

## Features

- 250 Watt Linearized TWT
- 220 Watt Rated Power @ Flange
- Low Power Consumption
- Ethernet with SNMP
- Web Page
- RS-232 & RS-485
- Beacon receiver interface
- Integrated redundancy, 3 switches
- Data & Event Logger
- Selectable discrete interfaces  
Interlock, RF inhibit, Fault
- RF arc protection
- Reflected power protection
- Thermal protection



The PA20-Ka250 series power amplifiers provide the best in class Size, Weight and Power performance of any SATCOM outdoor power amplifier. These amplifiers are designed to optimize linear power performance and minimize power consumption, making them the most efficient linear power amplifiers available. The carbon footprint of a PA20-Ka250 is driven by the high efficiency power conversion of the traveling wave tube; an unmatched technology for power conversion.

The PA20-Ka250 series power amplifiers are designed for global use. The reduced size and weight is user friendly for shipping and installation.

Reliability is built-in. Designs are qualified and all products are manufactured in the USA under very stringent standards for quality and workmanship.

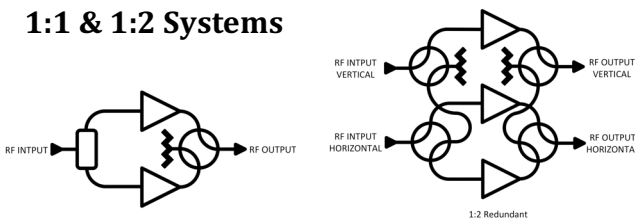
The PA20-Ka250 amplifier's internal monitor & control system provides Ethernet connectivity with plug and play web page interface for out of the box use. In addition SNMPv2 is supported.

Each amplifier includes a detailed system configuration interface for custom integration, as well as, multiple serial interfaces and multiple configurable discrete interfaces.

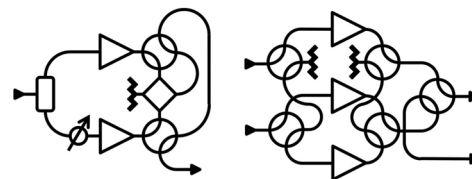
The PA20-Ka250 series power amplifiers are equipped with internal redundancy control, eliminating the need for external controllers. Systems can be configured for redundancy, power combining and combinations of these. Custom configurations with up to 3 switches can be managed over addressable Ethernet on a local area network.

PA20-Ka250

## 1:1 & 1:2 Systems



## Redundant and Phase Combined Systems



## RF Performance:

Frequency	27.5 – 30.0 GHz
Bandwidth	2500 MHz
Output Power	(for load VSWR $\leq$ 1.5:1)
TWT Power *	54.0 dBm (250 W) typical
Rated ( $P_{RATED}$ ) (PA flange) *	53.4 dBm (220) W)
Maximum Linear (MLP), $P_{MLP}$	50.4 dBm ( 110 W)

## Gain

Gain	$\geq$ 70 dB
Variation, 250 MHz, $\Delta G_{250MHz}$	$\leq$ 1.0 dB peak-peak
Variation, 1000 MHz, $\Delta G_{1000MHz}$	$\leq$ 2.5 dB peak-peak
Slope, $\Delta G_{SLOPE}$	$\pm$ 0.04 dB/MHz
Gain Stability vs. Time @ constant drive & temp	$\pm$ 0.25 dB/24 hours
Gain Stability vs. Temperature @ constant drive & frequency	$\pm$ 1.0 dB
Adjustment range, $G_{ADJ}$	30.0 dB typical
Adjustment step size	0.1 dB

## Linearity

AM/PM @ $P_o \leq MLP - 1$	$\leq$ 2.0°/dB
Inter-modulations (IMD) 2-tone	$\leq$ -28 dBc @ $P_o \leq MLP - 1$ dB
Spectral Re-growth (SR)	$\leq$ -30 dBc @ $P_o \leq MLP - 1$ dB
Noise Power Ratio (NPR)	$\leq$ -20 dBc @ $P_o \leq MLP - 1.5$ dB

Input VSWR (Return Loss)	$\leq$ 1.3:1 (17.7 dB)
Output VSWR (Return Loss)	$\leq$ 1.3:1 (17.7 dB)
Load VSWR (no damage)	$\leq$ 2.0:1 (9.5 dB)
Harmonic 2 <sup>nd</sup> & 3 <sup>rd</sup>	$\leq$ -60 dBc

## Noise Power

Transmit Band ( $T_x$ )	$\leq$ -70 dBW/4KHz
Receive Band ( $R_x$ )	$\leq$ -150 dBW/4KHz ( $\leq$ 21.2 GHz)
Spurious @ $P_o \leq MLP$	$\leq$ -60 dBc
Residual AM	$\leq$ -50 dBc, $f < 10KHz$ $\leq$ -20(1.5+LOG(frequency KHz))dBc, $f = 10KHz$ to 500KHz $\leq$ -85 dBc $> 500KHz$

Phase Noise	10 dB below IESS requirement $\leq$ - 50 dBc, AC fundamental $\leq$ - 47 dBc, Sum of all spurs
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## Group Delay (any 80 MHz)

Linear	0.01 nsec/MHz, max
Parabolic	0.005 nsec/MHz <sup>2</sup> , max
Ripple	0.5 nsec/Peak-Peak, max

\* The users exact frequency range must be specified at the time of purchase. Performance is dependent on the TWT and TWT-Linearizer optimization as a function of frequency.

## Prime Power:

AC Input Voltage	100-240 VAC, single phase 90-264 VAC maximum range 50-60 Hz $\pm$ 5%
Full Load Current	9 A max @ 90 VAC
Power Consumption	750 VA typical 800 VA maximum
Power Factor	0.99 typical 0.96 minimum

## Environmental:

Ambient Temperature	-40°C to +60°C
Relative Humidity	100% condensing
Altitude	12,000 ft. with standard adiabatic de-rating of 2°C/1000 ft., operating  50,000 ft., non-operating
Shock	15 g peak, 11mSec, 1/2 sine
Vibration	3.2 g rms, 10-500 Hz
Acoustic Noise	65 dBA @ $\geq$ 3 ft. from amplifier

## Mechanical:

Dimensions	Request outline at sales@tango-wave.com
Length	20.0 inches (50.8 cm)
Width	10.0 inches (25.4 cm)
Height	10.0 inches (25.4 cm)
Weight	46 pounds (21 kg) typical
Cooling	
Forced Air	200 cfm (340 m <sup>3</sup> /hr) typical
Thermal Load	2125 BTU/hour typical 2300 BTU/hour maximum
Connectors	
RF Input	WR-34
RF Output	WR-34
RF Output Sample	Type K(f), 50 ohm
AC Input	Amphenol C016 20C003 200 12
Ethernet	RJF71B
M&C Connector	PT07E18-32S (MS3114E-18-32S)
Auxiliary Connector	PT07E18-32SW (MS3114E-18-32SW)

## Options:

Ka2730	27.0 – 30.0 GHz ( $R_x \leq 21.2$ GHz)
Ka2830	28.0 – 30.0 GHz ( $R_x \leq 21.2$ GHz)
Ka3031	30.0 – 31.0 GHz ( $R_x \leq 21.2$ GHz)
BUC10	Integrated block up-converter with reference
WR-28-ADPT	RF Output – WR-34-to-WR-28 adapter
QDC34	Waveguide quick connector, WR-34
QDC28	Waveguide quick connector, WR-28 adapter
CON-AUX	Auxiliary Connector Cable Plug