Specifications

Trimble SPS461
Modular GPS Heading Receiver

Receiver Name	**SPS461 GPS Heading Receiver**
Configuration Option	**Precise RTK**
Base and Rover interchangeability	No, rover only
Rover position update rate	1 Hz, 2 Hz, 5 Hz, 10 Hz, 20Hz
Rover maximum range from base	Unrestricted, typical range 2–5 km (1.2–3 miles) without radio repeater
Rover operation within a VRS™ network	Yes
Heading operation	Yes[5]
Factory options	
General	
Keyboard and display	VFD display 16 characters by 2 rows On/Off key for one-button startup Escape and Enter keys for menu navigation 4 arrow keys (up, down, left, right) for option scrolls and data entry
Dimensions (L × W × D)	24 cm × 12 cm × 5 cm (9.4 in x 4.7 in x 1.9 in) including connectors
Weight	1.22 kg (2.70 lb) receiver only 1.37 kg (3.00 lb) receiver with internal radio
Antenna Options	
GA510	L1/L2/L2C GPS, SBAS, and OmniSTAR (optimized for OmniSTAR)
GA530	L1/L2/L2C GPS, MSK Beacon, SBAS, and OmniSTAR
L1/Beacon, DSM 232	Not supported
Zephyr™ Model 2	L1/L2/L2C GPS, SBAS, and OmniSTAR
Zephyr Geodetic™ Model 2	L1/L2/L2C GPS, SBAS, and OmniSTAR
Zephyr Model 2 Rugged	L1/L2/L2C GPS, SBAS, and OmniSTAR
Zephyr, Zephyr Geodetic, Z-Plus, Micro-Centered™	Refer to antenna specification
Temperature	
Operating[1]	–40 °C to +65 °C (–40 °F to +149 °F)
Storage	–40 °C to +80 °C (–40 °F to +176 °F)
Humidity	MIL-STD 810F, Method 507.4
Waterproof	IP67 for submersion to depth of 1 m (3.3 ft), dustproof
Shock and Vibration	
Pole drop	Designed to survive a 1 m (3.3 ft) pole drop onto a hard surface
Shock – Non-operating	To 75 g, 6 ms
Shock – Operating	To 40 g, 10 ms, saw-tooth
Vibration	Tested to Trimble ATV profile (4.5 g RMS): 10 Hz to 300 Hz: 0.04 g/Hz;[2] 300 Hz to 1,000 Hz; –6 dB/octave

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Measurements	
	Advanced Trimble Maxwell™ 5 Custom GPS Chip
	High-precision multiple correlator for L1/L2 pseudo-range measurements
	Unfiltered, unsmoothed pseudo-range measurements data for low noise, low multipath error, low-time domain correlation, and high-dynamic response
	Very low noise carrier phase measurements with <1 mm precision in a 1 Hz bandwidth
	L1/L2 signal-to-noise ratios reported in dB-Hz
	Proven Trimble low elevation tracking technology
	72-channel L1 C/A code, L1/L2/L2C Full Cycle Carrier.
	Trimble EVEREST™ multipath signal rejection
	4-channel SBAS (WAAS/EGNOS/MSAS)
Code Differential GPS Positioning[2]	
Horizontal accuracy	0.25 m + 1 ppm RMS (0.8 ft + 1 ppm RMS)
Vertical accuracy	0.50 m + 1 ppm RMS (1.6 ft + 1 ppm RMS)
SBAS (WAAS/EGNOS/MSAS) Positioning[3]	
Horizontal accuracy	Typically <1 m (3.3 ft)
Vertical accuracy	Typically <5 m (16.4 ft)
OmniSTAR Positioning	
VBS service accuracy	Horizontal <1 m (3.3 ft)
XP service accuracy	Horizontal 0.2 m (0.66 ft), Vertical 0.3 m (1.0 ft)
HP service accuracy	Horizontal 0.1 m (0.33 ft), Vertical 0.15 m (0.5 ft)
Real-Time Kinematic (RTK) Positioning	
Horizontal accuracy	10 mm + 1 ppm RMS (0.032 ft + 1 ppm RMS)
Vertical accuracy	20 mm + 1 ppm RMS (0.065 ft +1 ppm RMS)
Precise Heading	
Heading accuracy	
2 m antenna separation	0.09° RMS
10 m antenna separation	0.05° RMS
Initialization Time	
Regular RTK operation with base station	Single/Multi-base
	Minimum 10 seconds + 0.5 times baseline length in km, up to 30 km
RTK operation with Scalable GPS infrastructure	Typically <30 seconds anywhere within coverage area
Initialization reliability[4]	>99.9%
Power	
Internal	NA
External	
	Power input on the 26-pin D-sub connector is optimized for Trimble lithium-ion battery input with a cut-off threshold of 9.5 V
	9.5 V DC to 28 V DC external power input with over-voltage protection
	Receiver automatically turns on when connected to external power

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Power over Ethernet (PoE)	44 V DC to 57 V DC, IEEE802.3af compliant device
Power consumption	6.0 W in rover mode with internal receive radio
Operation Time on Internal Battery	
Rover	NA
Base station	NA
450 MHz systems	
900 MHz systems	
Regulatory Approvals	
	FCC: Part 15 Subpart B (Class B Device) and Subpart C, Part 90 Canadian ICES-003. Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada. Canadian RSS-310, RSS-210, and RSS-119. Cet appareil est conforme à la norme CNR-310, CNR-210, et CNR-119 du Canada. R&TTE Directive: EN 301 489-1/-5/-17, EN 300 440, EN 300 328, EN 300 113, EN 60950, EN 50371 ACMA: AS/NZS 4295 approval CE mark compliance C-tick mark compliance RoHS compliant WEEE compliant
Communications	
Lemo (Serial)	NA
Modem 1 (Serial)	26-pin D-sub, Serial 2, Full 9-wire RS232, using adaptor cable
Modem 2 (Serial)	26-pin D-sub, Serial 3, 3 wire RS-232, using adaptor cable
1PPS (1 Pulse-per-second)	Available
Ethernet	Through a multi-port adaptor
Bluetooth wireless technology	Fully-integrated, fully-sealed 2.4 GHz Bluetooth module[6]
Integrated radios (optional)	Fully-integrated, fully-sealed internal MSK Beacon and 450 MHz (UHF) Rx only, Internal MSK Beacon only or Internal 900 MHz Rx only
Channel spacing (450 MHz)	12.5 kHz or 25 kHz spacing available
450 MHz output power	NA
900 MHz output power	NA
Frequency approvals (900 MHz)	NA
External GSM/GPRS, cell phone support	Supported for direct-dial and Internet-based correction streams Cell phone or GSM/GPRS modem inside controller
Internal MSK Beacon receiver	If internal MSK Beacon radio is installed[7] Frequency range 283.5–325.0 kHz Channel spacing 500 Hz MSK bit rate 50, 100, and 200 bps Demodulation minimum shift key (MSK)
Receiver position update rate	1 Hz, 2 Hz, 5 Hz, 10 Hz, and 20 Hz positioning
Correction data input	CMR™, CMR+™, RTCM 3, RTCM 2.x
Correction data output	Repeat DGPS RTCM from MSK Beacon or OmniSTAR VBS source
Data outputs	NMEA, GSOF, 1PPS Time Tags

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Receiver Upgrades	
Notes	*1 Receiver will operate normally to –40 °C.* *2 Accuracy and reliability may be subject to anomalies such as multipath, obstructions, satellite geometry, and atmospheric conditions. Always follow recommended practices.* *3 Depends on SBAS system performance.* *4 May be affected by atmospheric conditions, signal multipath, and satellite geometry. Initialization reliability is continuously monitored to ensure highest quality.* *5 Two of the supported antennas (See Antenna Options) must be connected for heading.* *6 Bluetooth type approvals are country specific. For more information, contact* *7 One of the antennas must be a GA530 for MSK Beacon signal reception.*
Specifications subject to change without notice.	

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