IMU-CPT

Combines with SPAN GNSS+INS technology from Hexagon | NovAtel to provide 3D position, velocity and attitude solution

World-leading GNSS+INS technology
SPAN GNSS+INS technology brings together two different but complementary technologies: Global Navigation Satellite System (GNSS) positioning and inertial navigation. The absolute accuracy of GNSS positioning and the stability of Inertial Measurement Unit (IMU) gyro and accelerometer measurements are deeply coupled to provide an exceptional 3D navigation solution that is stable and continuously available, even through periods when satellite signals are blocked.

IMU-CPT overview
The IMU-CPT is designed to be paired with NovAtel receivers. It is comprised of Fiber Optic Gyros (FOG) and Micro Electromechanical Systems (MEMS) accelerometers. FOGs offer exceptionally long life and stable performance compared with other similar gyro technologies.

Advantages of IMU-CPT
Paired with a receiver from NovAtel, the IMU-CPT offers a fully integrated, deeply coupled GNSS and IMU system delivering the most satellite observations and the most accurate, continuous position, velocity and attitude solution possible. Further, the IMU-CPT is comprised entirely of commercial components, greatly minimizing cross border difficulties encountered with traditional GNSS+INS systems.

Improve IMU-CPT accuracy
Receivers from NovAtel provide your choice of accuracy and performance, from decimetre to RTK-level positioning. For more demanding applications, Waypoint Inertial Explorer post-processing software can be used to post-process IMU-CPT data and offers the highest level of accuracy with the system.
### IMU-CPT Product Sheet

**SPAN System Performance**
- **Horizontal Position Accuracy (RMS)**
  - Single Point L1/L2: 1.2 m
  - SBAS: 60 cm
  - DGPS: 40 cm
  - TerraStar-L\(^3,4\): 40 cm
  - TerraStar-C PRO\(^3,4\): 2.5 cm
  - TerraStar-X\(^3,4\): 2 cm
  - RTK: 1 cm + 1 ppm

**Data Rate**
- IMU Raw Data Rate: 100 Hz
- INS Solution: Up to 200 Hz

**Time Accuracy**
- 20 ns RMS

**Max Velocity**
- 515 m/s

**IMU Performance**

<table>
<thead>
<tr>
<th>Gyroscope Performance</th>
<th>Accelerometer Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gyro technology: FOG</td>
<td>Range: ±10 g</td>
</tr>
<tr>
<td>Output range: ±375°/s</td>
<td>Bias: 50 mg</td>
</tr>
<tr>
<td>Bias: 2°/hr</td>
<td>Bias stability: ±0.75 mg</td>
</tr>
<tr>
<td>Bias stability: ±1°/hr</td>
<td>Scale factor: 4000 ppm</td>
</tr>
<tr>
<td>Scale factor: 1500 ppm</td>
<td>Angular random walk: 0.0667°/√hr (max)</td>
</tr>
</tbody>
</table>

**Physical and Electrical**
- **Dimensions**: 152 x 168 x 89 mm
- **Weight**: 2.29 kg
- **Power consumption**: 13 W max
- **Input voltage**: +9 to +18 VDC

**Environmental**
- **Temperature**
  - Operating: -40°C to +65°C
  - Storage: -50°C to +80°C
- **Humidity**: 95% non-condensing
- **Waterproof**: MIL-STD-810F, 506.4, Procedure 1

**Included Accessories**
- Combined I/O and power cable

**Optional Accessories**
- Inertial Explorer post-processing software

### Performance During GNSS Outages\(^1,8\)

<table>
<thead>
<tr>
<th>Outage Duration</th>
<th>Positioning Mode</th>
<th>Position Accuracy (M) RMS</th>
<th>Velocity Accuracy (M/S) RMS</th>
<th>Attitude Accuracy (Degrees) RMS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Horizontal</td>
<td>Vertical</td>
<td>Horizontal</td>
</tr>
<tr>
<td>0 s</td>
<td>RTK(^1)</td>
<td>0.02</td>
<td>0.03</td>
<td>0.020</td>
</tr>
<tr>
<td></td>
<td>PPP</td>
<td>0.06</td>
<td>0.15</td>
<td>0.025</td>
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<tr>
<td></td>
<td>SP</td>
<td>1.00</td>
<td>0.60</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Post-Processed(^5)</td>
<td>0.01</td>
<td>0.02</td>
<td>0.015</td>
</tr>
<tr>
<td>10 s</td>
<td>RTK(^1)</td>
<td>0.24</td>
<td>0.18</td>
<td>0.055</td>
</tr>
<tr>
<td></td>
<td>PPP</td>
<td>0.28</td>
<td>0.30</td>
<td>0.055</td>
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<tr>
<td></td>
<td>SP</td>
<td>1.22</td>
<td>0.75</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Post-Processed(^5)</td>
<td>0.02</td>
<td>0.02</td>
<td>0.015</td>
</tr>
<tr>
<td>60 s</td>
<td>RTK(^1)</td>
<td>6.02</td>
<td>1.78</td>
<td>0.260</td>
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<tr>
<td></td>
<td>PPP</td>
<td>6.06</td>
<td>1.90</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SP</td>
<td>7.00</td>
<td>2.35</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Post-Processed(^5)</td>
<td>0.22</td>
<td>0.12</td>
<td>0.022</td>
</tr>
</tbody>
</table>

**Contact Hexagon | NovAtel**

sales.nov.at@hexagon.com | 1-800-NOVATEL (U.S. and Canada) | 403-295-4900 | China: 0086-21-68882300 | Europe: 44-1993-848-736 | SE Asia and Australia: 61-400-883-601.

For the most recent details of this product: novatel.com

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\(^1\) Typical values. Performance specifications subject to GNSS system characteristics, Signal-in-Space (SIS) operational degradation, ionospheric and tropospheric conditions, satellite geometry, baseline length, multipath effects and the presence of intentional or unintentional interference.  
\(^2\) GPS-only.  
\(^3\) Requires subscription to TerraStar data service. Subscriptions available from NovAtel.  
\(^4\) TerraStar service available depends on the SPAN enabled receiver used. See the receiver product sheet for details.  
\(^5\) Time accuracy does not include biases due to RF or antenna delay.  
\(^6\) Export licensing restricts operation to a maximum of 515 metres/second.  
\(^7\) Supplied by IMU manufacturer.  
\(^8\) RMS, incremental error growth from steady-state accuracy. Computed with respect to full GPS, RTK trajectory.  
\(^9\) 1 ppm should be added to all values to account for additional error due to baseline length.  
\(^10\) Post-processing accuracy using Inertial Explorer processing software.