PwrPak7D-E1

Compact dual-antenna enclosure delivers leading SPAN GNSS+INS technology from Hexagon | NovAtel

**Dual-antenna input**
Multi-frequency, dual-antenna input allows the PwrPak7D-E1 to harness the power of NovAtel RTK and ALIGN functionality. This makes the PwrPak7D-E1 ideal for ground, marine or aircraft-based systems, providing industry-leading GNSS multi-constellation heading and position data in static and dynamic environments.

**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 System (INS). The absolute accuracy of GNSS positioning with the stability of inertial measurement unit (IMU) gyro and accelerometer measurements generate a 3D navigation solution that is stable and continuously available. Deeply coupling the GNSS and inertial measurements through SPAN technology enables better bridging through GNSS interruptions and rapid reacquisition of signals.

**PwrPak7D-E1 advantages**
The PwrPak7D-E1 contains an Epson G320N MEMS IMU to deliver world-class SPAN technology in an integrated, single-box solution. This product is commercially exportable and provides an excellent price/performance/size GNSS+INS solution.

**Future-proofed scalability**
Capable of tracking all present and upcoming GNSS constellations and satellite signals, the PwrPak7D-E1 is a robust, high-precision receiver that is software upgradeable in the field to provide the custom performance required for your application demands.

The PwrPak7D-E1 has a powerful OEM7 GNSS engine, integrated MEMS IMU, built-in Wi-Fi, onboard NTRIP client and server support and 16 GB of internal storage.

**Precise thinking makes it possible**
Our GNSS products have set the standard in quality and performance for over 20 years. State-of-the-art lean manufacturing facilities in our North American headquarters produce the industry's most extensive line of OEM receivers, antennas and subsystems.

**Benefits**
- Small, low-power, all-in-one GNSS+INS enclosure
- Easy integration into space and weight constrained applications
- Commercially exportable system
- Rugged design ideal for challenging environments
- Enhanced connection options including serial, USB, CAN and Ethernet
- Future-proof for upcoming GNSS signal support

**Features**
- Low-noise commercial grade gyros and accelerometers
- Dedicated wheel sensor input
- TerraStar Correction Services supported over multi-channel L-Band and IP connections
- Spoofing detection, interference detection and mitigation provided by GNSS Resilience and Integrity Technology (GRIT)
- SPAN GNSS+INS capability with configurable application profiles
- Dual-antenna ALIGN heading
- 16 GB of internal storage
- Built-in Wi-Fi support
**Performance**

**Signal tracking**
- GPS: L1 C/A, L1C, L2C, L2P, L5
- Galileo: E1, E5a, E5b
- QZSS: L1 C/A, L1C, L1S, L2C, L5
- NavIC: (IRNSS)
- SBAS: L1, L5
- L-Band: up to 5 channels

**Horizontal position accuracy**
- Single point L1: 1.5 m
- Single point L1/L2: 1.2 m
- SBAS: 60 cm
- DGPS: 40 cm
- TerraStar-L: 40 cm
- TerraStar-C PRO: 2.5 cm

**Accuracy**
- Initialization time: < 10 s
- Initialization reliability: > 99.9%

**Baseline accuracy (RMS)**
- 2 m: 0.08 deg
- 4 m: 0.05 deg

**Maximum data rate**
- GNSS measurements: up to 20 Hz
- GNSS position: up to 20 Hz
- INS solution: up to 200 Hz
- IMU raw data rate: 125 Hz or 200 Hz

**Time to first fix**
- Cold start: < 39 s (typ)
- Hot start: < 20 s (typ)

**Time accuracy**
- 20 ns RMS

**Velocity limit**
- 515 m/s

**IMU performance**
- Gyroscope performance:
  - Input range: ±150 deg/s
  - Rate bias stability: 3.5 deg/hr
  - Angular random walk: 0.1 deg/√hr
- Accelerometer performance:
  - Input range: ±5 g
  - Bias stability: 0.1 mg
  - Velocity random walk: 0.05 m/s/√hr

**Communication ports**
- 1 RS-232: up to 460,800 bps
- 2 RS-232/RS-422 selectable: up to 460,800 bps
- 1 USB 2.0 (device): HS
- 1 USB 2.0 (host): HS
- 1 Ethernet: 10/100 Mbps
- 1 Wi-Fi
- 3 Event inputs
- 3 Event outputs
- 1 Pulse Per Second (PPS) output
- 1 Quadrature wheel sensor input

**Physical and electrical**
- Dimensions: 147 x 125 x 55 mm
- Weight: 510 g

**Power**
- Input voltage: +9 to +36 VDC
- Power consumption: 4.15 W

**Connectors**
- 2 Antenna LNA power outputs
- Output voltage: 5 VDC ±5%
- Maximum current: 200 mA

**Status LEDs**
- Power
- GNSS
- INS
- Data logging
- USB

**Environmental**
- Temperature:
  - Operating: -40°C to +75°C
  - Storage: -40°C to +85°C
- Humidity:
  - 95% non-condensing

**Ingress protection rating**
- IP67

**Vibration (operating)**
- Random: MIL-STD-810H, Method 514.8
- Method: Cat 24, 20 g RMS

**Performance during GNSS outages**

<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</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>0.010</td>
</tr>
<tr>
<td></td>
<td>SP</td>
<td>1.00</td>
<td>0.60</td>
<td>0.009</td>
</tr>
<tr>
<td>10 s</td>
<td>RTK</td>
<td>0.01</td>
<td>0.02</td>
<td>0.010</td>
</tr>
<tr>
<td></td>
<td>PPP</td>
<td>0.31</td>
<td>0.25</td>
<td>0.070</td>
</tr>
<tr>
<td></td>
<td>SP</td>
<td>1.25</td>
<td>0.70</td>
<td>0.020</td>
</tr>
<tr>
<td>60 s</td>
<td>RTK</td>
<td>15.02</td>
<td>1.63</td>
<td>0.720</td>
</tr>
<tr>
<td></td>
<td>PPP</td>
<td>15.06</td>
<td>1.75</td>
<td>0.030</td>
</tr>
<tr>
<td></td>
<td>SP</td>
<td>16.00</td>
<td>2.20</td>
<td></td>
</tr>
</tbody>
</table>

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. Mode-configurable to track L1 (Galileo) / Satellite Through L2 (GPS) or L1E1B1/BD (QZSS / Galileo) / BeiDII1/III (GLONASS) / NavIC (IRNSS). See manual for details.
3. Hardware ready for L5.
4. E1bc and E6bc support only
5. L-Band and SBAS reception on primary antenna only.
6. GPS-only.
7. Requires a subscription to a TerraStar data service. Subscriptions available from NovAtel.
8. Typical values using serial port communication without interference mitigation. Consult the OEM7 User Documentation for power supply considerations.
9. 147 ms should be added to all position values to account for additional error due to baseline length.
10. Processing results using Inertial Explorer software. The survey data used to generate these statistics had frequent changes in azimuth.

**Contact Hexagon | NovAtel**

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

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

ALIGN, GrafNav/GrafNet, Inertial Explorer, NovAtel, OEM7, PwrPak7, SPAN, TerraStar and VEXXIS are trademarks of NovAtel, Inc., entities within the Hexagon Autonomy & Positioning division, their affiliated entities, and/or their licensors. All other trademarks are properties of their respective owners.

©2022 NovAtel Inc. All rights reserved. NovAtel makes no representation or warranty regarding the accuracy of the information in this publication. This document gives only a general description of the product(s) or service(s) offered by NovAtel, and, except where expressly provided otherwise, shall not form part of any contract. Such information, the products and conditions of supply are subject to change without notice.

D22921 Version 7 | 11 April 2022 | Printed in Canada