

# 2.5 kW Modular SuperLinear® TWTA

## Compact

Provides 2500 watts of equivalent linear power (1110 watts operating) in a modular, nine rack-unit package, digital ready, for wideband, single- and multi-carrier satellite service in the 7.9 – 8.4 GHz frequency band. Designed to operate at up to 1260 watts CW power for multi-carrier uplinks. Ideal for transportable and fixed earth station applications where space and prime power are at a premium. 30% smaller than traditional HPAs.

## Efficient and Reliable

CPI SuperLinear® TWTA's are among the most power efficient in the industry. This amplifier is optimized for maximum efficiency at linear output operating levels.

## Simple to Operate

User-friendly microprocessor-controlled logic with integrated computer interface, digital metering, pin diode attenuation, optional integrated linearizer for improved intermodulation performance, and BUC option for use with L-band modems.

## Easy to Maintain

User-friendly event monitor and help screens. Completely independent and pre-calibrated modules can be field-replaced with minimal training. Built-in fault diagnostic capability with convenient and clearly visible indicators.

## Meets Global Requirements

Meets International Safety Standard EN-60215, Electromagnetic Compatibility 2014/30/EU and Harmonic Standard EN-61000-3-2 to satisfy worldwide requirements. CE Marked.

## Worldwide Support

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



## Model TL25XK

2500 watt X-band modular SuperLinear® TWTA for satellite uplink applications

### OPTIONS

- Remote control panel
- Redundant and power combined sub-systems
- Integrated 1:1 switch control and drive
- L-band block upconverter (BUC) - contact CPI for specifications
- Integral linearizer
- External receive band reject filter
- Ethernet interface



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## 2.5 kW X-Band Modular SuperLinear® TWTA

| Specification                                                                                                             | Model TL25XK                                                                                                                                                                                                                                                                                       |
|---------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Output Frequency                                                                                                          | 7.9 to 8.4 GHz                                                                                                                                                                                                                                                                                     |
| Output Power (min.)<br>TWT Peak Power<br>Flange Peak Power<br>Guaranteed CW Power at Flange<br>Maximum CW Power at Flange | 2500 W (63.98 dBm) min.<br>2220 W (63.45 dBm) min.<br>1110 W (60.45 dBm) min.<br>1395 W (61.45 dBm) max.                                                                                                                                                                                           |
| Note on Output Power                                                                                                      | This amplifier guarantees 1110 W of CW power at the flange. The peak power specifications are provided so that desired backoff may be more easily calculated.                                                                                                                                      |
| Gain                                                                                                                      | 75 dB min. at rated output power; 78 dB min. at small signal                                                                                                                                                                                                                                       |
| RF Level Adjust Range                                                                                                     | 0 to 30 dB (via PIN diode attenuator) typ, 0.1 dB steps                                                                                                                                                                                                                                            |
| Gain Stability<br>Over temp, constant drive                                                                               | ±0.25 dB/24 hour max,max. at constant drive and temperature, after 30 minute warmup<br>±1.0 dB typ. over operating temperature range                                                                                                                                                               |
| Small Signal Gain Slope                                                                                                   | ±0.02 dB/MHz max.                                                                                                                                                                                                                                                                                  |
| Small Signal Gain Variation                                                                                               | 0.5 dB pk-pk max. across any 40 MHz;<br>3.0 dB pk-pk max. across the 500 MHz band<br>(4.0 dB pk-pk with optional linearizer);                                                                                                                                                                      |
| Input/Output VSWR                                                                                                         | 1.3:1 max.                                                                                                                                                                                                                                                                                         |
| Load VSWR                                                                                                                 | 2.0:1 continuous output; 1.5:1 for full spec. compliance; any value operation without damage                                                                                                                                                                                                       |
| Phase Noise                                                                                                               | 10 dB below IESS-308/309 phase noise profile; -50 dBc AC fundamentals related; -47 dBc sum of spurs;<br>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.         |
| AM/PM Conversion                                                                                                          | 6.0°/dB max; with optional linearizer, can be tuned to 2.0°/dB max.                                                                                                                                                                                                                                |
| Harmonic Outputs                                                                                                          | -60 dBc                                                                                                                                                                                                                                                                                            |
| Noise Density                                                                                                             | <-130 dBW/4 kHz from 3.4 to 4.2 GHz; <-70 dBW/4 kHz from 4.2 to 12 GHz (<-65 dBW/4 kHz passband with linearizer option);<br>-110 dBW/4 kHz from 12.0 to 40.0 GHz                                                                                                                                   |
| Intermodulation - with respect to the sum of 2 equal carriers 5 MHz apart                                                 | -25 dBc max. at rated power (1110 W) with optional linearizer;<br>-25 dBc max. at output level of 400 W output power without linearizer                                                                                                                                                            |
| Group Delay                                                                                                               | 0.02 ns/MHz linear max; 0.002 ns/MHz <sup>2</sup> parabolic max; 0.5 ns pk-pk ripple max.                                                                                                                                                                                                          |
| Primary Power                                                                                                             | Voltage: Three phase with neutral and ground, 200 to 240 VAC ±10% with or without neutral; OR 380/415 VAC ±10%;<br>Frequency: 47-63 Hz five wire;<br>AC current harmonic content: less than 20%, primarily fifth and seventh harmonics.<br>Harmonics must be considered when choosing UPS sources. |
| Power Consumption                                                                                                         | 5.5 kW max; 4.9 kW typ. at 1000 W output power;<br>4.2 kW typ. at 800 W output power<br>3.3 kW typ. at 200 W output power<br>2.8 kW typ. at 100 W output power                                                                                                                                     |
| Power Factor                                                                                                              | 0.90 min; 0.95 typ.                                                                                                                                                                                                                                                                                |
| Ambient Temperature                                                                                                       | 0°C to +50°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; 50,000 ft. non-operating                                                                                                                                                                                                    |
| Shock and Vibration                                                                                                       | Designed and tested for MIL-STD-167-1A. Designed to withstand 20g at 11 ms (1/2 sine pulse) in non-operating condition                                                                                                                                                                             |
| Cooling                                                                                                                   | Forced air with integral blower. Maximum external pressure loss allowable: 0.25 inch water gauge.                                                                                                                                                                                                  |
| Connections                                                                                                               | RF Input: Type N Female; RF output: CPR-112 waveguide flange, grooved, threaded, UNC 2B 8-32;<br>RF output monitor: Type N Female                                                                                                                                                                  |
| M&C Interface                                                                                                             | RS-232 and RS-422/485 (4-wire) (Ethernet optional)                                                                                                                                                                                                                                                 |
| Weight and Dimensions                                                                                                     | 165 lbs (74.8 kg) max. / 19 W x 15.75 H x 24 D inches (483 W x 400 H x 610 D mm)                                                                                                                                                                                                                   |

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