



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

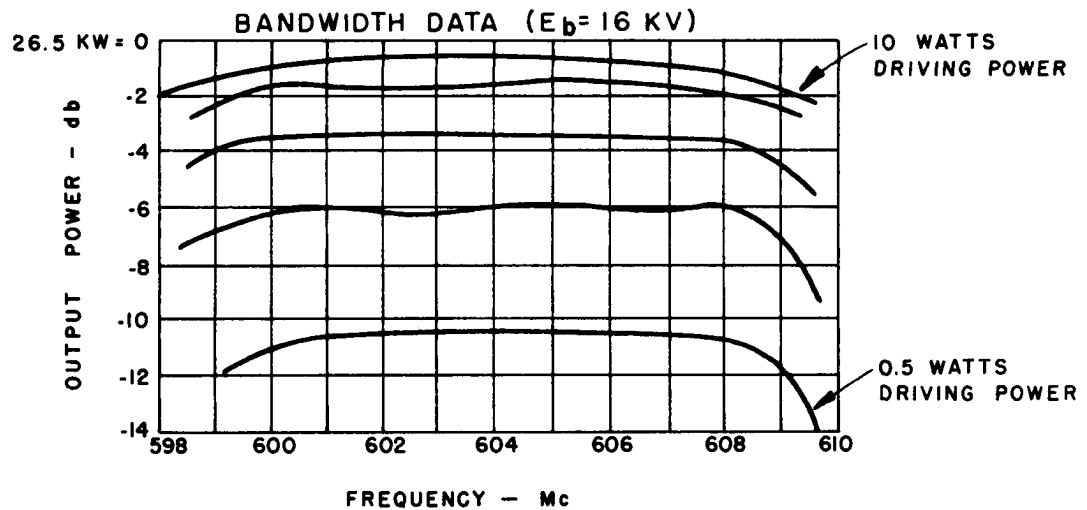
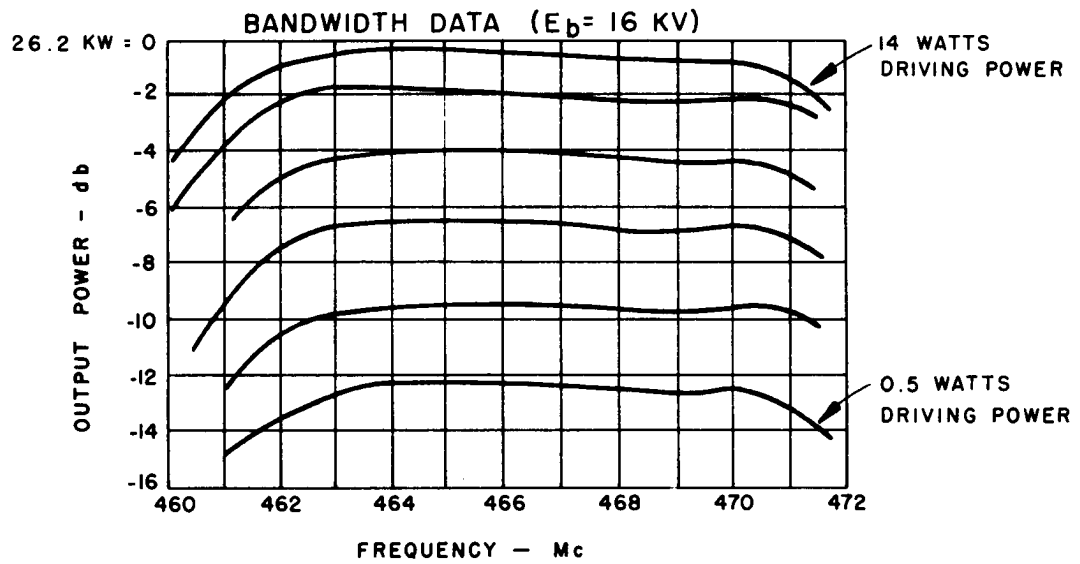
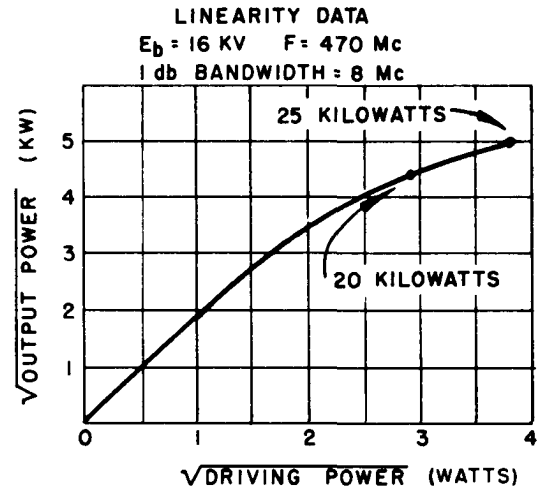
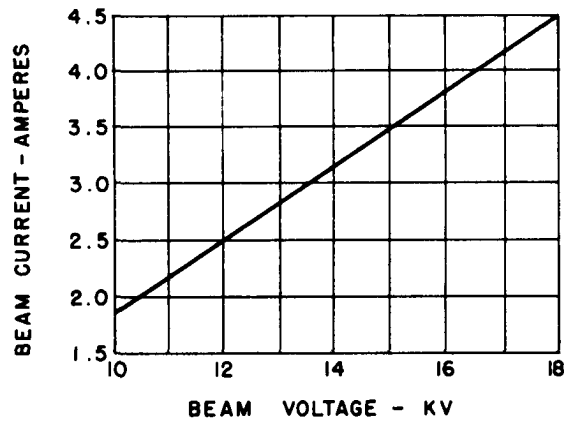
D-C BEAM VOLTAGE	-	-	-	20	KILOVOLTS
D-C BEAM CURRENT	-	-	-	6.0	AMPERES
D-C BODY CURRENT	-	-	-	150	MILLIAMPERES
COLLECTOR DISSIPATION	-	-	-	100	KILOWATTS
INLET WATER PRESSURE	-	-	-	100	PSI

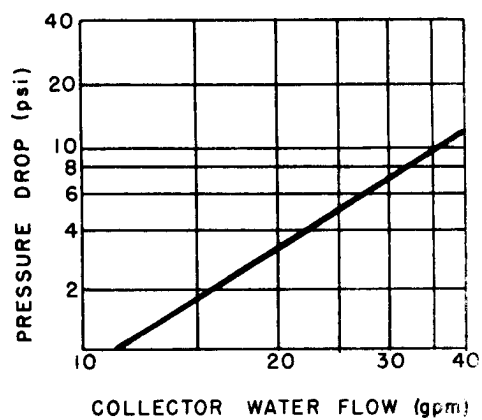
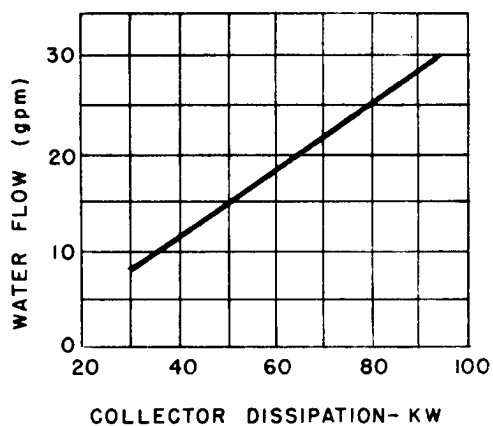
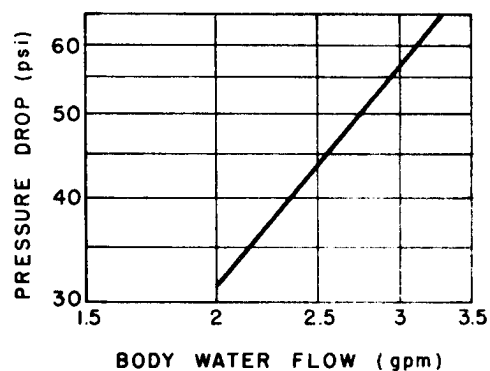
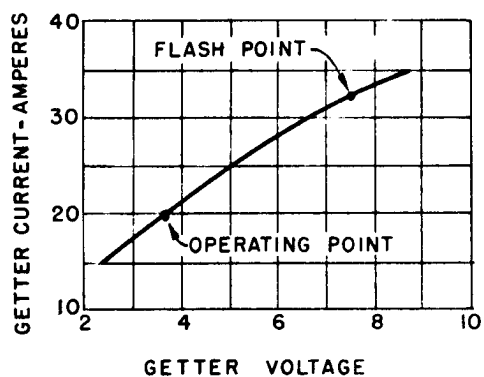
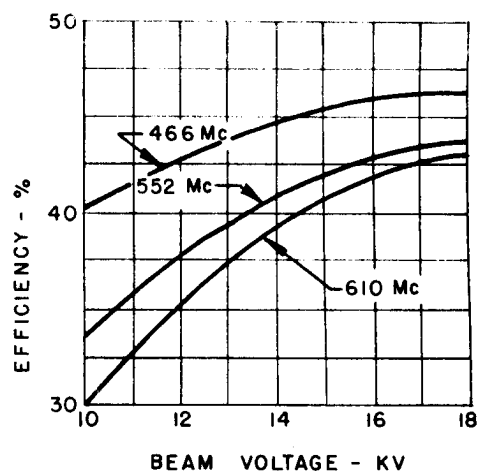
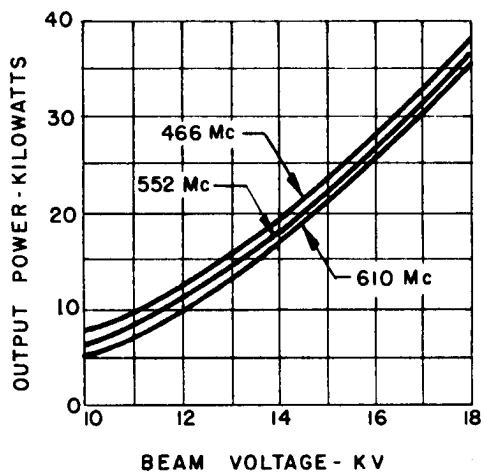
TYPICAL OPERATION

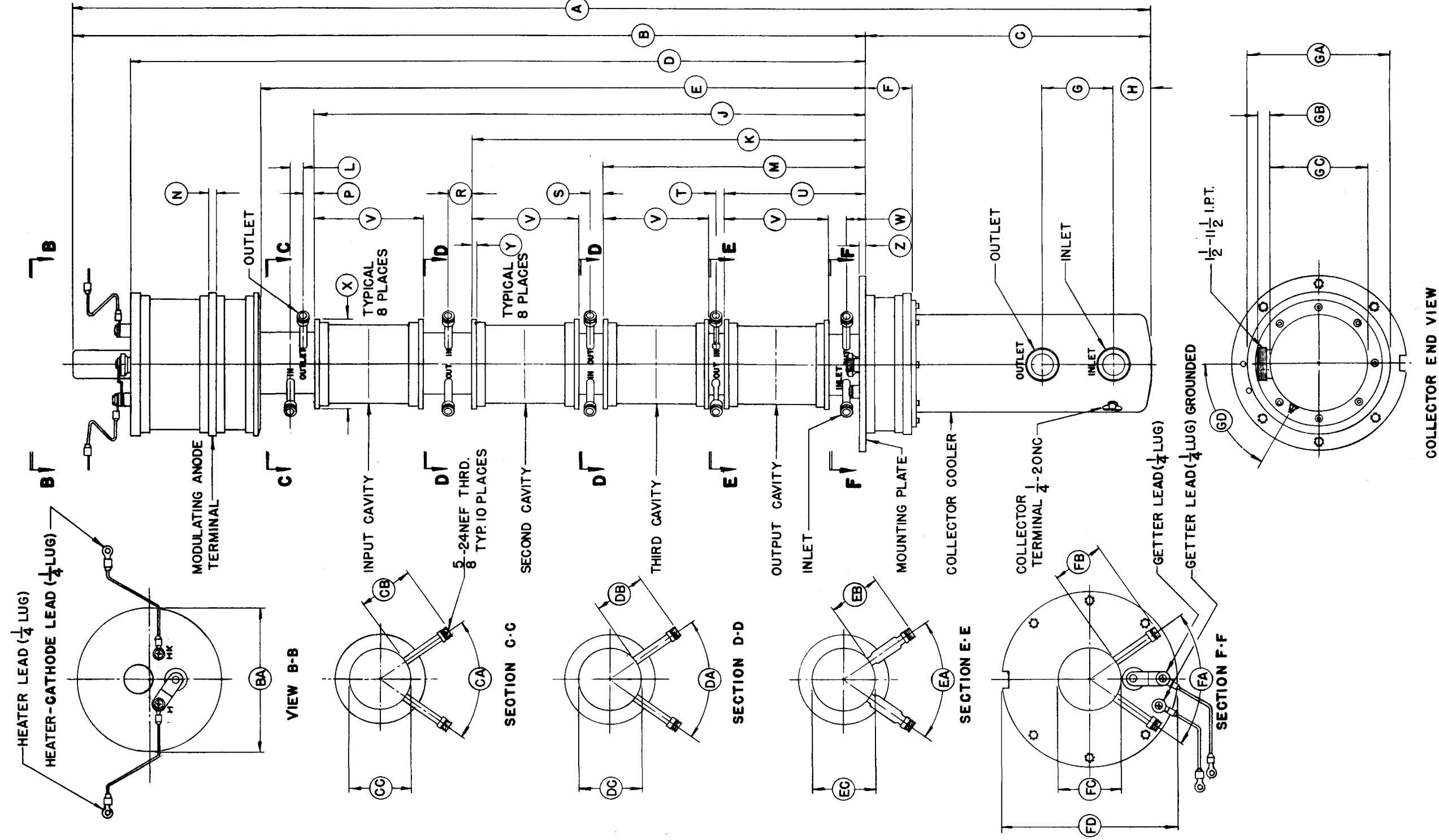
	<u>TV Visual Amplifier</u>	<u>Narrow Band CW</u>	
Frequency	- 550	550	megacycles
Output Power	- 26.4 (peak sync.)	35.4	kilowatts
Driving Power	- 20 " "	1.0	watts
Power Gain	- 31 " "	45	decibels
D-C Beam Voltage	- 16	18	kilovolts
D-C Beam Current	- 3.82	4.54	amperes
Beam Power Efficiency	- 43 (peak sync.)	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.

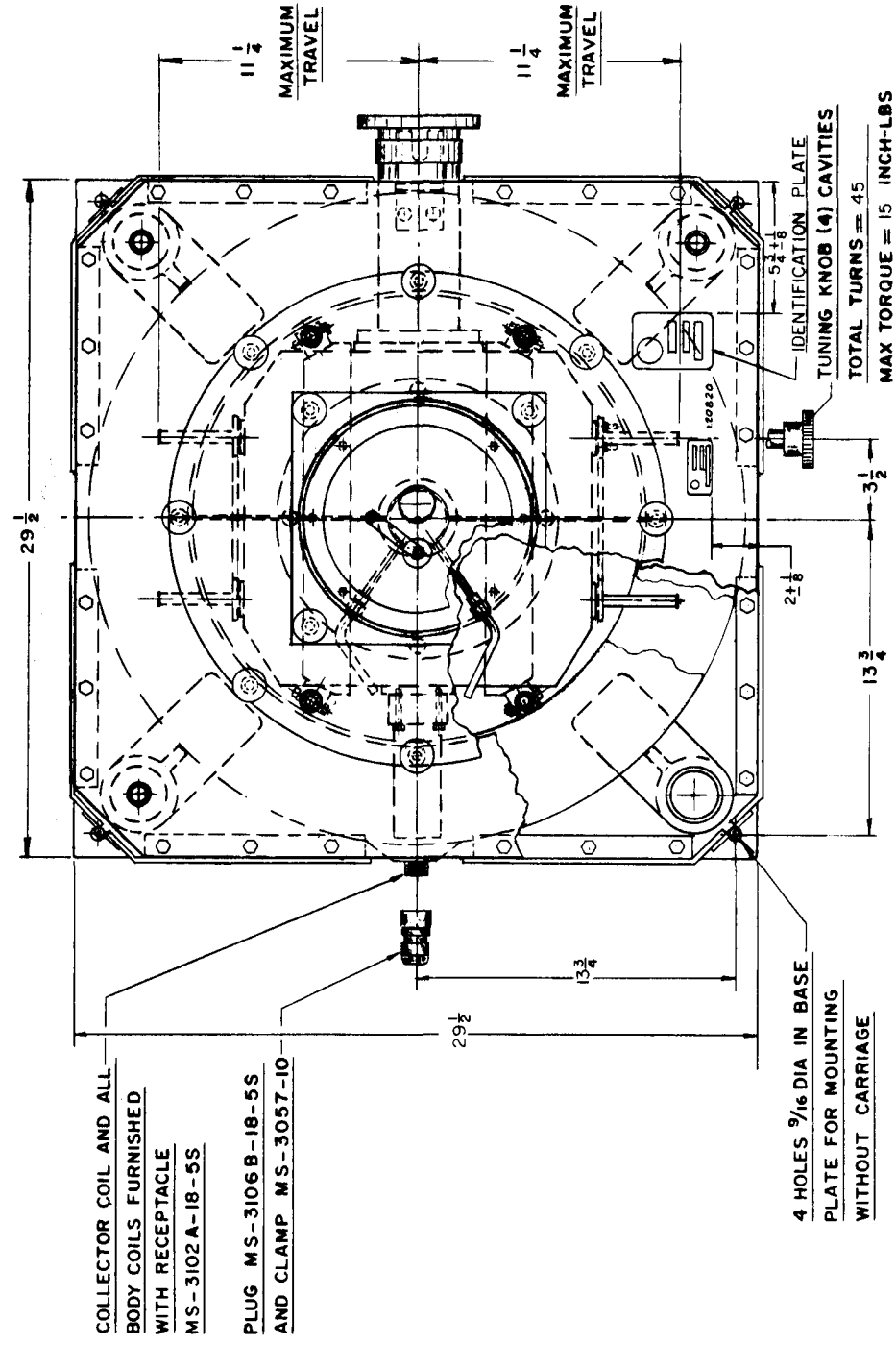






DIMENSION DATA			
REF.	NOMINAL	MINIMUM	MAXIMUM
A	61.625		
B	45.150		
C	16.475		
D	41.900		
E	34.467		
F	2.600		
G	4.000		
H	2.125		
J	31.341		
K	22.499		
L	.625		
M	14.999		
N	.375		
P	.636		
R	1.433		
S	.875		
T	.453		
U	8.124		
V	6.000		
W	1.124		
X	5.125		
Y	.250		
Z	.375		
BA	8.125 DIA		
CA	70°		
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°		

4KM100LA KLYSTRON

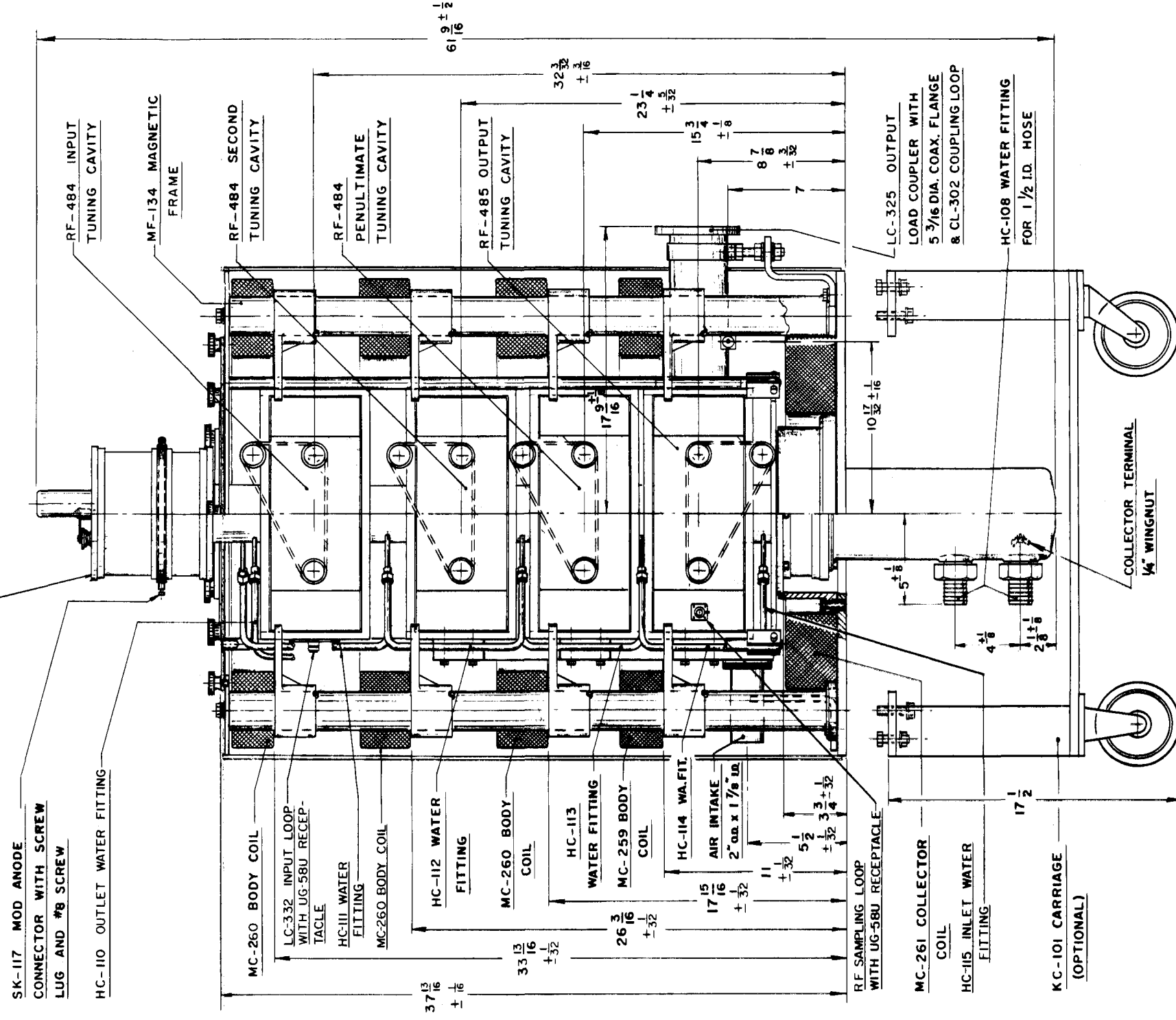


NOTES

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**

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.

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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.

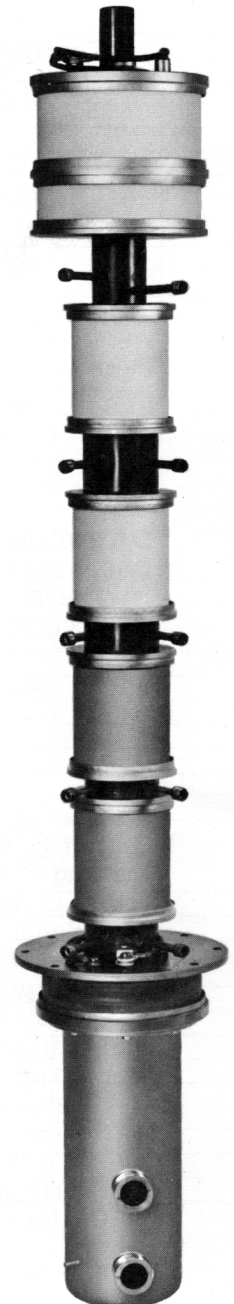
The 4KM100LA incorporates a built-in vacuum pump in the form of a titanium getter. This getter should be energized whenever heater power is applied. Its normal operating voltage is 3.7 volts at approximately 20 amperes. When a new tube is first placed in operation the getter should be flashed for 5 minutes 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





4KM100LA

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

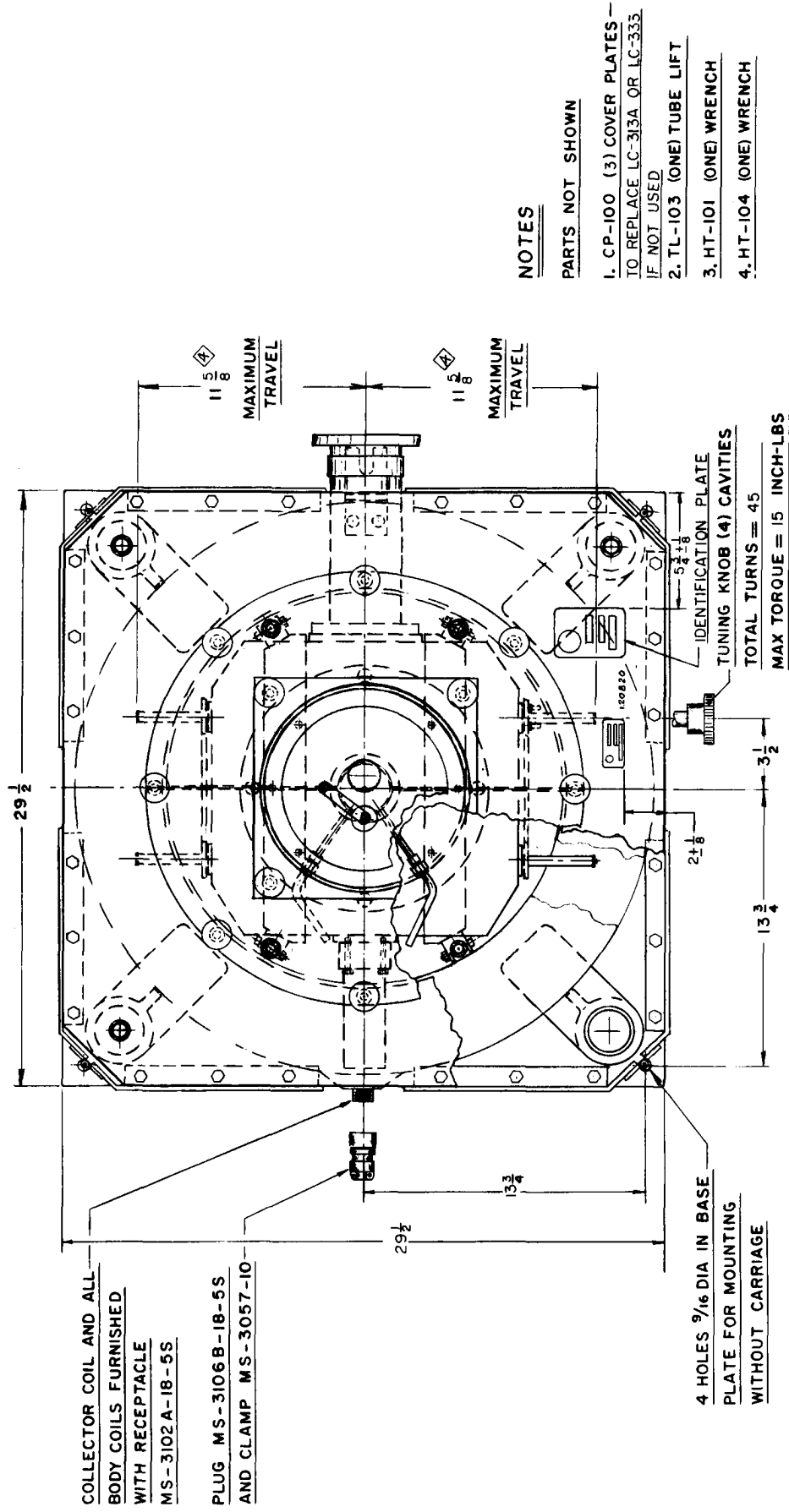
D-C BEAM VOLTAGE	-	-	-	-	20	KILOVOLTS
D-C BEAM CURRENT	-	-	-	-	6.0	AMPERES
D-C BODY CURRENT	-	-	-	-	150	MILLIAMPERES
COLLECTOR DISSIPATION	-	-	-	-	100	KILOWATTS
INLET WATER PRESSURE	-	-	-	-	100	PSI

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.

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



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 $\frac{3}{32}$ DIA COAX FLANGE

RF SAMPLING LOOP WITH UG-58U RECEPTACLE

MC-261 COLLECTOR COIL

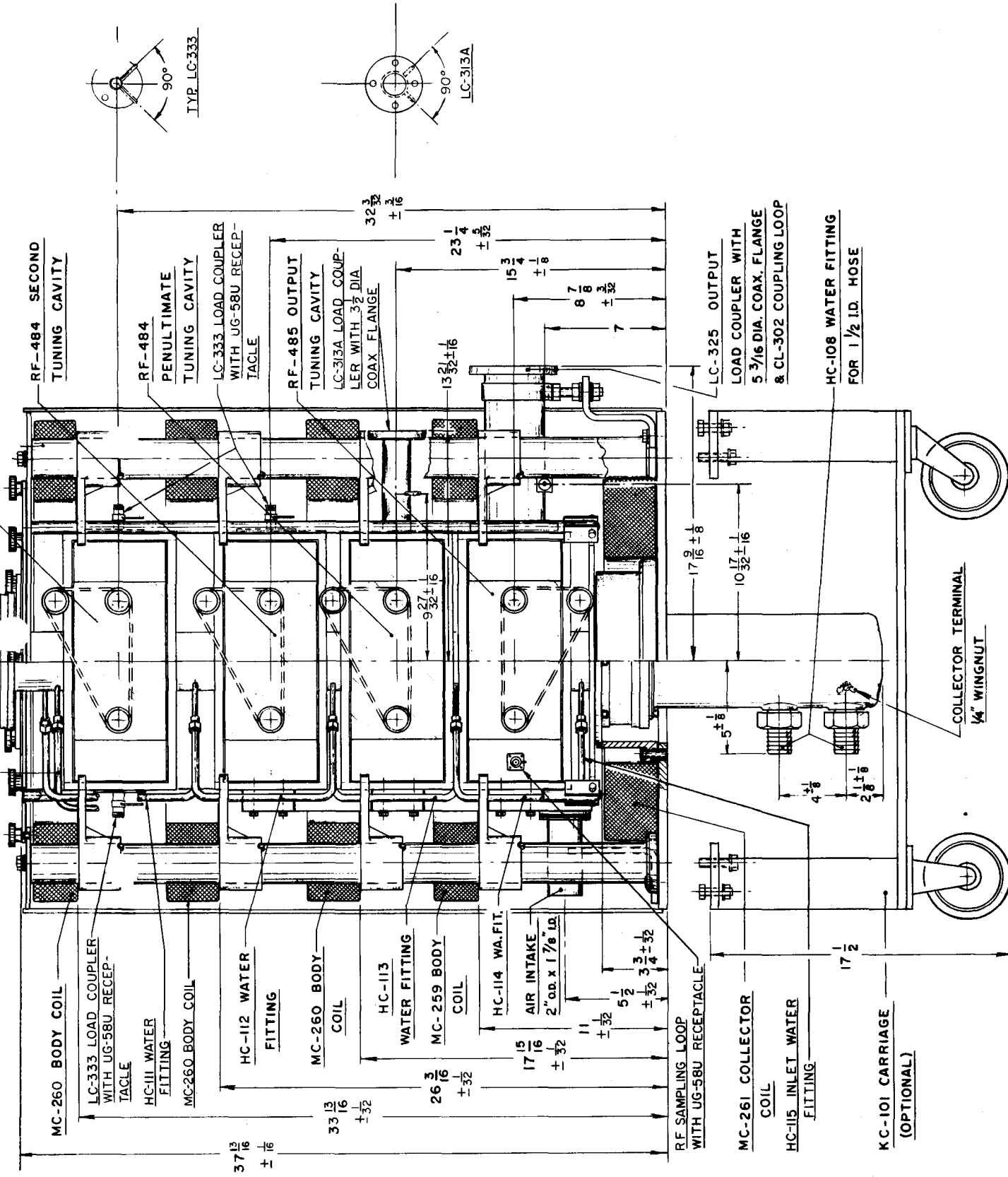
HC-115 INLET WATER FITTING

KC-101 CARRIAGE (OPTIONAL)

LC-325 OUTPUT LOAD COUPLER WITH $\frac{5}{16}$ DIA. COAX. FLANGE & CL-302 COUPLING LOOP

HC-108 WATER FITTING FOR $1\frac{1}{2}$ ID. HOSE

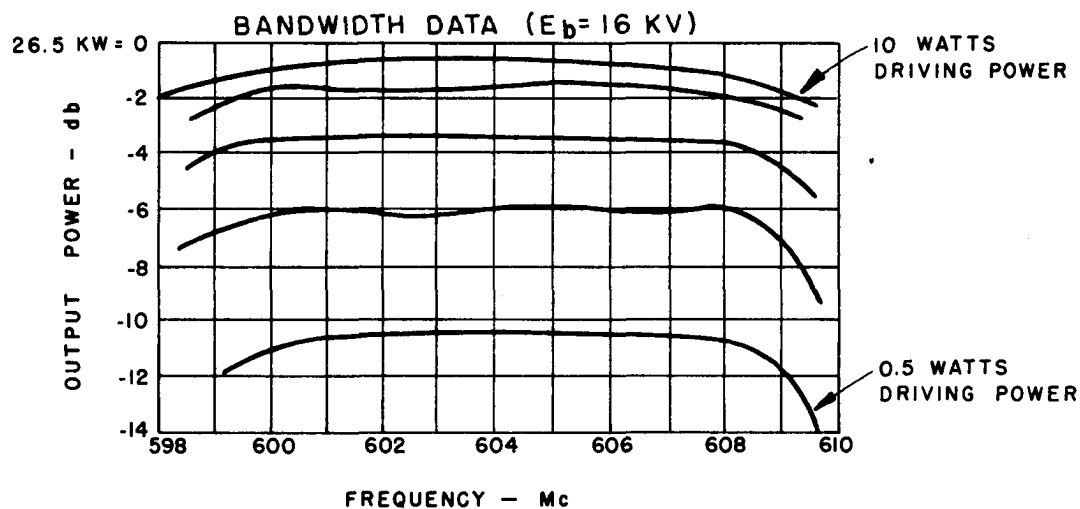
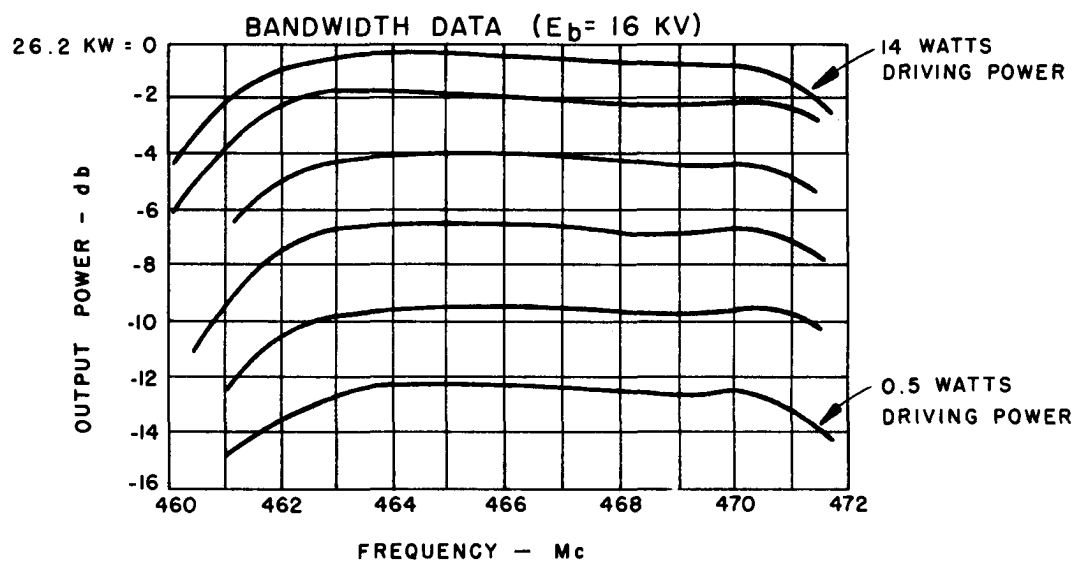
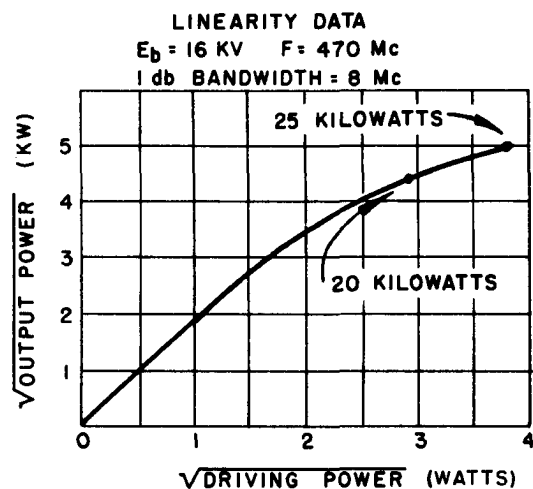
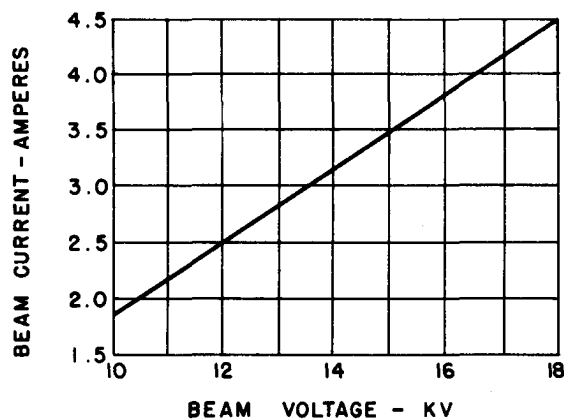
COLLECTOR TERMINAL $\frac{1}{4}$ " WINGNUT

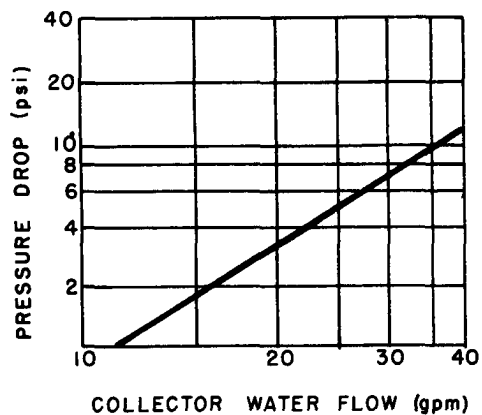
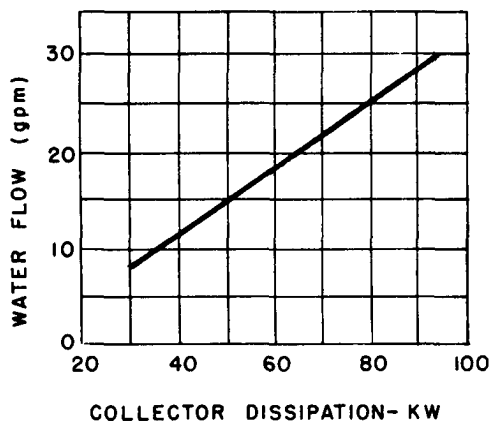
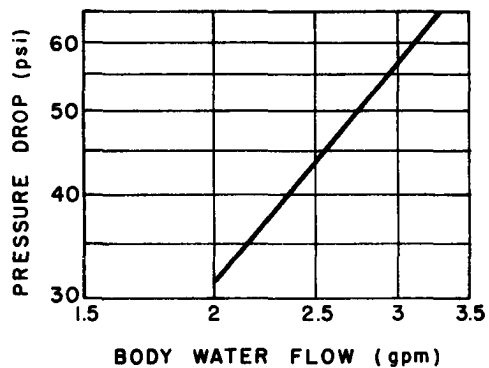
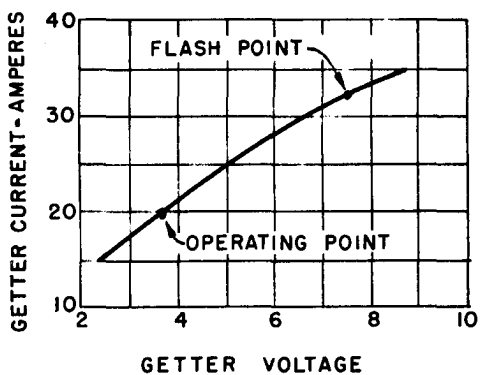
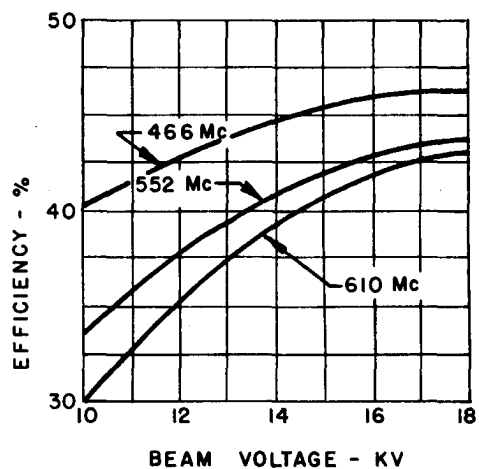
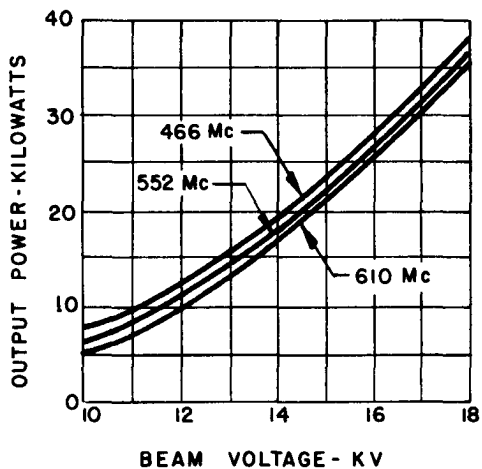


H-133 KLYSTRON AMPLIFIER CIRCUIT ASSEMBLY



4KM100LA







EITEL-McCULLOUGH, INC.
SAN CARLOS, CALIFORNIA

TENTATIVE DATA

4KM100LA
25KW

POWER-AMPLIFIER

L-BAND KLYSTRON

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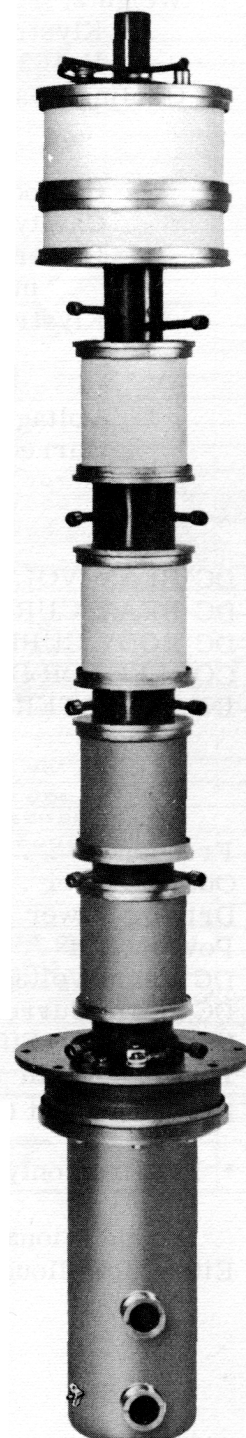
The 4KM100LA incorporates a built-in vacuum pump in the form of a titanium getter. This getter should be energized whenever heater power is applied. Its normal operating voltage is 3.7 volts at approximately 20 amperes.

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





4KM100LA

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	

	Flow Rate	Pressure Drop
Cathode	*5 cfm	-----
Cavity	50 cfm	TBS
Klystron Body and Electromagnet		
in Series	2 gpm	45 psi
Klystron Collector	30 gpm	7.5 psi

ELECTROMAGNET POWER-SUPPLY REQUIREMENTS

Voltage	0 to 150	volts
Current	0 to 12	amperes

MAXIMUM RATINGS

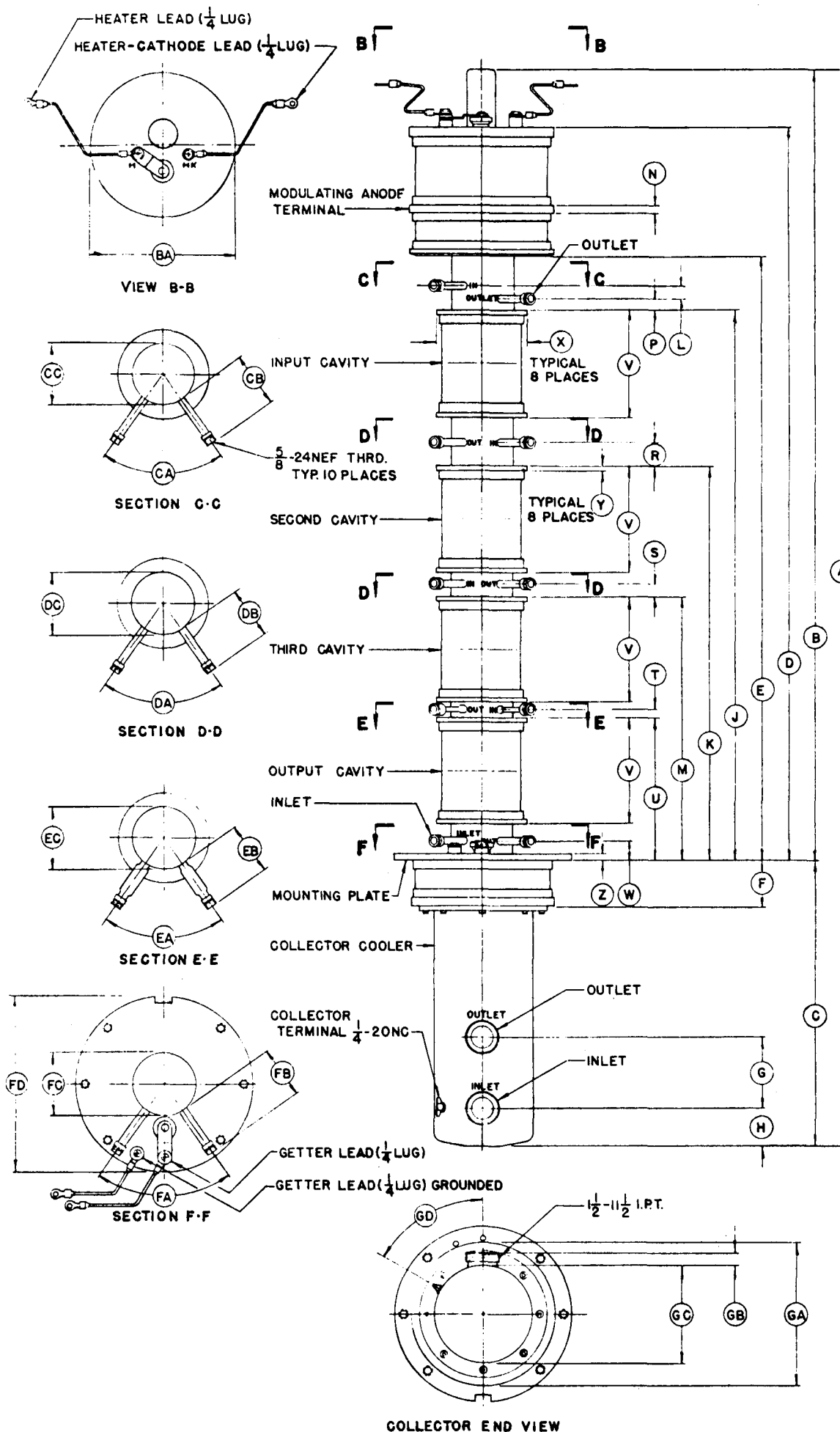
DC BEAM VOLTAGE	20	KILOVOLTS
DC BEAM CURRENT	6.0	AMPERES
DC BODY CURRENT	150	MILLIAMPERES
COLLECTOR DISSIPATION	100	KILOWATTS
INLET WATER PRESSURE	100	PSI

TYPICAL OPERATION

	TV Visual Amplifier	
Frequency	550	megacycles
Output Power	26.4 (peak sync.)	kilowatts
Driving Power	20 " "	watts
Power Gain	31 " "	decibels
DC Beam Voltage	16	kilovolts
DC Beam Current	3.82	amperes
Beam Power Efficiency	43 (peak sync.)	percent
1 db Bandwidth	8	megacycles
Electromagnet Current	8.9	amperes

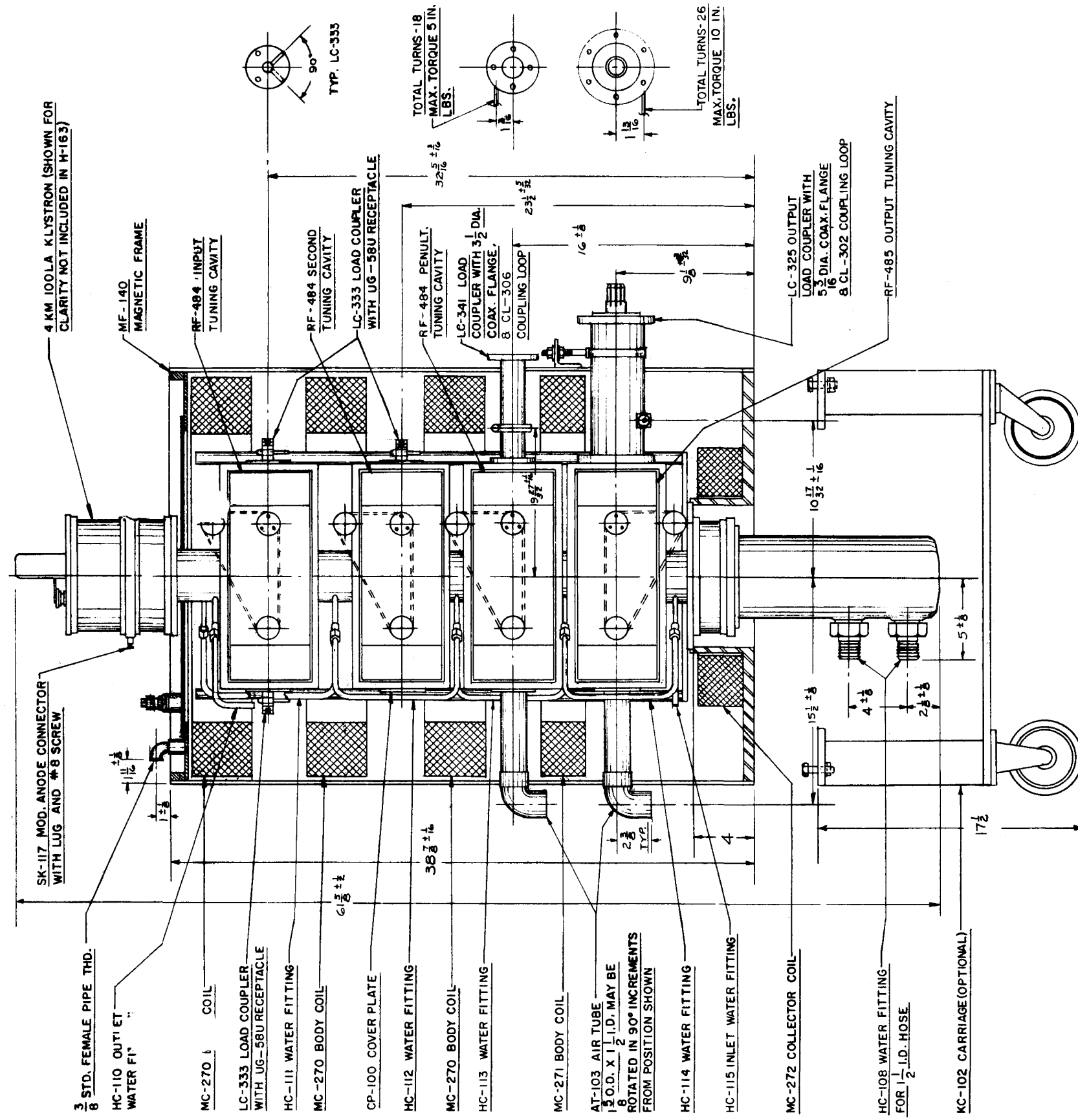
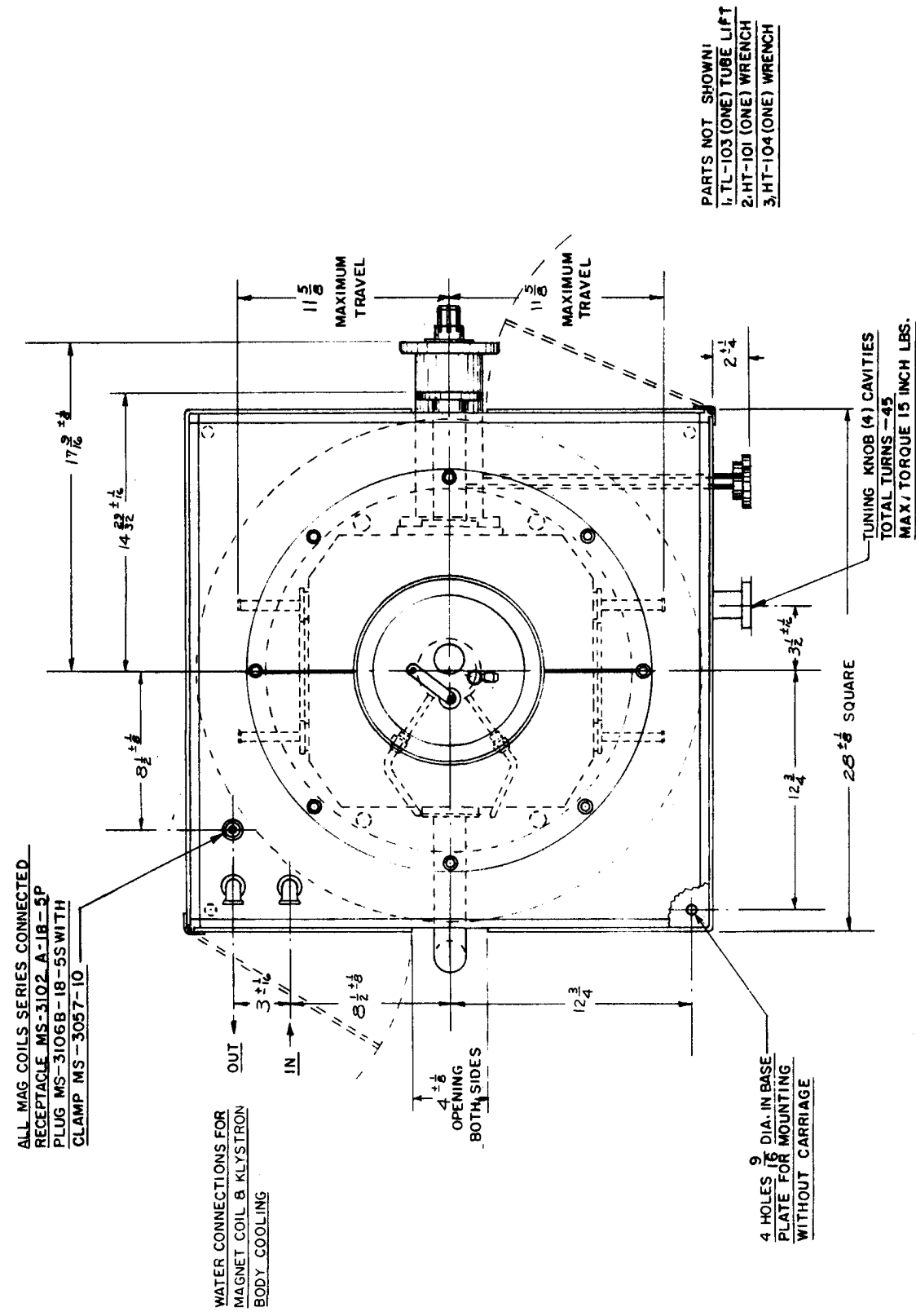
* Required only if ambient air temperature exceeds 25° C.

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	45.160		
C	10.475		
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°		

4KM100LA KLYSTRON



H-163 KLYSTRON AMPLIFIER CIRCUIT ASSEMBLY



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