Hemisphere®

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Vector™ VS1000 GNSS Receiver

HIGH-PRECISION POSITIONING & HEADING RECEIVER

atlas®

The Vector VS1000 is Hemisphere GNSS' premiere multi-GNSS, multi-frequency receiver designed specifically for the professional marine market. Providing precise heading, Athena RTK positioning, and full Atlas capability, its rugged design is compliant to 60529:2013 IP67 and IEC 60945:2002 8.7 standards.

The VS1000 supports antenna separations up to 10 meters, offering heading accuracy to 0.01 degrees RMS in addition to RTK position accuracy and full support for Hemisphere GNSS' Atlas worldwide L-band corrections.

Key Features

- Athena™ RTK and Atlas® L-band capable
- Extremely accurate heading (to 0.01° RMS)
- Multi-frequency GPS/GLONASS/BeiDou/Galileo
- Purpose-built for the most challenging environments
- Supports Ethernet, CAN, Serial, USB, Bluetooth, and Wi-Fi
- Powerful WebUI accessed via Wi-Fi plus a 128x64 display and 10 multi-color LEDs

GNSS Receiver Specifications

Receiver Type:	Vector GNSS RTK Receiver
Signals Received:	GPS, GLONASS, BeiDou, Galileo, & Atlas [3]
Channels:	1,100+
GPS Sensitivity:	-142 dBm
SBAS Tracking:	2-channel, parallel tracking
Update Rate:	10 Hz standard, 20 Hz optional
Timing (1PPS) Accuracy:	20 ns
Rate of Turn:	100°/s maximum
Cold Start:	60 s (no almanac or RTC)
Warm Start:	30 s typical (almanac and RTC)
Hot Start:	10 s typical (almanac, RTC and position)
Heading Fix:	10 s typical (valid position)
Antenna Input Impedance:	50 Ω
Maximum Speed:	1,342 mph (1,166 kts)
Maximum Altitude:	18,000 m (59,055 ft)
Differential Options:	SBAS, Atlas (L-band), RTK

Accuracy

Positioning:	**RMS (67%)**	**2DRMS (95%)**
Single Point: [1]	2.4 m	
SBAS: [2]	0.6 m	
Atlas H10: [6]	0.08 m	0.16 m
Atlas H30: [6]	0.3 m	
Atlas Basic: [6]	0.5 m	
RTK: [1, 3]	8 mm + 1 ppm	15 mm + 2 ppm
Heading (RMS):	0.2° @ 0.5 m antenna separation 0.1° @ 1.0 m antenna separation 0.05° @ 2.0 m antenna separation 0.02° @ 5.0 m antenna separation 0.01° @ 10.0 m antenna separation	
Pitch/Roll (RMS):	1°	
Heave (RMS):	30 cm (DGPS) [1], 10 cm (Atlas) [1, 6], 5 cm (RTK) [1, 6]	

L-Band Receiver Specifications

Channels:	1525 to 1560 MHz
Sensitivity:	-130 dBm
Channel Spacing:	5 kHz
Satellite Selection:	Manual or Automatic
Reacquisition Time:	15 sec (typical)

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

Communications

Ports:	1x CAN, 1x Ethernet, 1x USB, 1x 12-pin multi-purpose (RS232, RS422, CAN, 1PPS, Event Marker)
Baud Rates:	4800 - 115200
Radio Interfaces:	Bluetooth 2.0 (Class 2), Wi-Fi 2.4 GHz
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:	1PPS (CMOS, rising edge sync)
Event Marker Input:	Open drain, falling edge sync, 10 kΩ, 10 pF load

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
Enclosure:	ISO 60529:2013 for IPx6/IPx7
Vibration:	IEC 60945:2002 Section 8.7 Vibration
EMC:	IEC 60945:2002, EN 301 489-1 V2.1.1, EN 301 489-5 V2.1.1, EN 301 489-19 V2.1.0, EN 303 413 V1.1.1

Mechanical

Dimensions:	
No Plate:	23.2 L x 16.5 W x 7.9 H (cm) 9.1 L x 6.5 W x 3.1 H (in)
With Plate:	23.2 L x 21.4 W x 8.3 H (cm) 9.1 L x 8.4 W x 3.3 H (in)
Display:	128 x 64 Resolution
Weight:	1.7 kg (3.8 lb)
Status Indications (LED):	Power, Primary Antenna, Secondary Antenna, Heading, Quality, Atlas, Bluetooth, Wi-Fi, CAN, Ethernet
Power/Data Connector:	M12 CAN/Power, 12-pin multi-purpose, RJ45, USB
Antenna Connectors:	BT/Wi-Fi

Aiding Devices

Gyro:	Provides fast reacquisition and reliable heading for short periods when loss of GNSS has occurred
Tilt Sensors:	Provide pitch, roll data and assist in fast start-up and reacquisition of heading solution

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