

400W Outdoor TWT Amplifier for Satellite Communications

X-Band

The T04XO Series

400 Watt TWT
Amplifier — high
efficiency in an
environmentally sealed
compact package
designed for outdoor
operation



Plays in the Rain

Provides 400 watts of power in a rugged and compact weatherproof package, digital ready, for wideband, single- and multi-carrier satellite service in the 7.9 - 8.4 GHz frequency band. Ideal for transportable and fixed earth station applications.

Cost Effective and Efficient

Mounting at the antenna improves performance through minimized cable losses and saves cost in system design. Employs a high efficiency, dual-depressed collector helix traveling wave tube reducing operating costs.

Reliable

Designed and built to survive in extremely adverse environmental conditions and features increased cooling margin for longer life.

Simple to Operate

User-friendly microprocessor-controlled logic with integrated RS422/485 computer interface. Digital metering, pin diode attenuation and optional integrated linearizer for improved intermodulation performance.

Easy to Maintain

Modular design and built-in fault diagnostic capability via remote monitor and control.

Global Applications

Meets International Safety Standard EN-60215, Electromagnetic Compatibility 2004/108/EC and Harmonic Standard EN-61000-3-2 to satisfy worldwide requirements.

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.

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SPECIFICATIONS, T04XO Series

Electrical

Frequency	7.9 - 8.4 GHz
Output Power	
TWT	400 W min. (56.02 dBm)
Flange	350 W min. (55.44 dBm)
Bandwidth	500 MHz
Gain	46 dB min. at rated power output (70 dB with SSIPA) 52 dB min. at small signal (75 dB with SSIPA)
Gain Stability	At constant drive and temp. ± 0.25 dB/24hr max. (after 30 min. warmup) Over temp. constant drive ± 1.0 dB over operating temp. range (any freq.); ± 0.75 dB over $\pm 10^\circ\text{C}$
Small Signal Gain Slope	± 0.02 dB/MHz max. (± 0.04 dB/MHz max. with BUC option)
Small Signal Gain Variation	1.0 dB pk-pk across any 40 MHz band; 2.5 dB pk-pk across the 500 MHz band 4.0 dB pk-pk across 500 MHz with linearizer 4.5 dB pk-pk across 500 MHz with BUC
RF Level Adjust Range	0 to 30 dB typ. (SSIPA option required)
Attenuator Step-Size	0.1 dB (SSIPA option required)
Input VSWR	1.3:1 max. (1.5:1 max. with BUC)
Output VSWR	1.3:1 max.
Load VSWR	2.0:1 max. continuous operation; any value for operation without damage
Residual AM	-50 dBc below 10 kHz $-20[1.5 + \log F (\text{kHz})]$ dBc, 10 kHz to 500 kHz -85 dBc above 500 kHz
Phase Noise	
IESS-308/309	12 dB below mask (3 dB below with BUC)
phase noise continuous	
AC fundamentals related	-50 dBc (-33 dBc with BUC)
Sum of spurs (370 Hz to 1 MHz)	-47 dBc (-39 dBc with BUC)
AM/PM Conversion	2.5°/dB max. for a single carrier at 7 dB below rated power (2.5°/dB max. at 3 dB below rated with linearizer)
Harmonic Output	-60 dBc at rated power
Noise and Spurious (at rated gain)	<-70 dBW/4 kHz, passband <-70 dBW/4 kHz, 7.25 to 7.75 GHz
Intermodulation	-24 dBc max. with two equal carriers at total output power 7 dB (4 dB with optional integral linearizer) below rated single-carrier output

Electrical (continued)

Group Delay	0.01 ns/MHz linear max. (in any 40 MHz band) 0.001 ns/MHz ² parabolic max. 0.5 ns pk-pk ripple max.
Primary Power	90-264 volts AC, single phase 47-63 Hz
Power Consumption	1350 W typ. 1500 W max.
Power Factor	0.95 min.

Environmental (Operating)

Ambient Temperature	-40°C to +55°C operating, including solar loading; -40°C to +75°C non-operating
Relative Humidity	100% condensing
Altitude	10,000 ft. with standard adiabatic derating of 2°C/1000 ft., operating; 50,000 ft., non-operating
Shock and Vibration	Designed for normal transportation environment per Section 514.4 MIL-STD-810E. Designed to withstand 20G at 11 ms (1/2 sine pulse) in non-operating configuration.
Acoustic Noise	65 dBA @ 3 ft. from amplifier
Heat Dissipation	1100 W max.

Mechanical

Cooling (TWT)	Forced air with integral blower
RF Input Connection	Type N female
RF Output Connection	CPR-112 G waveguide flange, grooved with UNC 2B 10-32 threaded holes
RF Output Monitor	Type N female
Dimensions (W x H x D)	10.25 x 10.5 x 20.5 in. (260 x 267 x 521 mm)
Weight	55 lbs (25.0 kg) with no options, max.

OPTIONS:

- Remote Control Panel
- Integrated 1:1 Switch Control and Drive
- Redundant and Power Combined Subsystems
- SSIPA with Variable Attenuator (provides typical RF Level Adjust Range of 0 to 30 dB)
- Integral Linearizer (Requires SSIPA option)
- L-Band Block Upconverter (BUC --- requires SSIPA)
- Forward Power Detection Over CIF
- Ethernet Interface



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.



Communications & Power Industries

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