

13.2m Ka-Band Turning Head Antenna

Antenna Technologies



Overview

The CPI Antenna Technologies' large diameter Ka-Band antennas require unique design criteria which we have successfully demonstrated with the 13.2 meter products. Items such as reflector surface accuracy, antenna/feed design, structural antenna stiffness and integrity, thermal effects, anti-icing/deicing, HPA phase combining, monopulse tracking, hub redundant air-conditioning, installation and alignments plus hub integration all require special engineering expertise at Ka-Band.

CPI has proven our expertise in the above area and has earned the position as a preferred antenna system provider and integrator to a number of major satellite companies by providing in excess of one hundred (100) systems of this type since 2005.

FEATURES:

- Precision Ka-Band rated aluminum panel surface reflector on steel back-up structure with counterweight
- An elevation over azimuth all-steel antenna structure with high stiffness turntable bearing
- A circular (option for linear or switchable linear/circular) polarized Ka-Band cassegrain 4-port Tx/Rx feed assembly with TE21 tracking coupler (monopulse) and feed rain blower
- Brushless servo motor jackscrew drive in elevation
- Dual brushless servo motor, dual gear-pinion drives with servo controlled anti-backlash in azimuth
- Access stairway and large work platform for ease of maintenance
- 9-foot diameter hub (5 foot wide roll up door)
- Housing for up to 8 high power amplifiers (HPA's)
- HPA mounting via slide mounts and a mechanical de-weighting mechanism for ease replacement
- Up and down converter integration providing a wideband L-Band interface
- Easily accessible test and monitor points
- Strategically placed handles and storage to allow easy and safe access to hub
- Electric hoist on elevation platform for ease of lifting on hub RF and drive components to alidade level
- Phase/Power combined HPA design capability
- Power meter sensing of TX power capability
- Transmit signal block down converters (L-Band)
- Lightning protection and hub temperature monitoring

OPTIONS:

- Complete M&C capability
- Redundant HVAC systems for hub
- Deicing subsystem (gas or electric as required)
- Extra wide pedestal with air-conditioning

BENEFITS:

- CPI's industry knowledge and innovation
- Full support with CPI's 24/7/365
- Comprehensive warranty

APPLICATIONS:

- HTS Gateways; TT&C; IOT; High Power Uplinks, Broadcast

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Specifications

PERFORMANCE ⁽¹⁾		Ka-Band
Reflector		13.2 meter, Counterweight
Optics Configuration		Cassegrain
Frequency	Transmit Receive Tracking (Monopulse)	27.50 – 31.00 GHz 17.70 – 21.20 GHz (17.3 -21.2 GHz optional) 17.70 – 21.20 GHz
ANTENNA GAIN ⁽¹⁾		
Transmit @ Feed Tx Port Input		68.6 dBi @ 27.50 GHz 68.9 dBi @ 28.75 GHz 69.1 dBi @ 30.00 GHz
Receive @ LNA Input		65.2 dBi @ 17.70 GHz 65.8 dBi @ 18.95 GHz 66.4 dBi @ 20.20 GHz
G/T (min) @ 30° Elevation, 120K LNA Clear Sky, includes Feed to LNA losses LNA Redundancy		41.1 dBi/K @ 17.70 GHz 41.6 dBi/K @ 18.95 GHz 42.0 dBi/K @ 20.20 GHz
Polarization (Transmit and Receive)		Dual circular (RHCP/LHCP) Optional: CP/LP switchable
3 dB Beamwidth	Transmit Receive	0.06° 0.09°
Axial Ratio @ 1dB BW (X-POL Isolation in dB)	Transmit Receive	≤0.50 dB (≥30.7 dB) ≤0.50 dB (≥30.7 dB)
Port to Port Isolation	Transmit to Receive Receive to Transmit Transmit to Transmit Receive to Receive	85 dB 85 dB 20 dB 20 dB
VSWR	Transmit Receive	1.35:1 Max 1.35:1 Max
Sidelobe Performance		ITU-RS.580-6 (10% rule) FCC CFR-47 & 25.209
Power Handling		1 kW CW per port, 2 kW total
Feed Waveguide Interface	Transmit Receive	WR-34 WR-42
Pressurization	Operational Maximum	0.5 psi 2.0 psi
Elevation Travel		0 to 90° continuous
Azimuth Travel		Up to ±100° continuous

⁽¹⁾ Some specifications may vary based on the combination of equipment, options and/or upgrades ordered.

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Specifications

PERFORMANCE PARAMETER ⁽¹⁾		Ka-Band
Azimuth Axis Velocity		0.5 °/s
Azimuth Axis Acceleration		0.2 °/s ²
Elevation Axis Velocity		0.2 °/s, Option for EL: 0.5 °/s
Elevation Axis Acceleration		0.2 °/s ²
Azimuth Drive Configuration		Gear-pinion dual motor drives
Elevation Drive Configuration		Jackscrew single motor drive
Motor Type for Azimuth and Elevation		Brushless servo motor
Antenna Two-Axis Pointing Performance (over 10 degree of axis travel)		0.0083° RMS, no wind 0.0136° RMS winds 30 mph gusting to 45 mph
Tracking Performance for Optrack (C/No: 45 dB-Hz)		0.0039° RMS, no wind 0.0071° RMS winds 45 mph gusting to 60 mph
Tracking Performance for Monopulse (C/No: 45 dB-Hz)		0.0030° RMS, no wind 0.0033° RMS winds 45 mph gusting to 60 mph
Tracking Modes		Program track Optrack / step track Monopulse track
Deicing (Option)		Feed blower Heated subreflector Primary reflector – gas or electric (as required)
ENVIRONMENTAL ⁽¹⁾		
Normal Conditions	Temperature Wind Humidity Rain Altitude Solar Radiation	-22 to +122°F (-30 to +50°C) 30 gusting to 45 mph (48 gusting to 72 km/hr) 30 to 100%, with condensation Up to 4 in/hr (100 mm/hr) To 3,280ft AMSL (1000m AMSL), Higher altitudes with temperature de-rating 1.1 kW/m ²
Degraded Conditions	Wind	45 gusting to 60 mph (72 gusting to 97 km/hr)
Limit of Driving	Wind	60 gusting to 75 mph (97 gusting to 120 km/hr)
Survival Conditions	Temperature Wind Humidity Seismic	-40 to +131°F (-40 to +55°C) 125 mph (200 km/hr) continuous at zenith stow position 30 to 100%, with condensation 0.3g horizontal & 0.15g vertical acceleration
Design Life		15 years (mechanical); 20 years (structural)

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Contact us at CustomerCareSAT@cpii.com or call us at +1 770-689-2040

The data should be used for basic information only.
Formal, controlled specifications may be obtained from CPI for use in equipment design.



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For more detailed information, please refer to the corresponding CPI technical description if one has been published, or contact CPI. Specifications may change without notice as a result of additional data or product refinement. Please contact CPI before using this information for system design. © 2023 Communications & Power Industries LLC. Company proprietary; use and reproduction is strictly prohibited without written authorization from CPI.

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