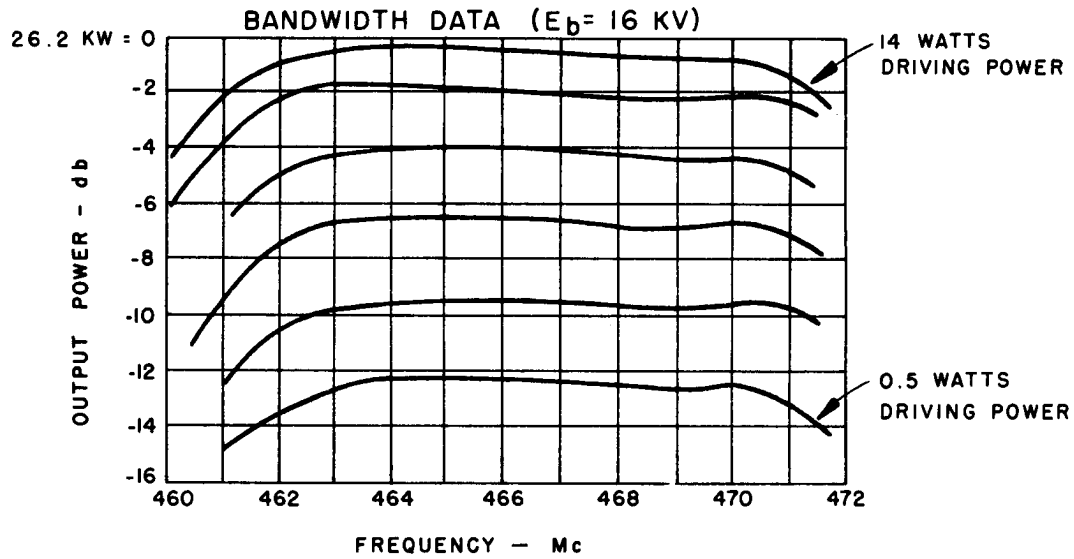
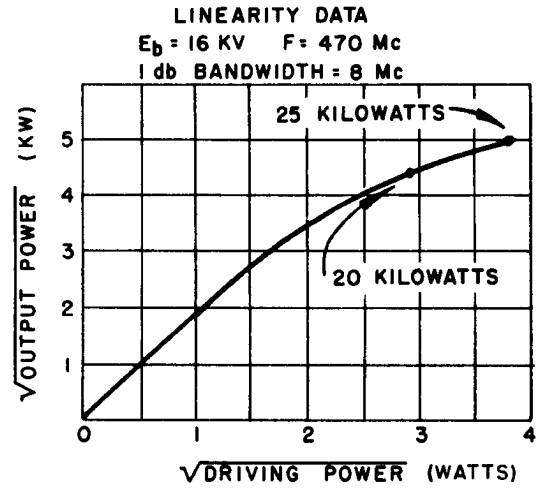
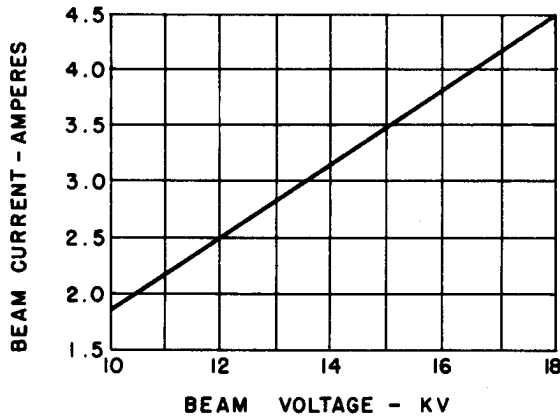
LC-325 OUTPUT LOAD COUPLER WITH 5 3/16 DIA. COAX. FLANGE & CL-302 COUPLING LOOP

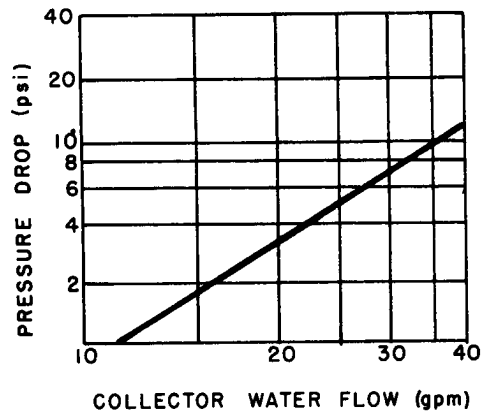
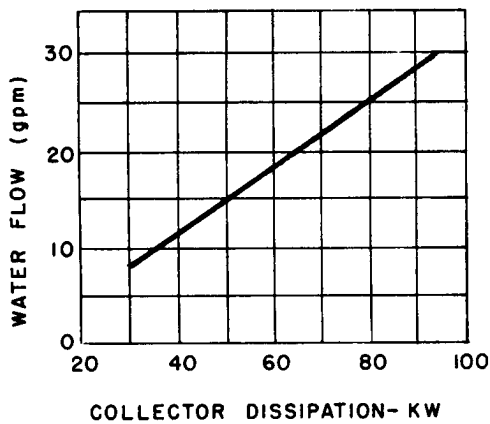
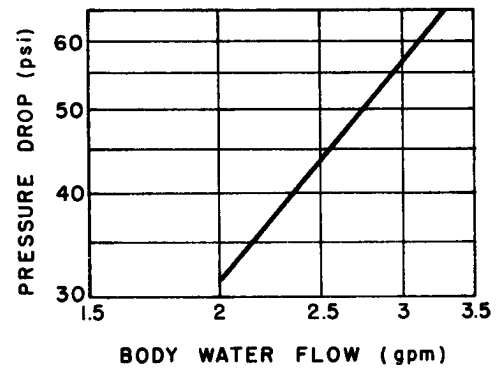
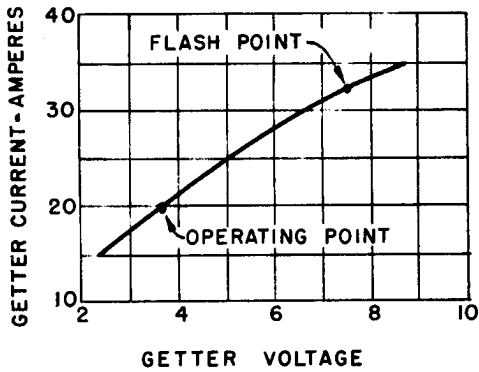
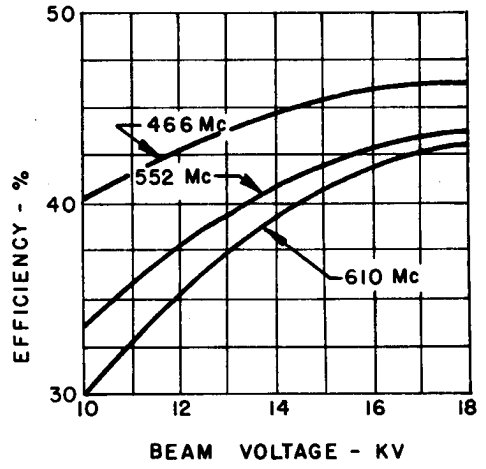
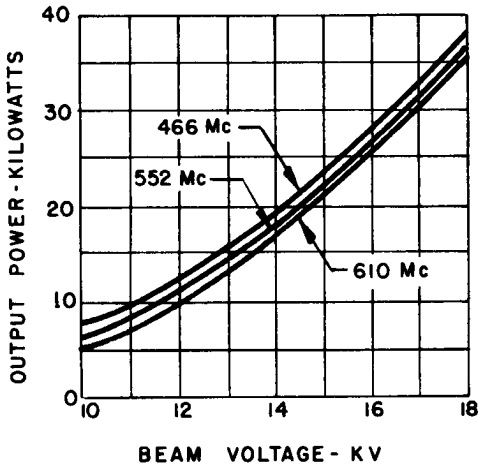
HC-108 WATER FITTING FOR 1 1/2 ID. HOSE

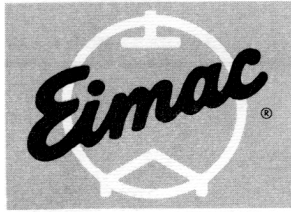
COLLECTOR TERMINAL 1/4" WINGNUT



**H-133 KLYSTRON AMPLIFIER CIRCUIT ASSEMBLY**







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

TENTATIVE DATA  
**4KM100LA**  
**25KW**  
POWER-AMPLIFIER  
L-BAND KLYSTRON

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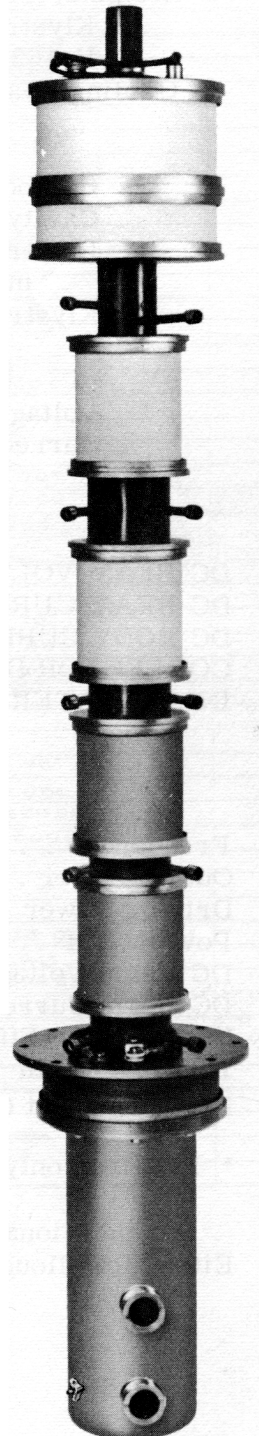
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Eimac Klystron Amplifier Circuit Assembly H-163 has been designed for use with the 4KM100LA to cover the specified frequency range. This assembly includes a klystron supporting structure, focusing electromagnet, tuning cavities, and adjustable load couplers for each cavity.

### CHARACTERISTICS

#### ELECTRICAL

Heater: DC Voltage . . . . .	26.0	volts
DC Current . . . . .	11.5	amperes
Maximum Starting Current . . . . .	23	amperes
Cathode: EMA, Unipotential		
Heating Time . . . . .	5	minutes
Getter (Operating):		
AC Voltage ( $\pm 5\%$ ) . . . . .	3.7	volts
AC Current . . . . .	20	amperes
Power Gain:		
Television Visual Service. . . . .	30	decibels
Output Power:		
Television Visual Service. . . . .	25	kilowatts
Frequency Range (H-163 Assembly) . . . . .	.470 to 610 megacycles	





MECHANICAL

Maximum Height of Klystron and H-163 Assembly including KC-102 Carriage 67 inches
Operating Position . . . . . Axis vertical, cathode up
R-F Coupling:
Input. . . . . Type "N" coaxial fitting
Output. . . . . 3-1/8 inch, 50-ohm line
Input and 2nd Cavity Loading. . . . . Type "N" coaxial fitting
3rd Cavity Loading . . . . . 1-5/8 inch, 50-ohm line
Weights:
Klystron Only . . . . . 119 pounds
H-163 RF Circuit Assembly . . . . . 1800 pounds
Cooling: Water and Forced Air

Table with 3 columns: Component, Flow Rate, Pressure Drop. Rows include Cathode, Cavity, Klystron Body and Electromagnet in Series, and Klystron Collector.

ELECTROMAGNET POWER-SUPPLY REQUIREMENTS

Voltage . . . . . 0 to 150 volts
Current . . . . . 0 to 12 amperes

MAXIMUM RATINGS

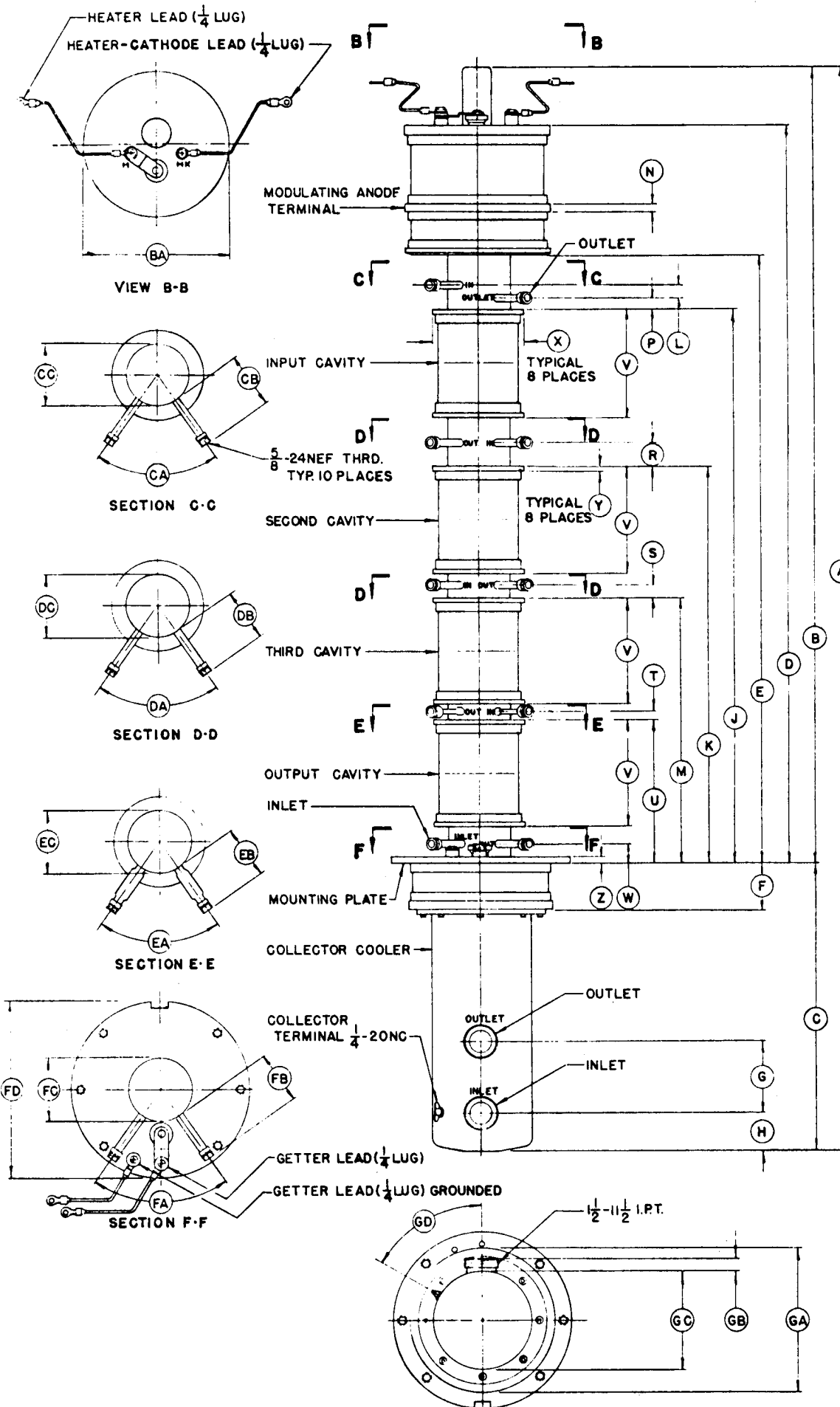
Table with 3 columns: Parameter, Value, Unit. Rows include DC BEAM VOLTAGE, DC BEAM CURRENT, DC BODY CURRENT, COLLECTOR DISSIPATION, and INLET WATER PRESSURE.

TYPICAL OPERATION

Table with 3 columns: Parameter, Value, Unit. Header: TV Visual Amplifier. Rows include Frequency, Output Power, Driving Power, Power Gain, DC Beam Voltage, DC Beam Current, Beam Power Efficiency, 1 db Bandwidth, and Electromagnet Current.

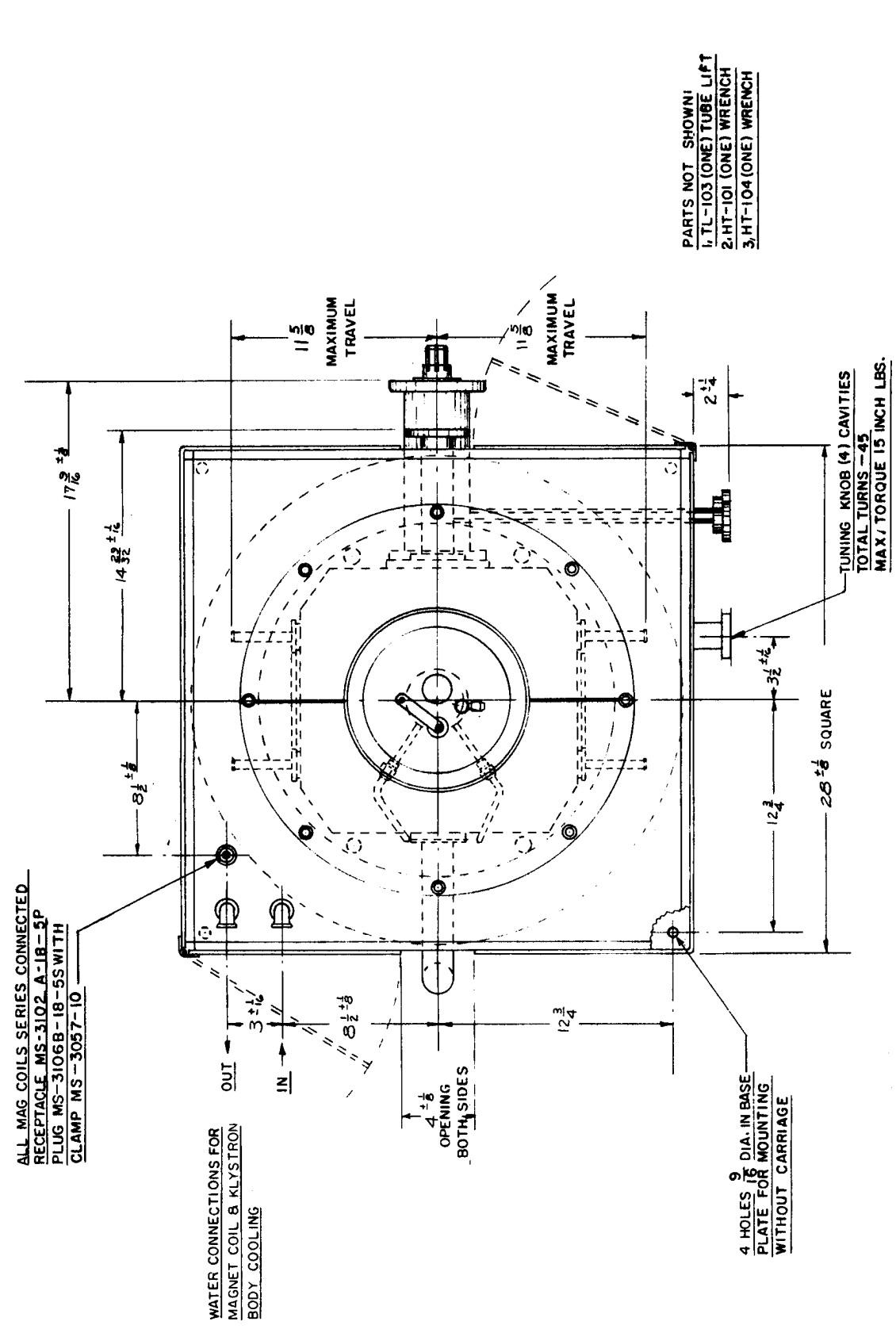
\* Required only if ambient air temperature exceeds 25° C.

For additional information or information regarding a specific application, write to Eitel-McCullough, Inc., 301 Industrial Way, San Carlos, California.

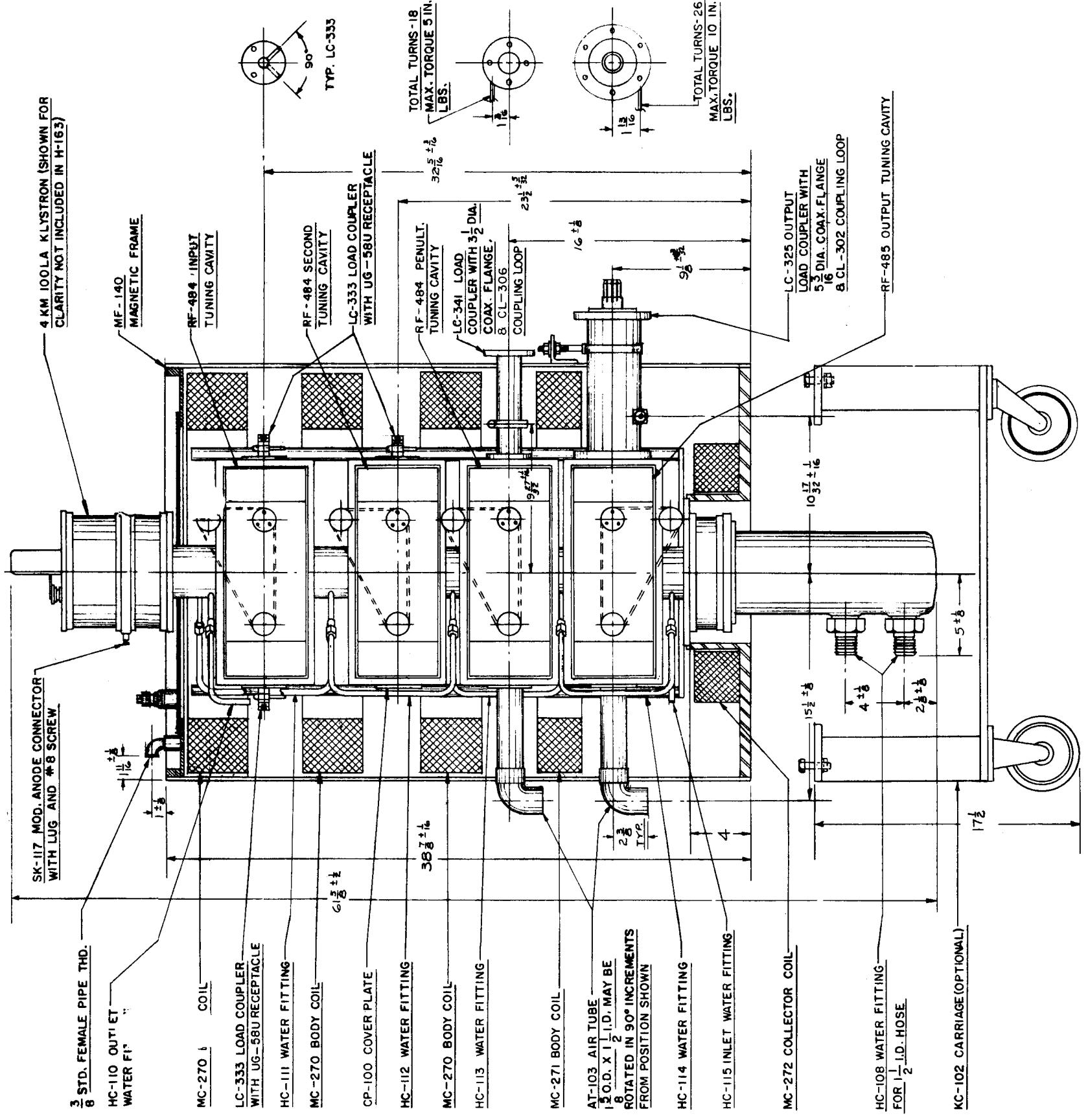


DIMENSION DATA			
REF.	NOMINAL	MINIMUM	MAXIMUM
A	61.625		
B	46.150		
C	10.475		
D	41.900		
E	34.467		
F	2.600		
G	4.000		
H	2.126		
J	31.341		
K	22.499		
L	.625		
M	14.999		
N	.375		
P	.636		
R	1.433		
S	.875		
T	.453		
U	8.124		
V	6.000		
W	1.124		
X	5.125		
Y	.250		
Z	.375		
BA	8.125 DIA		
CA	70°		
CB	3.000		
CC	3.500 DIA		
DA	70°		
DB	3.000		
DC	3.500 DIA		
EA	70°		
EB	3.000		
EC	3.500 DIA		
FA	70°		
FB	3.000		
FC	3.500 DIA		
FD	10.000 DIA		
GA	8.125 DIA		
GB	.843		
GC	5.500 DIA		
GD	60°		

4KM100LA KLYSTRON



PARTS NOT SHOWN!  
 1. TL-103 (ONE) TUBE LIFT  
 2. HT-101 (ONE) WRENCH  
 3. HT-104 (ONE) WRENCH



H-163 KLYSTRON AMPLIFIER CIRCUIT ASSEMBLY



