## Specifications

### Trimble SPS461

**Modular GPS Heading Receiver**

<table>
<thead>
<tr>
<th>Receiver Name</th>
<th>SPS461 GPS Heading Receiver</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Configuration Option</strong></td>
<td><strong>DGPS</strong></td>
</tr>
<tr>
<td>Type</td>
<td>Modular</td>
</tr>
<tr>
<td>Base and rover interchangeability</td>
<td>No, rover only</td>
</tr>
<tr>
<td>Base operation</td>
<td>NA</td>
</tr>
<tr>
<td>Rover operation</td>
<td>All models</td>
</tr>
<tr>
<td>Heading operation</td>
<td>All models</td>
</tr>
<tr>
<td>Rover position update rate</td>
<td>1 Hz, 2 Hz, 5 Hz, 10 Hz, 20Hz</td>
</tr>
<tr>
<td>Rover maximum range from base</td>
<td>Unlimited</td>
</tr>
<tr>
<td>Rover operation within a VRS™ network</td>
<td>DGPS only</td>
</tr>
</tbody>
</table>

### General

- **Keyboard and display**
  - Location RTK, OmniSTAR HP/XP, Precise Vertical, Precision RTK
  - 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 (9.4 in) × 12 cm (4.7 in) × 5 cm (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**
- **GA530**
- **L1/Beacon, DSM 232**
- **Zephyr™ Model 2**
- **Zephyr Geodetic™ Model 2**
- **Zephyr Model 2 Rugged**
- **Zephyr, Zephyr Geodetic, Z-Plus, Micro-Centered™**

- **L1/L2 GPS, SBAS, and OmniSTAR (optimized for OmniSTAR)**
- **L1/L2 GPS, MSK Beacon, SBAS, and OmniSTAR**
- **L1/L2 GPS, MSK Beacon, SBAS, and OmniSTAR**
- **L1/L2 GPS, SBAS, and OmniSTAR**
- **L1/L2 GPS, SBAS, and OmniSTAR**
- **L1/L2 GPS, SBAS, and OmniSTAR**
- Refer to antenna specification

### Temperature

- **Operating**
  - –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

- **Drop**
  - Designed to survive a 1 m (3.3 ft) pole drop onto a hard surface
  - To 75 g, 6 ms
- **Shock – Non-operating**
  - To 40 g, 10 ms, saw-tooth
- **Shock – Operating**
  - Tested to Trimble ATV profile (4.5 g RMS): 10 Hz to 300 Hz: 0.04 g/Hz
  - 300 Hz to 1,000 Hz: –6 dB/octave
### Specifications

**Trimble SPS461 Modular GPS Heading Receiver**

#### 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 Full Cycle Carrier
  - Trimble EVEREST™ multipath signal rejection
  - 2-channel MSK Beacon (Optional)
  - 4-channel SBAS (WAAS/EGNOS/MSAS)

#### Code Differential GPS Positioning

<table>
<thead>
<tr>
<th>Correction type</th>
<th>Correction source</th>
<th>Horizontal accuracy</th>
<th>Vertical accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>DGPS RTCM 2.x</td>
<td>DGPS Base via radio or Internet</td>
<td>±(0.25m + 1 ppm) RMS ±(0.8 ft + 1 ppm)</td>
<td>±(0.50m + 1 ppm) RMS ±(1.6 ft + 1 ppm)</td>
</tr>
</tbody>
</table>

#### SBAS (WAAS/EGNOS/MSAS) Positioning

- Horizontal accuracy | Typically <1 m (3.3 ft)
- Vertical accuracy   | Typically <5 m (16.4 ft)

#### OmniSTAR Positioning

<table>
<thead>
<tr>
<th>Service</th>
<th>Horizontal accuracy</th>
<th>Vertical accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>VBS</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>XP</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>HP</td>
<td>NA</td>
<td>NA</td>
</tr>
</tbody>
</table>

#### Location RTK Positioning

<table>
<thead>
<tr>
<th>Accuracy</th>
<th>Horizontal</th>
<th>Vertical</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accuracy</td>
<td>NA</td>
<td>NA</td>
</tr>
</tbody>
</table>

#### Precise Heading

<table>
<thead>
<tr>
<th>Antenna Separation</th>
<th>Heading Accuracy</th>
<th>Vertical Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 m antenna separation</td>
<td>0.09° RMS</td>
<td>NA</td>
</tr>
<tr>
<td>10 m antenna separation</td>
<td>0.05° RMS</td>
<td>NA</td>
</tr>
</tbody>
</table>

#### Power

<table>
<thead>
<tr>
<th>Type</th>
<th>Power Consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal</td>
<td>NA</td>
</tr>
<tr>
<td>External</td>
<td></td>
</tr>
</tbody>
</table>
  - Power input on the 26-pin D-sub connector is optimized for lead acid batteries with a cut-off threshold of 11 V DC
  - 11 V DC to 28 V DC external power input with over-voltage protection
  - Receiver automatically turns on when connected to external power
  - 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
### Specifications

**Trimble SPS461**

**Modular GPS Heading Receiver**

<table>
<thead>
<tr>
<th><strong>Operation Time on Internal Battery</strong></th>
<th><strong>Rover</strong></th>
<th><strong>Base station</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>450 MHz systems</strong></td>
<td>NA</td>
<td>NA</td>
</tr>
</tbody>
</table>

**Regulatory Approvals**

- FCC: Part 15 Subpart B (Class B Device) and Subpart C, Part 90, Canadian ICES-003.
- Canadian RSS-310, RSS-210, and RSS-119.
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- Canadian RSS-310, RSS-210, and RSS-119.
- 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
- **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:
  - Frequency range 283.5–325.0 kHz
  - Channel spacing 500 Hz
  - MSK bit rate 50, 100, and 200 bps
  - Demodulation minimum shift key (MSK)

**Correction data input**

- RTCM 2.x

**Correction data output**

- Repeat DGPS RTCM from MSK Beacon or OmniSTAR VBS source

**Data outputs**

- NMEA, GSOF, 1PPS Time Tags
## Specifications

### Trimble SPS461
Modular GPS Heading Receiver

### Receiver Upgrades
Location RTK OmniSTAR, Location RTK PV, Precise RTK

### 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. Bluetooth type approvals are country specific. For more information, contact your local Trimble office or representative.

5. Two of the supported antennas (See Antenna Options) must be connected for heading.

6. One of the antennas must be a GA530 for MSK Beacon signal reception.

Specifications subject to change without notice.

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