



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

TENTATIVE DATA

**4KM50,000LR**

**POWER-AMPLIFIER  
L-BAND KLYSTRON**

The Eimac 4KM50,000LR is a four-cavity, magnetically focused, power-amplifier klystron designed for use at frequencies between 755 and 985 megacycles. This klystron will deliver a narrow-band CW output power of 10 kilowatts with a minimum power gain of 50 decibels. When adjusted for wide-band operation the 4KM50,000LR will deliver an output power of 10 kilowatts with a half-power bandwidth of 7 megacycles and a power gain of 30 decibels.

This klystron employs the Eimac Modulating Anode which provides an effective means for protecting the tube against internal arcs when connected to the beam supply through a resistor.

All tuning is accomplished outside of the vacuum envelope by means of external resonant cavities which enclose the cylindrical ceramic windows of the klystron. This design affords a wide tuning range and permits external cavity loading for broadband applications. For spares or replacements, only the basic vacuum tube, without cavities, need be purchased.

Eimac Klystron Amplifier Circuit Assembly H-141 has been designed for use with the 4KM50,000LR to cover the specified frequency range. This assembly includes a klystron supporting structure, magnetic focusing coils, tuning cavities, adjustable load couplers for each cavity, and an Eimac SK-110 Air-System Socket.

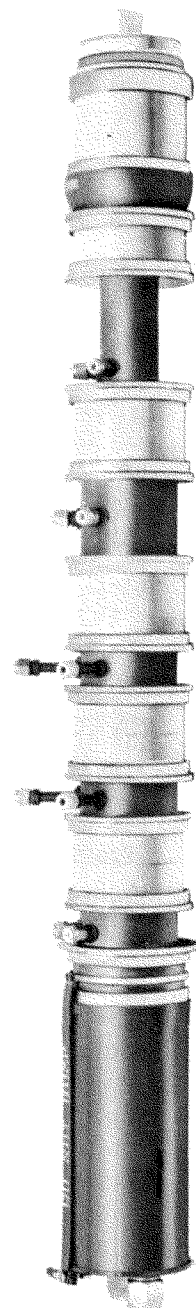
#### CHARACTERISTICS

##### ELECTRICAL

|                 |                          |   |   |   |   |            |            |
|-----------------|--------------------------|---|---|---|---|------------|------------|
| Heater:         | Voltage                  | - | - | - | - | 7.5        | volts      |
|                 | Current                  | - | - | - | - | 40.0       | amperes    |
|                 | Maximum Starting Current | - | - | - | - | 80.0       | amperes    |
| Cathode:        | EMA, Unipotential        |   |   |   |   |            |            |
|                 | Heating Time             | - | - | - | - | 5          | minutes    |
| Getter          | (Operating) :            |   |   |   |   |            |            |
|                 | Voltage                  | - | - | - | - | 2.0        | volts      |
|                 | Current                  | - | - | - | - | 36.0       | amperes    |
| Power Gain:     | (Narrow Band)            | - | - | - | - | 50         | decibels   |
| Output Power    |                          | - | - | - | - | 10         | kilowatts  |
| Frequency Range | (H-141 Assembly)         | - | - | - | - | 755 to 985 | megacycles |

##### MECHANICAL

|                            |   |   |   |   |   |                           |
|----------------------------|---|---|---|---|---|---------------------------|
| Operating Position         | - | - | - | - | - | Axis vertical, cathode up |
| RF Coupling:               |   |   |   |   |   |                           |
| Input                      | - | - | - | - | - | Type "N" coaxial fitting  |
| Output                     | - | - | - | - | - | 3 1/8 inch, 50-ohm line   |
| Input Cavity Loading       | - | - | - | - | - | Type "N" coaxial fitting  |
| 2nd and 3rd Cavity Loading | - | - | - | - | - | Type "N" coaxial fitting  |





## MECHANICAL (cont'd)

## Weights:

|                           |   |   |   |                                |
|---------------------------|---|---|---|--------------------------------|
| 4KM50,000LR Klystron only | - | - | - | 55 lbs (Net), 140 lbs (Gross)  |
| H-141 RF Circuit Assembly | - | - | - | 349 lbs (Net), 601 lbs (Gross) |

## Cooling: Water and Forced Air

|                                         |   |   |   |   |                  |                             |
|-----------------------------------------|---|---|---|---|------------------|-----------------------------|
|                                         | - |   |   |   | <u>Flow Rate</u> | <u>Pressure Drop</u>        |
| Cathode (with SK-110 Air-System Socket) |   |   |   |   | *25 cfm          | 1 inch H <sub>2</sub> O     |
| Output Cavity                           | - | - | - | - | *50 cfm          | 1.5 inches H <sub>2</sub> O |
| Klystron Body (5 drift-tube sections    |   |   |   |   |                  |                             |
| in series)                              | - | - | - | - | 1 gpm            | 28 psi                      |
| Klystron Collector                      | - | - | - | - | 25 gpm           | 28 psi                      |

## MAGNETIC-COIL POWER-SUPPLY REQUIREMENTS

|                                                |         |   |   |   |   |           |         |
|------------------------------------------------|---------|---|---|---|---|-----------|---------|
| Prefocus Coil:                                 | Voltage | - | - | - | - | 0 to 25   | volts   |
|                                                | Current | - | - | - | - | 0 to 1.25 | amperes |
| Three Body Coils and Collector Coil in Series: |         |   |   |   |   |           |         |
|                                                | Voltage | - | - | - | - | 0 to 400  | volts   |
|                                                | Current | - | - | - | - | 0 to 4.0  | amperes |

## MAXIMUM RATINGS

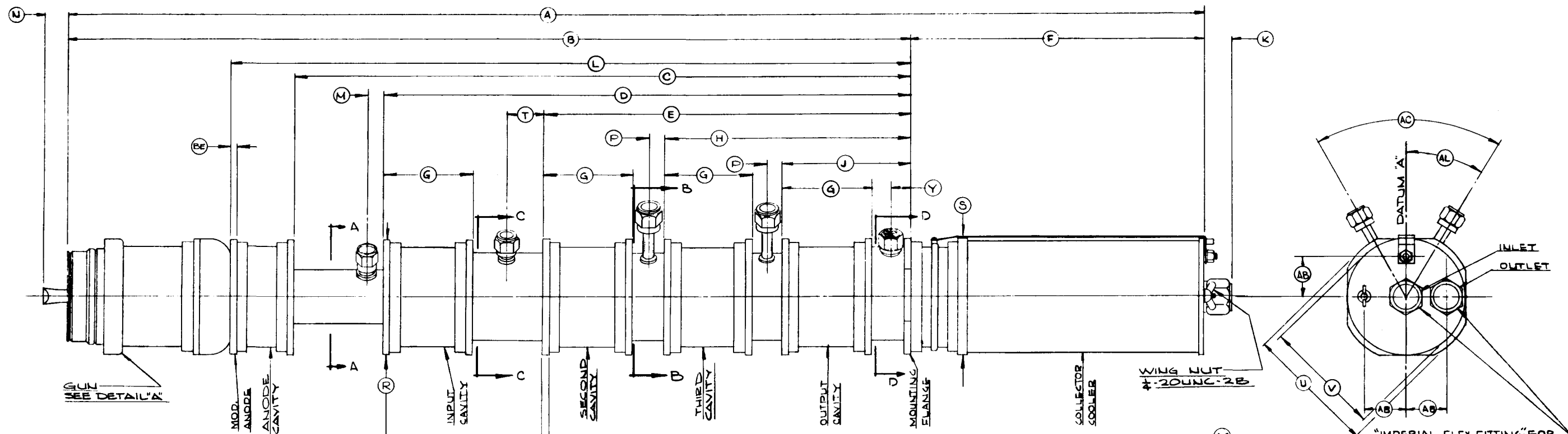
|                                |   |   |   |   |   |      |              |
|--------------------------------|---|---|---|---|---|------|--------------|
| D-C BEAM VOLTAGE               | - | - | - | - | - | 20   | KILOVOLTS    |
| D-C BEAM CURRENT               | - | - | - | - | - | 2.5  | AMPERES      |
| D-C BODY CURRENT (CONTINUOUS)  | - | - | - | - | - | 100  | MILLIAMPERES |
| D-C BODY CURRENT (TUNING ONLY) | - | - | - | - | - | 150  | MILLIAMPERES |
| A-C GETTER CURRENT             | - | - | - | - | - | 50   | AMPERES      |
| FOCUS-ELECTRODE VOLTAGE        | - | - | - | - | - | -500 | VOLTS        |
| COLLECTOR DISSIPATION          | - | - | - | - | - | 50   | KILOWATTS    |
| INLET WATER PRESSURE           | - | - | - | - | - | 50   | PSI          |

## TYPICAL OPERATION

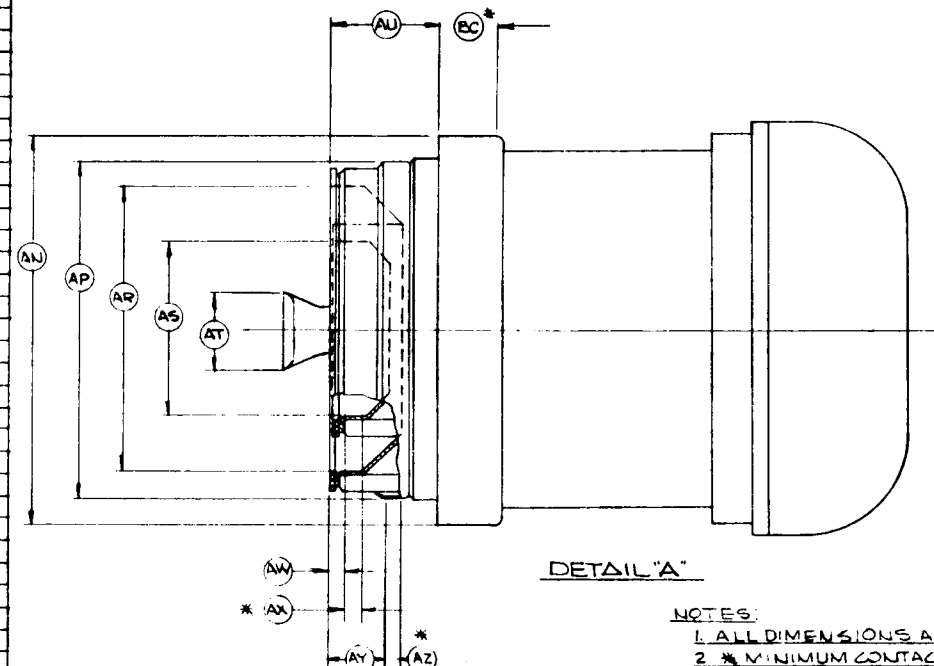
|                                | <u>Narrow Band</u> |      | <u>Wide Band</u> |              |
|--------------------------------|--------------------|------|------------------|--------------|
| Frequency                      | 755                | 985  | 762              | megacycles   |
| Output Power                   | 12.1               | 11.5 | 10               | kilowatts    |
| Driving Power                  | 0.05               | 0.05 | 10               | watts        |
| Power Gain                     | 53.8               | 53.6 | 30               | decibels     |
| D-C Beam Voltage               | 17                 | 17   | 17               | kilovolts    |
| D-C Beam Current               | 1.76               | 1.76 | 1.9              | amperes      |
| Beam Power Efficiency          | 45.7               | 43.7 | 31               | percent      |
| D-C Body Current               | 30                 | 40   | 90               | milliamperes |
| Focus-Electrode Voltage        | -245               | -245 | -175             | volts        |
| Half Power Bandwidth           | - -                | - -  | 7                | megacycles   |
| Cavity Loading:                |                    |      |                  |              |
| 1st Cavity                     | - -                | - -  | 8                | watts        |
| 2nd Cavity                     | - -                | - -  | 70               | watts        |
| 3rd Cavity                     | - -                | - -  | 400              | watts        |
| Magnetic-Coil Currents:        |                    |      |                  |              |
| Prefocus Coil                  | 1.06               | 1.03 | 1.1              | amperes      |
| Three Body Coils and Collector |                    |      |                  |              |
| Coil in Series                 | 3.0                | 3.0  | 3.0              | amperes      |

\* At sea level with 20° C inlet air temperature.

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

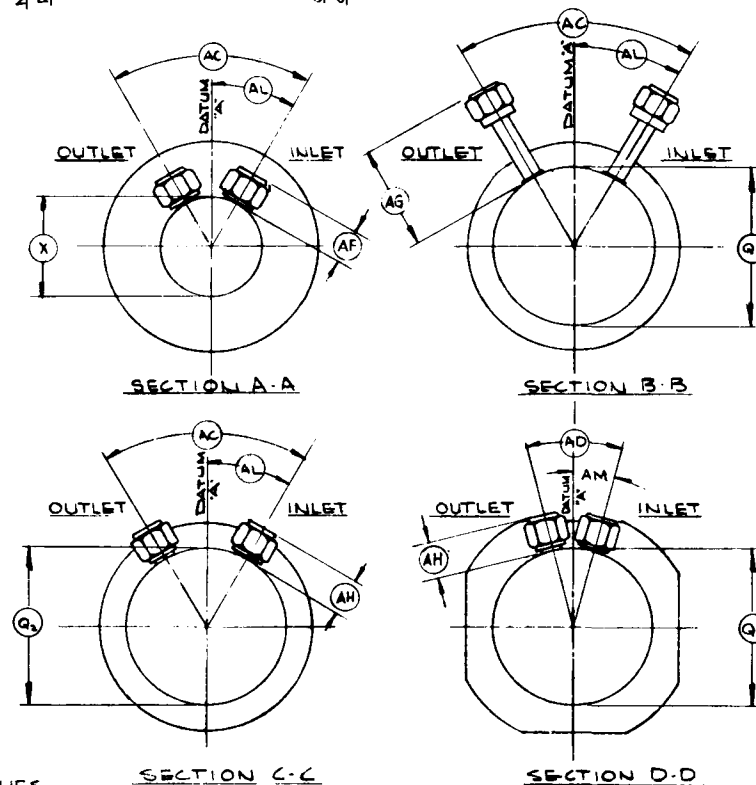


| DIMENSIONAL DATA |        |       |       |    |             |
|------------------|--------|-------|-------|----|-------------|
| NO               | NOM    | MIN.  | MAX.  | AS |             |
| A                | 44.640 |       |       | AT | 1.865 1.950 |
| B                | 33.127 |       |       | AU | 1.000 1.500 |
| C                | 24.392 |       |       | AV |             |
| D                | 20.642 |       |       | AW | .125 .175   |
| E                | 14.388 |       |       | AX | .100        |
| F                | 11.818 |       |       | AY | .670 .775   |
| G                | 3.504  |       |       | AZ | .100        |
| H                | 9.696  |       |       | BA |             |
| J                | 5.004  |       |       | BC | .100        |
| K                | 1.062  |       |       | BD |             |
| L                | 26.875 |       |       | BE | 0.250       |
| M                | .562   |       |       |    |             |
| N                |        |       | 1.750 |    |             |
| P                | .593   |       |       |    |             |
| Q                | 3.500  |       |       |    |             |
| R                | 4.625  | 4.610 | 4.640 |    |             |
| S                | 4.720  |       |       |    |             |
| T                | 1.375  |       |       |    |             |
| U                | 5.122  |       |       |    |             |
| V                | 4.625  |       |       |    |             |
| W                |        |       |       |    |             |
| X                | 2.120  |       |       |    |             |
| Y                | 0.656  |       |       |    |             |
| AB               | 15°    |       |       |    |             |
| AC               | 60°    |       |       |    |             |
| AD               | 30°    |       |       |    |             |
| AE               |        |       |       |    |             |
| AF               | .850   |       |       |    |             |
| AG               | 2.250  |       |       |    |             |
| AH               | 0.850  |       |       |    |             |
| AJ               |        |       |       |    |             |
| AK               |        |       |       |    |             |
| AL               | 30°    |       |       |    |             |
| AM               | 18°    |       |       |    |             |
| AN               |        | 4.300 | 4.450 |    |             |
| AP               |        | 3.750 | 3.835 |    |             |
| AQ               |        |       |       |    |             |
| AR               |        | 3.100 | 3.200 |    |             |



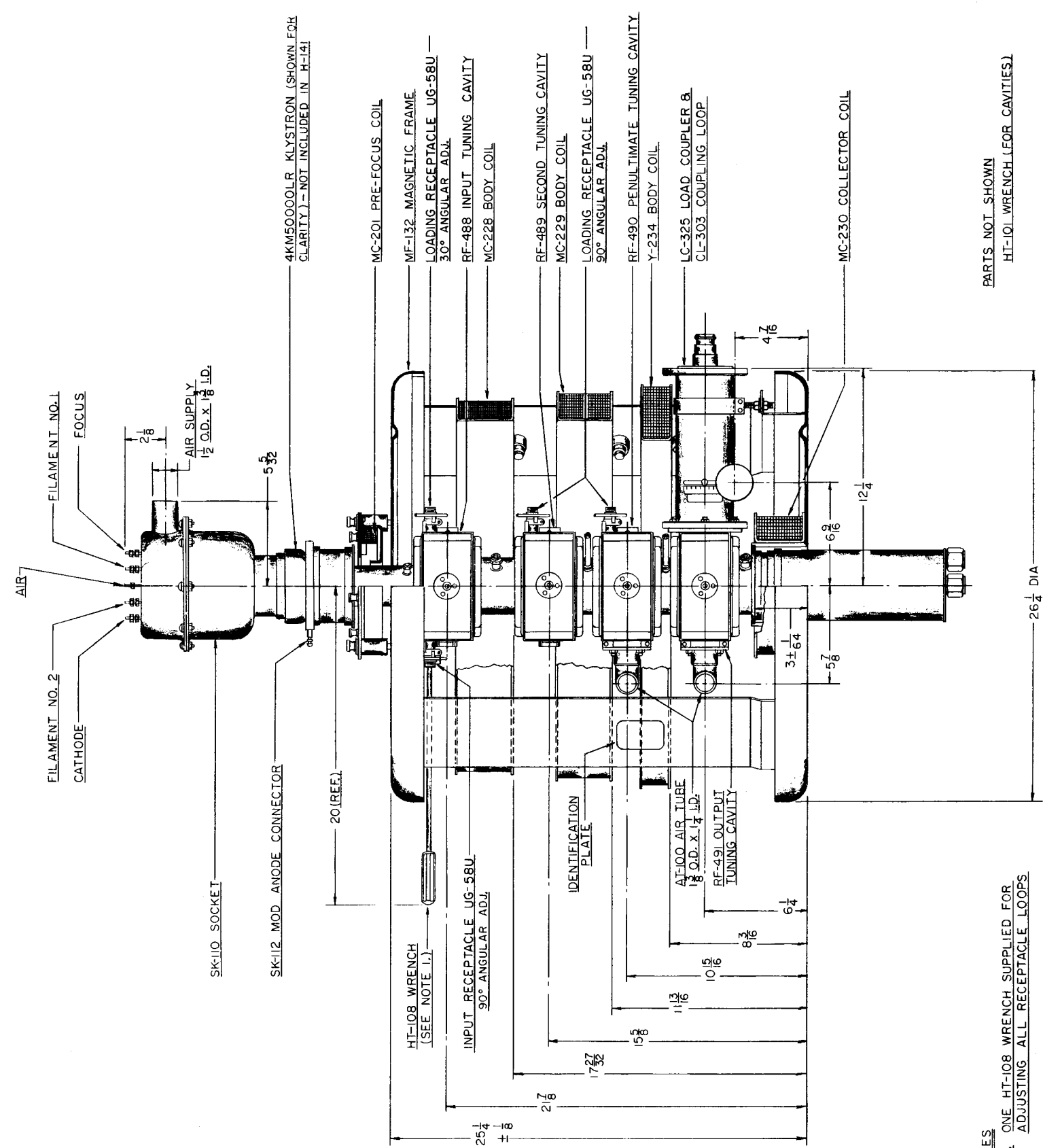
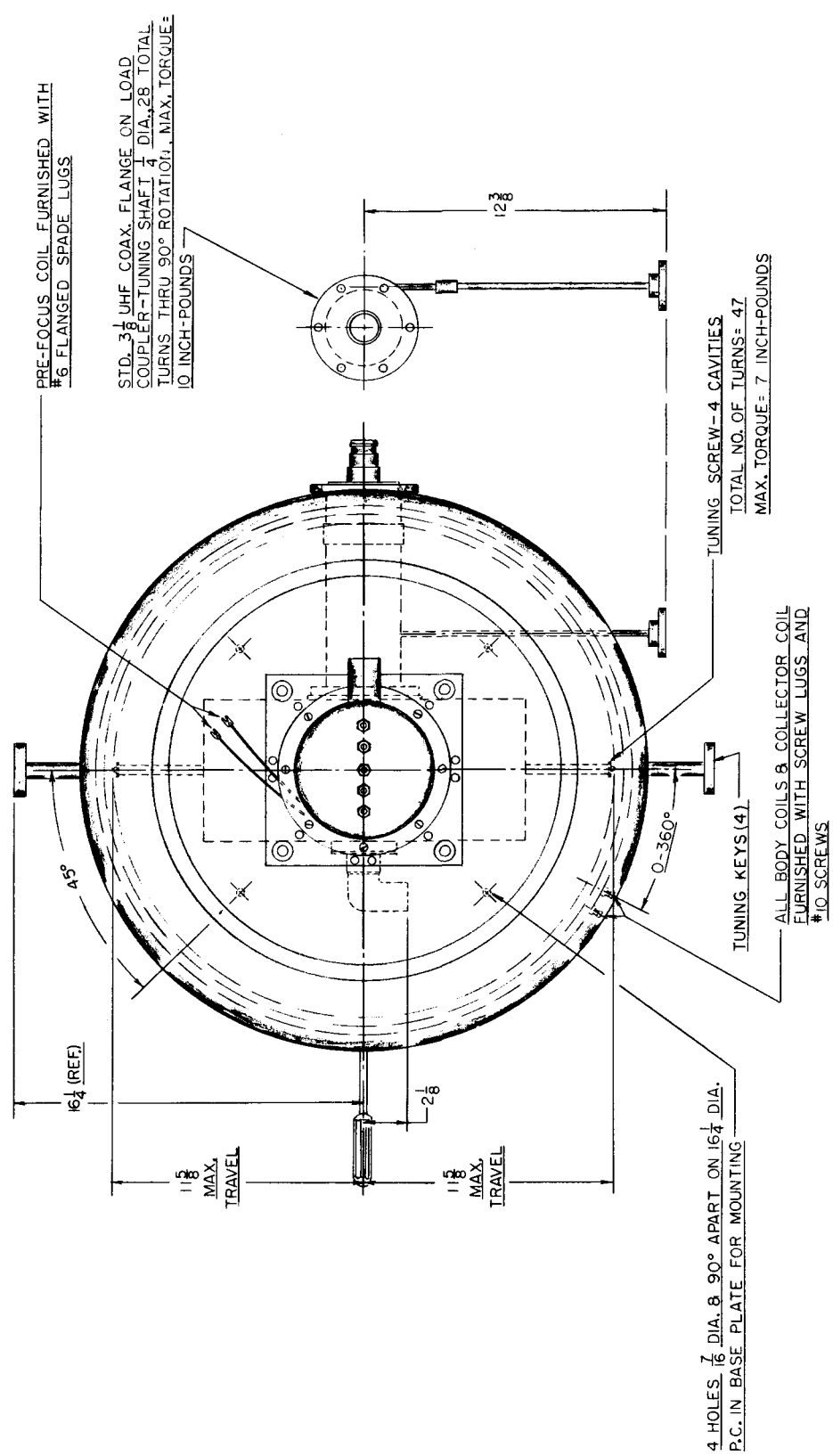
DETAIL 'A'

- NOTES:  
 1. ALL DIMENSIONS ARE IN INCHES  
 2. \* MINIMUM CONTACT SURFACE



"IMPERIAL FLEX FITTING" FOR 3/4 OD TUBING. ALL OTHERS ARE "IMPERIAL FLEX FITTING" FOR 5/8 OD TUBING.

4KM50,000LR KLYSTRON



NOTES

1. ONE HT-108 WRENCH SUPPLIED FOR ADJUSTING ALL RECEPTACLE LOOPS

PARTS NOT SHOWN

HT-101 WRENCH (FOR CAVITIES)

# H-141 KLYSTRON AMPLIFIER CIRCUIT ASSEMBLY