

500 W Outdoor TWT Amplifier for Satellite Communications

Ka-Band

The TL05KO Series

500 watt peak power
TWT Amplifier —
Environmentally sealed
compact design for
outdoor operation



Efficient and Cost Effective

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

Simple to Operate

User-friendly microprocessor-controlled logic with integrated Ethernet computer interface. Digital metering and TWT input drive monitoring are standard.

Rugged and Easy to Maintain

Built-in fault diagnostic capability via remote monitor and control. Easy access enclosure for improved serviceability. CANBUS architecture improves reliability and improves noise immunity.

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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500 W Outdoor TWT Amplifier

SPECIFICATIONS, TL05KO Series

Electrical

Frequency	27.5 – 30.0 GHz or 30.0 – 31.0 GHz (optional frequency ranges available within the 27.0 - 31.0 GHz frequency band)
Output Power TWT	500 W (57.00 dBm) peak; 250, 300, 350 or 400 W CW ¹ (54.0, 54.8, 55.4 or 56.0 dBm)
Flange	415 W (56.18 dBm) peak ² 215, 250, 290 or 340 W CW ^{1,3} (53.33, 53.97, 54.63 or 55.3 dBm)
Bandwidth	up to 2500 MHz, depending on selected frequency range
Gain	70 dB min. at rated power output; 70 dB typ. at small signal
Gain Stability	±0.25 dB/24hr max. (at constant drive and temp.); ±0.75 dB max. over ±10°C; ±1.0 dB typ. over temperature range
Small Signal Gain Slope	±0.04 dB/MHz max.
Small Signal Gain Variation	1.0 dB pk-pk across any 500 MHz segment; 2.5 dB pk-pk across any 1 GHz segment
RF Level Adjust Range	0 to 30 dB
Attenuator Step Size	0.1 dB
Input and Output VSWR	1.3:1 max.
Load VSWR	1.5:1 max. continuous operation; any value for operation without damage; 2.0:1 max continuous
Phase Noise	-15 dB below IESS-308 mask; -47 dBc AC fundamental; -50 dBc sum of all spurs
Spurious	-60 dBc max.
AM/PM Conversion	2.5°/dB max. for a single carrier up to 7 dB OBO (2.0°/dB max. up to 4 dB OBO with linearizer option)
Residual AM	-50 dBc below 10 kHz -20 [1.5 + log F(kHz)] dBc, 10 kHz to 500 kHz -85 dBc, above 500 kHz
Harmonic Output	-12 dBc max. at rated power (-60 dBc with optional filter)
Noise Power Density	<-150 dBW/4 kHz, below 21.2 GHz; <-70 dBW/4 kHz max, transmit band (<-80 dBW/4 kHz typ. in transmit band); <-65 dBW/4 kHz max, transmit band with linearizer
Noise Power Ratio (NPR) (with linearizer)	-19 dB at 4 dB OBO typical; -20 dB at 4.3 dB OBO typical

OPTIONS:

- *1 RU Remote Control Panel*
- *Internal Switch Control and Drive*
- *Redundant or Power Combined Subsystems*
- *Integral L-Band Block Upconverter (BUC)**
- *MIL-STD-461 EMI External Filter*
- *500 W CW option: see model T05KO*
- *Integral Linearizer*
- *RS-422/485*
- *Harmonic Filter³* - lowers harmonic output to -60 dBc max.*

*** This data sheet does not provide amplifier specifications for when the BUC and/or the Harmonic Filter options are included. Consult CPI for details.**

Electrical Specifications (continued)

Group Delay (over any 40 MHz)	Linear 0.01 nsec/MHz max. Parabolic 0.001 nsec/MHz ² max. Ripple 0.5 nsec pk-pk max.
Intermodulation	-25 dBc max. with respect to the sum of both carriers at total output power of 49.2 dBm (at 52.2 dBm with optional linearizer)
Primary Power	100-240 VAC ±10% single phase, 47-63 Hz
Power Consumption	1300 VA max. 1050 VA typ.
Power Factor	0.95 min.
Amplitude and Phase Linearity	Exceeds MIL-STD-188-164A

Environmental Specifications (Operating)

Ambient Temperature	-40°C to +50°C operating in direct sunlight; up to 55°C out of direct sunlight; -54°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	20 g pk, 11 ms, 1/2 sine
Vibration	2.1 grms, 5 to 500 Hz
Acoustic Noise	65 dBA typ. @ 3 ft. from amplifier
Heat Dissipation	950 W max.

Mechanical Specifications

Cooling	Forced air with integral blower
RF Input Connection	WR-28F (WR-34F optional)
RF Output Connection	WR-34G (WR-28G optional)
RF Output Monitor	2.9 mm SMA Female
Remote Interface	Ethernet (RS422/485 optional)
Dimensions (W x H x D)	10.25 x 10.5 x 22.25 in. max. (261 x 267 x 566 mm)
Weight	60 lbs (27.2 kg) with no options

Mounting hardware is provided with each amplifier.

Note 1. Customer must select 250 W, 300 W, 350 W or 400 W CW amplifier at time of purchase. This option is TWT dependent and not field changeable.

Note 2. This number is provided so that desired backoff can more easily be calculated. The amplifier's actual output at the flange, CW power, is 215 W, 250 W, 290 W or 350 W, depending on selection. See note 1.

Note 3. CW power is reduced by 10 W with harmonic filter option.



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.



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