The Eimac 1K20XD-S is a ceramic and metal, conduction-cooled reflex klystron designed for transmitter or local oscillator service in applications encountering severe vibration, shock or temperature extremes. This tube will deliver a typical output power of 120 milliwatts over the frequency range of 10,500 to 11,000 megacycles.

The stacked-ceramic construction results in an extremely rugged design and a low sensitivity to vibration.

Leads to the tube are permanently attached and protected by molded silastic rubber caps which permit operation at any altitude without flashover.

**GENERAL CHARACTERISTICS**

**ELECTRICAL**

- **Cathode:** Unipotential, oxide coated
- **Warm-up time:** 30 seconds
- **Heater:** Voltage: 6.3 volts, Current: 1.0 ampere
- **Minimum Output Power (Load VSWR 1.15:1):** 100 milliwatts
- **Frequency Range:** 10,500 to 11,000 megacycles

**MECHANICAL**

- **Operating Position:** Any
- **Mounting:** UG-39/U waveguide flange
- **Cooling:** Conduction
- **Electrical Connections:** Flexible leads
- **RF Output Coupling:** RG-52/U waveguide
- **Net Weight:** 4 ounces
- **Shipping Weight (Approximate):** 2 pounds
- **Maximum Overall Dimensions:**
  - Height: 1.50 inches
  - Width: 1.63 inches
  - Length: 2.50 inches

**ENVIRONMENTAL**

- **Maximum Ambient Temperature:** 150°C
- **Maximum Altitude:** No limit
- **Maximum Non-Operating Shock** (11 ms Duration): 40 g
- **Maximum Operating Vibration** (20 to 2000 cps): 10 g
- **Maximum Operating Shock** (11 ms Duration): 40 g

*Based on a permanent frequency shift after drop of 2 megacycles.

**Based on a maximum peak-to-peak frequency deviation of 200 kilocycles.

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MAXIMUM RATINGS

DC RESONATOR VOLTAGE* - - - - - - - - - - 450 MAX, VOLTS
DC CATHODE CURRENT - - - - - - - - - - - 45 MAX, MA
RESONATOR DISSIPATION - - - - - - - - - - 25 MAX, WATTS
PEAK REPPELLER VOLTAGE*
  POSITIVE WITH RESPECT TO CATHODE - - - 0 MAX, VOLTS
  NEGATIVE WITH RESPECT TO CATHODE - - - 500 MAX, VOLTS

TYPICAL OPERATION (Load VSWR less than 1.15:1)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC Resonator Voltage*</td>
<td>400 volts</td>
</tr>
<tr>
<td>Mode</td>
<td>5-3/4</td>
</tr>
<tr>
<td>Frequency</td>
<td>10,750 mcycles</td>
</tr>
<tr>
<td>DC Cathode Current</td>
<td>40 mAmp</td>
</tr>
<tr>
<td>DC Repeller Voltage*</td>
<td>-175 volts</td>
</tr>
<tr>
<td>DC Repeller Current</td>
<td>1 microampere</td>
</tr>
<tr>
<td>Power Output</td>
<td>120 mwatts</td>
</tr>
<tr>
<td>Electronic Tuning (3 db bandwidth)</td>
<td>30 mcycles</td>
</tr>
<tr>
<td>Modulation Sensitivity (AE_F ± 3 volts)</td>
<td>1.7 Mc/volt</td>
</tr>
<tr>
<td>Peak-to-Peak FM Deviation (10g, 20-2000 cps)</td>
<td>200 kilocycles</td>
</tr>
<tr>
<td>Residual FM</td>
<td>50 kilocycles</td>
</tr>
</tbody>
</table>

*All voltages referred to cathode.

APPLICATION

Cooling: At sea level this tube will not require forced air cooling when operated at its maximum rated dissipation with an ambient temperature less than 150° Centigrade. The waveguide flange connection will normally provide the required heat sink for conduction cooling. If an insulator is used between the tube and waveguide for DC isolation, forced air cooling may be required to maintain the ceramic-to-ceramic seal temperatures below the maximum rating of 250° Centigrade.

Resonator: The resonator of the 1K20XD-S is integral with the body of the klystron. For this reason it is often convenient to operate the resonator at chassis potential, with the repeller and cathode at appropriate negative potentials.

Cathode: The heater voltage should be maintained within ±5% of the rated value of 6.3 volts if variations in performance are to be minimized and the best tube life obtained.

The heater and cathode of the 1K20XD-S are internally connected. When the resonator of this tube is operated at chassis potential, the heater transformer must be insulated for the cathode-to-resonator voltage.

Mechanical Tuning: In the 1K20XD-S a fixed-tuned inner cavity is closely coupled through a ceramic window to a secondary cavity outside the vacuum. Mechanical tuning is accomplished by a capacitive slug in the secondary cavity with a tuning rate of approximately 150 megacycles per turn. This design allows repeated tuner cycling without damaging the vacuum seals. The maximum tuner torque is 40 inch-ounces.

A clockwise rotation of the tuner will produce a decrease in frequency.
IK20XD-S

12" NOM LEAD LENGTH

FLANGE MATES WITH UG-39/U

CONNECTIONS
- HEATER
- CATHODE
- HEATER REPELLER

* INTERNALLY CONNECTED

.250 +.000 DIA. TUNER

1.625 NOM

1.958 NOM

.675 MAX

.187 MAX
IK20XD-S TYPICAL OPERATING CHARACTERISTICS

\[ E_{rs} = 400 \text{ Vdc} \]
\[ I_k = 40 \text{ mA} \]
\[ 5 \frac{3}{4} \text{ MODE} \]

- **Power Output vs. Frequency**
  - Y-axis: Power Output (mW)
  - X-axis: Frequency (GHz)

- **Repeller Voltage vs. Frequency**
  - Y-axis: Repeller Voltage (volts)
  - X-axis: Frequency (GHz)