Hemisphere®

Vector™ VR500
GNSS Smart Antenna

GNSS SMART ANTENNA FOR MACHINE CONTROL SYSTEMS

atlas®

The Vector VR500 is our latest rugged all-in-one multi-frequency, multi-GNSS smart antenna which provides RTK-level position and precise heading. The integrated UHF radio, Ethernet and Wi-Fi capabilities provide versatile access to RTK correction data and services. The VR500 is compliant to IP69, and MIL-STD-810G standards for water ingress, shock, and vibration, for the harshest environments. The VR500 is an excellent solution for machine control and other challenging applications that require high accuracy position and heading data.

The all-in-one VR500 with set antenna separation provides consistent and reliable position and heading accuracy.

Key Features

- Integrated all-in-one RTK capable position & heading solution
- Athena™ RTK Engine
- Atlas® Global Correction Service
- Integrated IMU delivers fast start-up times and maintains heading during temporary GNSS outage
- Fully rugged IP69, and MIL-STD810G compliant solution for the harshest environments
- Multi-frequency GPS/GLONASS/BeiDou/Galileo/QZSS/IRNSS
- Powerful WebUI accessed via Wi-Fi plus 4 multi-color LEDs

GNSS Receiver Specifications

Receiver Type:	GNSS Position & Heading RTK Receiver
Signals Received:	GPS, GLONASS, BeiDou, Galileo, QZSS, IRNSS and Atlas
Channels:	1059
GPS Sensitivity:	-142 dBm
SBAS Tracking:	3-channel, parallel tracking
Update Rate:	10 Hz standard, 20 Hz optional
Timing (1 PPS) Accuracy:	20 ns
Rate of Turn:	100°/s maximum
Cold Start:	40 s (no almanac or RTC)
Warm Start:	20 s typical (almanac and RTC)
Hot Start:	5 s typical (almanac, RTC and position)
Heading Fix:	10 s typical (Hot Start)
Maximum Speed:	1,850 mph (999 kts)
Maximum Altitude:	18,288 m (60,000 ft)
Differential Options:	SBAS, Atlas (L-band), RTK

Accuracy

Positioning:	**RMS (67%)**	**2DRMS (95%)**
Autonomous, no SA: [2]	1.2 m	2.5 m
SBAS: [2]	0.25 m	0.5 m
Atlas: [2,6]	0.04 m	0.08 m
RTK: [1]	10 mm + 1 ppm	20 mm + 2 ppm
Heading (RMS):	<0.27°	
Pitch/Roll (RMS):	1°	
Heave (RMS):	30 cm (DGPS) [6],10 cm (RTK) [6]	

L-Band Receiver Specifications

Receiver Type:	Single Channel
Channels:	1530 to 1560 MHz
Sensitivity:	-130 dBm
Channel Spacing:	5 kHz
Satellite Selection:	Manual or Automatic
Reacquisition Time:	15 sec (typical)

Communications

Ports:	1x full-duplex RS-232/RS-422, 1x full-duplex RS232, 2x CAN, 1x Ethernet
Baud Rates:	4800 - 115200
Radio Interfaces:	Bluetooth 2.0 (Class 2), Wi-Fi 2.4 GHz, UHF (400 MHz)
Correction I/O Protocol:	Hemisphere GNSS proprietary ROX format, RTCM v2.3, RTCM v3.2, CMR[7], CMR+[7]
Data I/O Protocol:	NMEA 0183, Hemisphere GNSS binary
Timing Output:	1 PPS, CMOS, active high, rising edge sync, 10 kΩ, 10 pF load
Event Marker Input:	CMOS, active low, falling edge sync, 10 kΩ, 10 pF load

Power

Input Voltage:	9-36 VDC
Power Consumption:	10.8W Maximum (All signals and L-band)
Current Consumption:	1.2A Maximum
Power Isolation:	No
Reverse Polarity Protection:	Yes

Environmental

Operating Temperature:	-40°C to +70°C (-40°F to +158°F)
Storage Temperature:	-40°C to +85°C (-40°F to +185°F)
Humidity:	95% non-condensing
Mechanical Shock:	50G, 11ms half sine pulse (MIL-STD-810G w/ Change 1 Method 516.7 Procedure 1)
Vibration:	7.7Grms (MIL-STD-810G w/Change 1 Method 514.7 Category 24)
EMC:	CE (ISO14982/EN13309/ISO13766/ IEC60945), Radio Equipment Directive 2014/53/EU, E-Mark, RCM
Enclosure:	IP69

Mechanical

Dimensions:	68.6 L x 22 W x 12.3 H cm
Weight:	3.9 kg
Status Indications (LED):	Power, GNSS Lock, Heading, Radio
Power/Data Connector:	22-pin environmentally sealed

Aiding Devices

Gyro:	Provides smooth heading, fast heading reacquisition and reliable < 0.5° per min heading for periods up to 3 min. when loss of GNSS has occurred [4]
Tilt Sensors:	Provide pitch/roll data and assist in fast start-up and reacquisition of heading solution

1. Depends on multipath environment, number of satellites in view, satellite geometry, no SA, and ionospheric activity
2. Depends on multipath environment, number of satellites in view, WAAS coverage and satellite geometry
3. Depends on multipath environment, number of satellites in view, satellite geometry, baseline length (for differential services), and ionospheric activity
4. Based on a 40 second time constant
5. Hemisphere GNSS proprietary
6. Requires a Hemisphere GNSS subscription
7. CMR and CMR+ do not cover proprietary messages outside of the typical standard

Hemisphere®

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