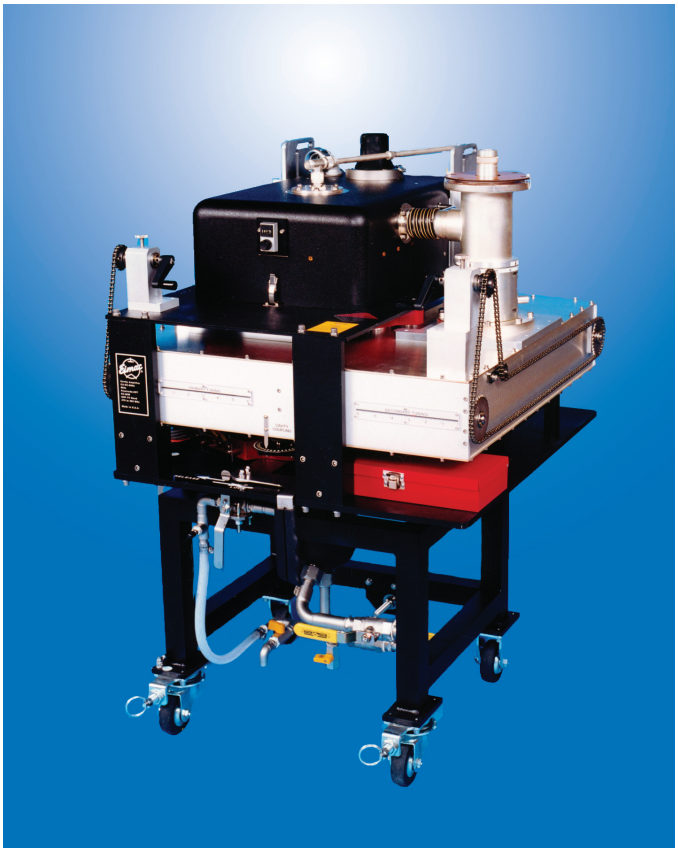
K275W
K2 Series
IOT Amplifier

- 75 kW Peak of Sync in Vision only Service
- 55 kW Peak of Sync, 5.5 kW single carrier sound in Common Amplification Service
- Figure of Merit of 116% in Vision only; 114% in Common Amplification
- High gain amplifier: 23 dB Channel 20
- Long life, high reliability with dispenser type cathode and pyrolytic graphite grid
- Single tube and circuit: 470 to 815 MHz
- User-friendly tuning
- Tube replacement does not require disconnection of power supply or cooling water
- Compact size with "collector (water) down"
- Water-cooled collector and output cavity; air-cooled circuits, anode and electron gun
- U.S. Based, Worldwide product and applications support

K2 UHF-TV Cavity Amplifier



Made in USA

The EIMAC K275W Klystrode® Inductive Output Tube (IOT) is a high efficiency amplifier tube for use in UHF television service in the output stages of vision, sound, combined vision and sound. The IOT has a magnetically focused electron beam which is density bunched by an RF cavity driven grid. With moderate amplitude and phase precorrection the tube can be operated in class AB mode with very low average beam current thus saving beam power which would otherwise be wasted as heat in the collector.

The K2 cavity amplifier is comprised of a single tube, K275W, and associated hardware assembly, HA2000. The cavity amplifier covers the entire UHF TV band from 470—815 MHz (bands IV and V).

The K2 amplifier series has an advanced Electro-Magnetic-Compatibility (EMC) designed input circuit, which isolates the RF input from the transmitter DC high voltage. The input circuit has a stable, out-of-the-way storage position and utilizes a cam-guided insertion mechanism to ensure positive connection to the IOT. The input cavity, the output cavity, focus magnet assembly, arc detector, water-jacket and load coupler are mounted on a rugged wheeled support stand.

Electron gun and cavity air-cooling is improved with the new K2 air plenum design. Tube replacement and maintenance is a simple matter for one person without requiring winches or removing the cavity assembly from the transmitter cabinet. Coolant lines or power supplies do not have to be disconnected.

The Klystrode® IOT may be operated in combined sound and vision mode service at 55 kW peak-of-sync with suitable precorrection. This mode of operation results in extremely simple, compact, and economical transmitter design.

The Klystrode® IOT is also suitable for operation as an FM aural power amplifier. It may be operated in the FM mode at approximately 10% of the peak-of-sync power of a companion visual mode IOT with a common beam supply.

In DTV digital transmission, the Klystrode® IOT can be used at up to 110 kW peak power or greater depending on the peak-to-average level (for details please contact Eimac Division, CPI Inc., Klystrode® IOT Applications Engineering).

Communications & Power Industries

April 2007

General Characteristics

SUMMARY DATA

Frequency Range ..... 470 to 815 MHz
Peak-of-sync output power (at IOT flange) ..... 75 kW
Power Gain ..... 23 dB @ 500 MHz
Gain decreases approximately 0.6 dB per 100 MHz increase
Beam Voltage ..... 30 to 38 kV*

ELECTRICAL

Cathode ..... Dispenser type
DC Heater Voltage ..... 8 to 10 V
DC Heater Current ..... 8.5 A (typical)
Heater Power ..... 80 Watts (nominal)
Maximum cold start DC Heater Current 15A*
Heater warm-up time ..... 5 minutes (nominal)
Focus Magnet (current regulated):
DC Voltage ..... 3.5 ±1.5V
DC Current ..... 15—25A

* Current must be limited by the supply

MECHANICAL

K275W Klystrode IOT

Length ..... (overall) 22.5 in (57.2 cm) nominal
Diameter ..... (overall) 5.1 in (12.9 cm) nominal
Mounting position ..... vertical, collector end down
Net weight (with lift handle) ..... 25.0 lbs (11.4 kg) approx.

HA2000 Hardware Assembly

Input ..... RF connector, 7/16" type N
Output RF connector: Standard 3-1/8 inch, 50 Ohm coaxial line (Alternate 4-1/16 inch, 50 Ohm coaxial line available - user to specify).
Net weight of total hardware assembly ..... 460 lbs [209 kg]

Cooling[1]

Airflow to cavities and cathode ..... 50 - 70 cfm (2.0m³/min)
Static pressure head ..... 5.0 inches water (1.30 kPa)
Inlet air temperature ..... 15—50°C
Water flow for collector: ..... 10 - 20 US g/min (38 -75 1/min)
Collector pressure drop at 15 US gal/min ..... 15 psi (104 kPa)
Maximum Inlet pressure ..... 60 psi (414 kPa)
Water Outlet temperature ..... 70°C max
Water Inlet temperature ..... 15°—55°C

Arc Detector

Two (2) photo resistors and test lamps are located in the output cavities which must be used for protection of the tube from cavity arc damage.

ION Pump

A getter ion pump requiring 3-4 kV with respect to the heater is provided.

Operational Characteristics

Common Amplifier Service (Single Sound)

- Visual output power (peak-of-sync) ..... 55 kW
- Aural output power ..... 5.5 kW
- Peak instantaneous RF output power ..... 95 kW
- Heater requirements ..... 80 W
- Beam voltage ..... 33 kV
- Beam current (peak-of-sync) (vision content only) ..... 3.3 A
- Beam current (black level) ..... 2.8 A
- Beam current (gray level) ..... 1.6 A
- Grid current (max) ..... ±0.2 A
- Quiescent beam current ..... 0.40 A
- Grid bias voltage with respect to cathode voltage ..... -65 V
- Drive power (visual peak-of-sync) ..... 450 W
- Drive power (aural) ..... 46 W
- Figure of merit 114%
- Collector Dissipation (Max) ..... 60 kW

Absolute Maximum Ratings: Combinations of absolute maximum rating can not be attained simultaneously.

Heater Current ..... 10 A
Heater Voltage ..... 10 V
Beam Voltage ..... 38 kV
Beam Current ..... 5 A
Quiescent Current ..... 0.700 A
Collector Dissipation ..... 60 kW
Drive Power (Peak) ..... 1.5 kW
Drive Power (Average) ..... 300 W
Grid Voltage ..... -200 V
Grid Current ..... 0.300 A
Peak Power Out ..... 130 kW
Average/CW Power Out ..... 60 kW
VSWR 3.0:1

NOTE 1:

The recommended coolant flow rate for pure demineralized water is 10 GPM. When using a 50/50 glycol/water mix, Eimac recommends the flow rate be set at 20 GPM. Regardless of the coolant mixture, should audible evidence of boiling be heard, which sounds like rattling, the coolant flow rate must be immediately increased or the equipment shut down. Annual replacement of the coolant, such as Dowtherm 4000 or Dowtherm SR-1, is recommended to avoid glycol breakdown.

For More Detailed Information: Contact CPI / MPP Eimac Operation, IOT Applications Engineering
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