

S-Band Gen IV Klystron High Power Amplifier

for Satellite, Troposcatter and Terrestrial Gapfiller Applications

The Gen IV High Power Amplifier (K4S74 and K4S71 Series)

S-Band Gen IV – provides up to 1.2, 2.5 or 3.0 kW of power in a dual drawer package

Unmatched Efficiency

Uses less power and produces less heat than any other K-HPA. Features Power Saver and Power Tracker, optimizing K-HPA efficiency to meet your operating condition.

New 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.

Unmatched Size

Greater 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 klystron 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.

S-Band



Integrated Protection Switching

Redundant switch controller eliminates the cost of external controllers. System status is shown on the display and switch controls are implemented locally on the front panel touch-pad, or remotely via the digital serial interface.

Easy Maintenance

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.

Acoustically Quiet

The quietest K-HPA in the industry.

Worldwide Support

Backed by over three decades of satellite communications experience, and CPI's worldwide 24-hour customer support network that includes sixteen regional factory service centers.

satcom  **division**

811 Hansen Way
P.O. Box 51625, Palo Alto, CA 94303

tel: +1 (650) 846-3803
fax: +1 (650) 424-1744

e-mail: satcommarketing@cpil.com
www.cpii.com/satcom

S-Band

Gen IV Klystron High Power Amplifier

SPECIFICATIONS, S-Band Gen IV

Electrical

| | |
|---|--|
| Frequency Range | 1.6 - 2.0 GHz, 1.7 - 1.9 GHz, 1.7 - 2.0 GHz, 2.0 - 2.2 GHz, 2.15 - 2.65 or 2.6 - 2.7 GHz (others available) |
| Klystron Power Output | 2.5 kW min. (64.0 dBm), 3.0 kW min. at 2.6 GHz (64.8 dBm) 1.2 kW min. (60.8 dBm) for 25 MHz BW |
| Amplifier Output at flange ¹ | 2.0 kW min. (63.0 dBm), 2.66 kW min. at 2.6 GHz (64.3 dBm) 900 W (59.5 dBm) for 30 MHz BW |
| Bandwidth | 8 MHz (-1 dB); 25 MHz for 1.2 kW KPA |
| Power Adjustability | 0 to -20 dB of output with ± 0.1 dB typical resolution |
| Gain at Rated Power | 70 dB min.; 60 dB for 1.2 kW KPA |
| Gain Stability vs. Time | ± 0.25 dB/24 hr. max. at constant drive and temperature |
| Gain Stability vs. Temp. | 1 dB max. from 20° to 40°C; ± 2.5 dB max from 0° to 50°C (at constant drive) |
| Gain Slope (at rated power) | 0.02 dB/MHz max. over (F ± 2.5 MHz) |
| Gain Variation (at rated power) | 0.5 dB pk-pk max. over (F ± 2.5 MHz) |
| Input VSWR (200 MHz Tunable) | 1.25:1 max.; 1.30:1 max (>200 MHz Tunable) |
| Output VSWR (200 MHz Tunable) | 1.35:1 max.; 1.40:1 max (>200 MHz Tunable) |
| Load VSWR | 2.0:1 max. for full spec. compliance; any value for operation without damage |
| AM/PM Conversion (at rated power) | 3°/dB maximum |
| Harmonic Output ¹ | -80 dBc |
| Noise and Spurious (at rated gain) | -145 dBW/4 kHz, receive band typ. -60 dBW/4 kHz, in passband typ. -110 dBW/MHz, outside passband typ. |
| Phase Noise ³ | Exceeds requirements of IESS-308/309 at -10 dB backoff. |
| Intermodulation ⁴ | -29 dBc with two equal carriers at total output 7 dB below rated single-carrier output |
| Group Delay ⁴ | 3.0 ns/MHz linear max. 2.0 ns/MHz ² parabolic max. 4.0 ns pk-pk ripple max. |
| Primary Power ³ | All ratings are $\pm 10\%$, 47-63 Hz 3-phase with neutral and ground: 208 VAC 380 to 415 VAC 200 VAC (without neutral) |

¹External Harmonic Filter may be removed as an option. Add 0.25 dB to amplifier output for units ordered without this option, and increase Harmonic Output to -30 dBc. The external harmonic filter extends 12 to 18" behind the back panel of the RF drawer.

²Prime 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.

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

⁴Typical values for 1.2 kW 25 MHz version. Maximum values TBD.

OPTIONS:

- *Motorized Channel Selector: (<10 seconds)*
- *Remote Control Panel*
- *Linearizer*
- *Ethernet Interface*
- *Power Combined Option*

Klystron Magnet Susceptibility:
Install RF Drawer at least 12 inches from ferromagnetic structures (i.e. power transformers, cold rolled steel racks or structural beams). Failure to comply with this requirement may result in degraded RF performance and/or product failures.

Electrical (continued)

| | |
|--------------------------------|---|
| Power Consumption ⁵ | 8.0 kW max. Typical values for the following RF output backoffs with respect to rated (power saver off): 7.2 kW @ 0 dB (rated) 5.5 kW @ -4 dB 4.7 kW @ -7 dB 4.2 kW @ -10 dB 4.0 kW @ -13 dB |
| Power Factor | 0.95 min. |
| Inrush Current, peak | 180% of normal line current peak max. (first half cycle only) |

Mechanical

| | |
|--|--|
| RF Input Connection | Type N female |
| RF Output Connection | CPR-430 Grooved flange below 2.10 GHz (CPR-340G flange at 2.6-2.7 GHz above 2.10 GHz) |
| RF Power Monitors | Type N female |
| Dimension (W x H x D without fans and handles) | |
| RF Drawer (Above 2.1 GHz) | 19 x 21 x 32 in. ¹ (483 x 534 x 813 mm) ¹ |
| (Below 2.1 GHz) | 19 x 24.5 x 42 in. ¹ (483 x 623 x 2070 mm) ¹ |
| PS Drawer | 19 x 8.75 x 24 in. (483 x 223 x 610 mm) |
| Weight | |
| RF Drawer | 280 lbs w/klystron (127 kg) |
| PS Drawer | 100 lbs (45.4 kg) |
| Cooling | Forced air with integral blower and fans; separate klystron collector cooling path |
| Air Flow Rate, Klystron | 250 cfm min., at sea level (175 cfm at 10,000 feet) |
| External Ducts Backpressure | 0.5 inch water gauge total, maximum |
| Klystron Heat Loss | 5300 W max. |
| Heat Loss in Room (cabinet less Klystron) | 2000 W max. |
| Acoustic Noise | 63 dBA nominal, measured 3 ft. from front of equipment |

Environmental

| | |
|---------------------|---|
| Ambient Temperature | -10° to +50° operating; -40° to +80° non-operating |
| Relative Humidity | 95%, non-condensing |
| Altitude operating: | 10,000 ft. (3000 m) with standard adiabatic temp derating of 2°C/1000 ft. or 6.5°C/km |
| non-operating: | 40,000 ft. (12,000 m) |
| Shock and Vibration | As normally encountered in satellite earth stations and shipping |

⁵Lower power consumption can be achieved if power saver (included as standard) is employed when operating below rated output power. Power consumption for 1.2 kW klystron PA is 5.9 kW typ. at rated power, 3.5 kW typ. at 13 dB backoff.



Please check CPI's web site to ensure most current data sheet.

For more detailed information, please refer to the corresponding CPI Technical Description.

Note: Specifications may change without notice as a result of additional data or product refinement.

Please contact CPI before using this information for system design.



satcom division