R330 GNSS Receiver

Multi-GNSS RTK, High Accuracy Receiver

key features

- **High-precision positioning in RTK, GNSS, L1/L2 GNSS, SBAS, Beacon and L-band**
- **Long range RTK baselines of up to 50 km**
- **SureTrack technology improves RTK performance**
- **Benefit from fewer RTK dropouts in congested environments**
- **Faster reacquisitions and more robust solutions due to better cycle slip detection**
- **Status LEDs and menu system make R330 easy to monitor and configure**
- **Fast update rate of up to 20 Hz providing the best guidance and machine control**
- **Long-range RTK baselines of up to 50 km**
- **Uses standard USB flash drive for data logging**

The R330™ GNSS receiver is a full solution product in a small box. The R330 utilizes Hemisphere GNSS' Eclipse™ platform, and our latest GNSS patented technology. The R330 provides accurate positioning using several differential correction methods such as RTK, L-band DGNSS (VBS/HP/XP/G2) and Beacon. The R330 GNSS receiver works well in any marine or land application where positioning accuracy is required. The base unit is configured with L1 GNSS, 10 Hz and raw data. The fully-upgraded unit can be optionally subscribed to L1/L2 GNSS, 20 Hz, RTK, L-band and Beacon. Compatible GNSS antennas for the R330 are A21™, A31™, A42™, A43™ and A52™.

The new R330™ GNSS receiver will outperform its predecessors and provides a user friendly experience. It features Hemisphere GNSS' exclusive Eclipse Suretrack™ technology that enables the receiver to model the phase on satellites the rover is tracking, which allows the opporator to continue working without corrections from the base.

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R330 GNSS Receiver

GNSS Sensor Specifications

Receiver Type:	GNSS L1 & L2, RTK with carrier phase
Signals Received:	GPS, GLONASS and BeiDou [4]
Channels:	270
SBAS Tracking:	3-channel, parallel tracking
Update Rate:	10 Hz standard, 20 Hz optional
Timing (1PPS) Accuracy:	20 ns
Cold Start Time:	< 60 s typical (no almanac or RTC)
Warm Start Time:	< 30 s typical (almanac and RTC)
Hot Start Time:	< 10 s typical (almanac, RTC and position)
Maximum Speed:	1,850 kph (999 kts)
Maximum Altitude:	18,288 m (60,000 ft)
Differential Options:	SBAS, Autonomous, External RTCM, RTK, L-band (VBS/HP/XP/G2)[3]

Positioning Accuracy [2]

RMS (67%):	Horizontal	Vertical
Single Point, no SA:	1.2 m	2.5 m
SBAS (WAAS): [2]	0.3 m	0.6 m
L-band DGPS:	0.3 m	0.6 m
Code Differential GPS:	0.3 m	0.6 m
L-band L1/L2:	0.15 m	0.3 m
RTK:	10 mm + 1 ppm	20 mm + 2 ppm

Beacon Sensor Specifications

Channels:	2-channel parallel tracking
Frequency Range:	283.5 to 325.0 kHz
Operating Modes:	Manual, automatic and database
Compliance:	EN50081-4-2 ESD

L-band Sensor Specifications

Sensitivity:	-130 dBm
Channel Spacing:	7.5 KHz
Satellite Selection:	Manual and Automatic
Reacquisition Time:	15 seconds (typical)
Rejection:	15 kHz spacing > 30 dB, 300 kHz spacing > 60 dB

Communications

Serial Ports:	2 full-duplex RS232
Baud Rates:	4800 - 115200
Correction I/O Protocol:	Hemisphere GPS proprietary, RTCM v2.3 (DGPS), RTK v3, CMR, CMR+[1]
Data I/O Protocol:	NMEA 0183, Hemisphere GPS 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
USB Ports:	1 USB Host, 1 USB Device

Power

Input Voltage:	8 to 36 VDC
Power Consumption:	3.8 W nominal (WAAS and Beacon) 4.6 W nominal (L-band)
Current Consumption:	315 mA nominal (WAAS and Beacon) 383 mA nominal (L-band)
Antenna Voltage Output:	5 VDC maximum 80mA
Antenna Short Circuit Protection:	Yes
Antenna Gain Input Range:	10 to 40 dB
Antenna Input Impedance:	50 Ω

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
Shock and Vibration:	Mechanical Shock: EP455 Section 5.14.1 Operational Vibration: EP455 Section 5.15.1 Random
EMC:	CE (IEC 60945 Emissions and Immunity) FCC Part 15, Subpart B CISPR22

Mechanical

Dimensions:	17.8 L x 12.0 W x 4.6 H (cm) 7.0 L x 4.7 W x 1.8 H (in)
Weight:	645 g (1.42 lbs)
Status Indicators (LED):	Power, GPS lock, Differential lock, DGPS position, L-band lock
Power/Data Connector:	2-pin metal ODU
Antenna Connector:	TNC-male, straight

[1] Receive only, does not transmit this format

[2] Depends on multipath environment, number of satellites in view, satellite geometry and ionospheric activity

[3] Requires a subscription from OmniSTAR

[4] Upgrade required

Note: The Eclipse receiver technology is not designed or modified to use the GPS Y-Code

Authorized Distributor:

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Vector V102 GPS Compass Series

General Navigation Heading and Positioning Smart Antenna

key features

- **Provides heading, positioning, heave, roll and pitch**
- **Excellent in-band and out-of-band interference rejection**
- **0.75 degree heading accuracy in amazingly small form factor**
- **Extremely quick time-to-first-fix**
- **Differential positioning accuracy of 1.0 m, 95% of the time**
- **Integrated gyro and tilt sensors deliver fast startup times and provide heading updates during temporary loss of GPS**
- **SBAS compatible (WAAS, EGNOS, MSAS, etc.) and optional external differential input**
- **COAST™ technology maintains differentially corrected positioning for 40 minutes after loss of differential signal**

Experience superior navigation from the accurate heading and positioning performance available with the Vector™ V102™ GPS compass. The Vector V102 uses SBAS (WAAS, EGNOS, MSAS, etc.) for differential GPS positioning allowing Hemisphere GNSS to provide a low cost and highly effective heading and position based smart antenna.

The rugged and low profile enclosure combines Hemisphere GPS' Crescent® Vector II OEM technology and two multipathresistant antennas for accuracy, portability and simple installation. The smart antenna - measuring less than half-meter length - mounts easily to a flat surface or pole. The stability and maintenance-free design of the Vector V102 provides traditional GPS positioning and heading at a low cost.

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Vector V102 GPS Compass Series

GPS Sensor Specifications

Receiver Type:	L1 C/A code, with carrier phase smoothing
Channels:	Two 12-channel, parallel tracking (Two 10-channel when tracking SBAS)
SBAS Tracking:	2-channel, parallel tracking
Update Rate:	10 Hz standard, 20 Hz optional (position and heading)
Horizontal Accuracy:	< 1.0 m 95% confidence (DGPS[1])
	< 2.5 m 95% confidence (autonomous, no SA[2])
Heading Accuracy:	< 0.75˚ rms
Pitch/Roll Accuracy:	< 1.5˚ rms
Heave Accuracy:	< 30 cm[5] rms
Rate of Turn:	90˚/s maximum
Compass Safe Distance:	30 cm[4]
Cold Start:	< 60 s (no almanac or RTC)
Warm Start:	< 20 s typical (almanac and RTC)
Hot Start:	< 1 s typical (almanac, RTC and position)
Heading Fix:	< 10 s typical (valid position)
Maximum Speed:	1,850 mph (999 kts)
Maximum Altitude:	18,288 m (60,000 ft)

Communications

Serial Ports:	2 full-duplex RS-232
Baud Rates:	4800 - 115200
Correction I/O Protocol:	RTCM SC-104
Data I/O Protocol:	NMEA 0183, NMEA 2000, Crescent binary[3], CAN

Environmental

Operating Temperature:	-30°C to + 70°C (-22°F to + 158°F)
Storage Temperature:	-40°C to + 85°C (-40°F to + 185°F)
Humidity:	100% non-condensing
Vibration:	IEC 60945
EMC:	FCC Part 15, Subpart B CISPR22 IEC 60945 (CE)

Power

Input Voltage:	6 to 36 VDC
Power Consumption:	~ 3 W nominal
Current Consumption:	240 mA @ 12 VDC
Power Isolation:	Isolated to enclosure
Reverse Polarity Protection:	Yes

Mechanical

Enclosure:	UV resistant, white plastic, AES HW 600G, non-corrosive, self-extinguishing
Dimensions:	41.7 L x 15.8 W x 6.9 H (cm) 16.4 L x 6.2 W x 2.7 H (in)
Weight:	~1.5kg (3.3 lb)
Power/Data Connector:	12-pin, Female, IP67

Aiding Devices

Gyro:	Provides smooth heading, fast heading reacquisition and reliable < 1° heading for periods up to 3 minutes when loss of GPS has occurred
Tilt Sensors:	Assists in fast start-up of heading solution

1 Depends on multipath environment, number of satellites in view, satellite geometry, ionospheric activity and use of SBAS

2 Depends on multipath environment, number of satellites in view, satellite geometry and ionospheric activity

3 Hemisphere GNSS proprietary

4 This is the minimum safe distance measured when the product is placed in the vicinity of the steering magnetic compass. The ISO 694 defines "vicinity" relative to the compass as within 5 m (16.4 ft) separation

5 Based on a 40 second time constant

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Hemisphere GNSS designs and manufactures innovative, cost-effective GNSS and complimentary products for positioning, heading, and navigation applications. For more than 22 years, we have established numerous patents and other intellectual property. We are a global company with sales in more than 55 countries with several leading product brands, including Crescent®, Eclipse™, and Vector™, for precise GNSS applications. Our innovative GNSS receiver and antenna technologies are sold on the board level to OEM integrators and as positioning and navigation components for use in marine, land survey, machine control, and mapping applications.

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Vector Series GNSS Compass Solutions

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Vector V102 GPS Compass

Heading Accuracy: < 0.75° rms
Receiver Type: L1 GNSS (SBAS)

Vector V103/V113 GNSS Compass

Heading Accuracy: < 0.30° rms
Receiver Type: L1 GNSS (SBAS, Beacon)

Experience superior navigation with Hemisphere GNSS' all-in-one GNSS compass solutions. Vector GNSS Compasses provide precise heading and positioning for IMO Wheelmark applications, hydrographic surveying vessels, fishing vessels, leisure boats, work boats, and other general marine navigation applications.

Hemisphere GNSS Vector Compasses bring a series of robust features including heave, pitch and roll output as well as NMEA 0183 and NMEA 2000 support.

The all-in-one Vector Compasses combine Hemisphere GNSS Crescent technology and multipath-resistant antennas for simple installation on flat surfaces or pole mounting.

The rugged and reliable design of Vector Compasses make them an ideal solution to replace traditional gyrocompasses, at a fraction of the cost.

Vector VS131 Receiver

Heading Accuracy: < 0.03° rms (5 m Baseline)
Receiver Type: L1 GNSS (SBAS, L-band, Beacon)

Vector VS330 GNSS Compass

Heading Accuracy: < 0.01° rms (10 m Baseline)
Receiver Type: Vector GNSS L1/L2 RTK

The industry's most precise applications demand the industry's most accurate heading and positioning solution from Hemisphere GNSS.

Ideal for professional level machine control and navigation applications, Hemisphere GNSS Vector VS131™ and VS330™ deliver reliable GNSS accuracy in the most demanding environments. With stand-alone antennas, users can simply change the antenna separation to meet their desired accuracy. The rack mountable display allows for the unit to be conveniently installed near the operator so that adjustments and configuration settings can be made in real-time.

Hemisphere GNSS Vector Compasses offer exclusive design features and unprecedented accuracy that cannot be obtained through competitor products or traditional navigation methods.

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* Board is actual size

GNSS OEM Modules

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Positioning Modules

Crescent P102/P103 OEM Modules
- Low cost, high performance single frequency GPS module
- Differential positioning accuracy of 0.25 m rms using SBAS or DGPS corrections
- COAST technology maintains differentially corrected positions for up to 40 minutes or more after a loss of differential signal
- P102 (34 pin), P103 (20 pin)

Eclipse P302 and P303 OEM Modules
- Long range dual frequency GPS and GLONASS capable RTK solutions
- Compatible with many RTK correction formats including Hemisphere GNSS' ROX format, RTCM, CMR, CMR+
- P302 (34 pin), P303 (20 pin)

Eclipse P306 and P307 OEM Modules
- Long range dual frequency GPS, GLONASS, BeiDou and Galileo capable RTK solutions
- Multiple GNSS measurements provides robust solutions in challenging environments
- Compatible with many RTK correction formats including Hemisphere GNSS' ROX format, RTCM, CMR, CMR+
- P306 (34 pin), P307 (20 pin)

Eclipse P320 GNSS OEM Module
- Long range dual frequency GPS and GLONASS capable RTK solutions
- Compatible with many RTK correction formats including Hemisphere GNSS' ROX format, RTCM, CMR, CMR+
- Built-in L-band signal tracking

PA300 GNSS Smart Antenna Module
- Complete dual frequency GPS / GLONASS RTK capable receiver and antenna module
- Easy integration ideal for high precision applications for limited integration spaces
- Automatically switches to optional external antenna if present

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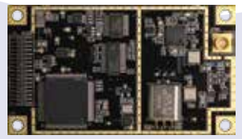
Heading and Positioning Modules

Vector H102 GPS Compass OEM Module
- Affordable solution delivers GPS heading accuracy better than 0.75°
- Differential positioning accuracy of 0.5 m rms using SBAS or DGPS corrections
- All-in-one smart antenna design ensures simple integration
- Integrated gyro and tilt sensors deliver fast startup times and maintain heading solution during temporary loss of GPS

Crescent Vector H200 Module
- Heading accuracy of 0.02° using a 5 meter antenna baseline using GPS and GLONASS
- Single frequency GPS/GLONASS RTK capable
- Integrated gyro and tilt sensors maintain heading solution during temporary loss of signal
- Robust heading, position and heave solutions in challenging environments

Vector H320 GNSS Compass Module
- Heading accuracy of up to 0.001° using a 100 meter antenna baseline using GPS and GLONASS
- Long range dual frequency GPS/GLONASS capable RTK solutions
- Integrated gyro and tilt sensors maintain heading solution during temporary loss of signal
- Robust heading, position and heave solutions in challenging environments
- Built-in L-band signal tracking

Differential Modules



LX-2 OEM Module
- Stacking L-band module adds L-band capability
- Easy integration: simply stack LX-2 with a 34 pin Hemisphere GNSS module
- Smart power management shuts module off when not in use

SBX-4 Beacon Module
- DGPS beacon module tracks free correction signals from worldwide beacon station networks
- Dual-channel design allows strongest signal or closest station tracking
- Dual serial ports accommodate separate RTCM and NMEA communication

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Hemisphere GNSS Inc

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A101 Smart Antenna

Unparalleled sub-meter performance – 60 cm accuracy, 95% of the time

The A101™ Smart Antenna offers an affordable, portable solution with professional-level accuracy for, marine, GIS mapping, and other applications. Including fast start-up and reacquisition times, 60 cm accuracy, and an easy-to-see status indicator for power, GPS, and DGPS.

A325 GNSS Smart Antenna

Long range RTK baselines of up to 50 km

The A325™ Smart Antenna offers an affordable, portable solution with professional-level accuracy for, marine, GIS mapping, and other applications. The durable enclosure houses both antenna and receiver and can be powered through various sources.

R330 GNSS Receiver

High-precision positioning in RTK, GNSS, L1/L2 GNSS, SBAS, Beacon and L-band

The R330™ GNSS receiver is a full solution product that utilizes Hemisphere GNSS' Eclipse™ platform, and our latest GNSS patented technology. The R330 provides accurate positioning using several differential correction methods such as RTK, L-band DGNSS (VBS/HP/XP/G2) and Beacon.

S320 GNSS Survey Receiver

GNSS Configurable: L1 GPS, L1/L2 GPS, L1/L2 GPS + GLONASS, SBAS, and L-band DGPS

Hemisphere GNSS' S320 GNSS survey receiver provides the quality one can expect from a trusted and experienced manufacturer. So whether you are doing GIS, mapping, land surveying or construction, S320 can be tailored to meet your needs.

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