

# GEN IV Klystron High Power Amplifier

## Features and Options

Scopescreen provides a graphical log display. The Ethernet option provides higher speed connections, can update and coordinate all clock settings, and enables a snapshot feature where user can create a file containing all settings, alarms and faults at a single point in time.

## Compact Size

Greater klystron efficiency and exceptional thermal margins have enabled CPI to design the smallest KPA on the market --- without the threat of overheating or a shorter klystron life.

## Greater Reliability

Low temperatures are the key to longer lifetimes for klystrons and electronic parts. The CPI power supply design and high efficiency, multi-stage depressed collector Extended Interaction Klystron (EIK) make these lower temperatures possible.

## Useful Displays

Large, high quality, color, graphical display has a wide viewing angle and a sharp appearance. All important functions are clearly displayed, and an event log is included.

## Easy Maintenance, Easy Handling

All areas of the amplifier are easily accessible and there are no large harnesses to get in the way. Separate RF and Power Supply drawers slide out from a standard rack.

## Worldwide Support

Backed by over 35 years of satellite communications experience, and CPI's worldwide 24-hour customer support network that includes more than 20 regional factory service centers.



### Model E4Q7

47.5 to 52.0 GHz Klystron Power Amplifier for **EMC or communications applications**

#### OPTIONS

- Remote control panel
- Integral linearizer
- Ethernet interface



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## Q-band GEN IV Klystron High Power Amplifier

Specification	Model E4Q7
Output Frequency	Various power and bandwidth combinations within the frequency band: Up to 500 MHz at 800 W output power; to 800 MHz at 400 W output power; to 1 GHz at 300 W output power
Output Power with Harmonic Filter <sup>1</sup> Klystron CW Power Flange CW Power (min.)	1.0 kW (60.0 dBm) min. 750 W (58.75 dBm) min.
Instantaneous Bandwidth	500 MHz to 1 GHz depending on required output power (see Output Frequency above)
Gain at rated power	70 dB min.
Gain Stability vs. Time	±0.5 dB/24 hr. max. at constant drive and temperature
Gain Stability vs. Temperature	1 dB max. from 20° to 40°C; ±2.5 dB max. from 0° to 40°C (at constant drive)
Gain Slope at Rate Power	0.1 dB/MHz max. over Fo ±18 MHz
Gain Variation at Rated Power	0.5 dB pk-pk max. over Fo ±18 MHz
Input/Output VSWR	1.35:1 max / 1.40:1 max.
Load VSWR	2.0:1 max. for full spec. compliance; any value for operation without damage
AM/PM Conversion	5°/dB max. at rated power
Harmonic Output	-70 dBc with filter; -35 dBc without filter
Noise Density at Rated Gain	-65 dBW/4 kHz, in passband with linearizer -60 dBc/4 kHz, passband with linearizer; -110 dBc/MHz, 12.7 to 40 GHz (excluding passband) excluding passband
Intermodulation	-28 dBc typical with two equal carriers at total output 7 dB below rated single-carrier output
Phase Noise (typical)	Exceeds requirements of INTELSAT Standard IESS-308/309 at 10 dB backoff from rated output power
Group Delay (typical)	In any 36 MHz band: 0.10 ns/MHz linear; 0.02 ns/MHz <sup>2</sup> parabolic; 2.0 ns pk-pk ripple
Primary Power <sup>3</sup>	All ratings are ±10%; Frequency: 47-63 Hz, 5 wire, 3 phase with ground; 208 VAC (with or without neutral); 380 to 415 VAC
Power Consumption <sup>4</sup>	3.0 kVA typ.
Power Factor	0.90 min, 0.95 typ.
Inrush Current, peak	180% of normal line current peak max. (first half-cycle only)
Ambient Temperature	-10°C to +40°C operating, -54°C to +71°C non-operating
Relative Humidity	95% non-condensing
Altitude	10,000 ft. with standard adiabatic derating of 2°C/1000 ft. operating; 40,000 ft. non-operating
Shock and Vibration	As normally encountered in satellite earth stations and shipping
Cooling	Forced air with integral blower and fans; separate klystron collector cooling path
Air Flow Rate, Klystron	175 cfm min. at sea level
External Ducts Back Pressure	0.5 inch water gauge total, max.
Klystron Heat Loss	5000 W max.
Heat Loss in Room	Cabinet less klystron: 1700 W max.
Acoustic Noise	63 dBA nom, measured 3 ft from front of equipment
Connections	RF Input: 2.9 mm coax, female; RF output: WR-22 waveguide flange, grooved; RF output monitors: 2.9 mm coax, female
M&C Interface	RS422/485, RS232 serial interface; Ethernet optional
Dimensions, W x H x D	RF Drawer: 19 x 17.5 x 28 inches (483 x 445 x 711 mm); Power Supply: 19 x 8.75 x 24 in. (483 x 223 x 610 mm)
Weight	RF Drawer: 220 lbs with klystron (100 kg) nom; Power Supply: 100 lbs (45.4 kg)

Notes: 1. Harmonic filter can be removed as an option. Add 0.25 dB to amplifier output for units ordered without harmonic filter. Output VSWR without filter is 1.25:1 max.

2. Prime power AC line unbalance not to exceed 3%. Excess imbalance may cause an increase in residual RF noise (AM, FM and PM). Phase noise increase is typically 2.5 dB / % imbalance.

3. AC current harmonic content: less than 20%, primarily fifth and seventh harmonics. Harmonics must be considered when choosing UPS sources.

4. Lower power consumption can be achieved if power saver (included as standard) is employed when operating below rated output power.