

# Enclosures PwrPak7D-E2™



## OEM7® DUAL ANTENNA SPAN® GNSS+INS ENCLOSURE WITH IMPROVED PERFORMANCE AND HIGHER DATA RATES



### DUAL ANTENNA INPUT

Multi-frequency, dual antenna input allows the PwrPak7D-E2 to harness the power of NovAtel CORRECT® with RTK and ALIGN functionality. This makes the PwrPak7D-E2 ideal for ground, marine or aircraft based systems, providing industry leading GNSS multi-constellation heading and position data in static and dynamic environments.

### SPAN: WORLD LEADING GNSS+INS TECHNOLOGY

Synchronous Position, Attitude and Navigation (SPAN) 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 and the stability of Inertial Measurement Unit (IMU) gyro and accelerometer measurements are tightly coupled to provide an exceptional 3D navigation solution that is stable and continuously available, even through periods when satellite signals are blocked.

### SPAN ENABLED MEMS RECEIVER

The PwrPak7D-E2 contains an Epson G370N MEMS IMU to deliver world class NovAtel® SPAN technology in an integrated, single box solution. Built on top of the reputable PwrPak7 family, with a higher performance Epson IMU, it provides seamless positioning, quick alignment and excellent performance. This product is commercially exportable and provides an excellent midrange price/performance/size GNSS+INS solution.

### FUTURE PROOFED SCALABILITY

Capable of tracking all present and upcoming GNSS constellations and satellite signals, the PwrPak7D-E2 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-E2 has a powerful OEM7® GNSS engine, integrated MEMS IMU, built in Wi-Fi, on board 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.

### FEATURES

- + SPAN enabled enclosure featuring NovAtel's tightly coupled GNSS+INS engine
- + Enhanced connection options including serial, USB, CAN and Ethernet
- + 555 channel, all-constellation, multi-frequency positioning solution
- + TerraStar® correction services supported over multi-channel L-Band and IP connections
- + INS data rates up to 200 Hz
- + Multiple communication interfaces for easy integration and installation
- + Built-in Wi-Fi support
- + 16 GB of internal storage
- + ALIGN® heading solution

If you require more information about our GNSS+INS enclosures, visit [www.novatel.com/products/span-gnss-inertial-systems/span-combined-systems/](http://www.novatel.com/products/span-gnss-inertial-systems/span-combined-systems/)

# PwrPak7D-E2™



## PERFORMANCE<sup>1</sup>

### Channel Configuration

555 Channels

### Signal Tracking<sup>2</sup>

GPS L1 C/A, L1C, L2C, L2P, L5  
GLONASS<sup>3</sup> L1 C/A, L2 C/A, L2P,  
L3, L5

Galileo<sup>4</sup> E1, E5 AltBOC, E5a, E5b

BeiDou B1I, B1C, B2I, B2a

QZSS L1 C/A, L1C, L2C, L5

NavIC (IRNSS) L5

SBAS<sup>5</sup> L1, L5

L-Band<sup>5</sup> up to 5 channels

### Horizontal Position Accuracy (RMS)

Single point L1 1.5 m

Single point L1/L2 1.2 m

SBAS<sup>6</sup> 60 cm

DGPS 40 cm

TerraStar-L™<sup>7</sup> 40 cm

TerraStar-C PRO™<sup>7</sup> 2.5 cm

TerraStar-X™<sup>7</sup> 2 cm

RTK 1 cm + 1 ppm

Initialization time <10 s

Initialization reliability >99.9%

### ALIGN Heading Accuracy

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 Position/Attitude up to 200 Hz

IMU Raw Data Rate 200 Hz

### Time to First Fix

Cold start<sup>8</sup> <39 s

Hot start<sup>9</sup> <20 s

Time Accuracy<sup>10</sup> 20 ns RMS

Velocity Limit<sup>11</sup> 515 m/s

### IMU PERFORMANCE<sup>12</sup>

#### Gyroscope Performance

Input range ±450 deg/s

Rate bias stability 0.8 deg/hr

Angular random walk

0.06 deg/√hr

#### Accelerometer Performance

Range ±10 g

Bias stability 0.01 mg

Velocity random walk

0.025 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 CAN Bus 1 Mbps

1 Wi-Fi

3 Event inputs

3 Event outputs

1 Pulse Per Second output

1 Quadrature Wheel Sensor input

### PHYSICAL AND ELECTRICAL

Dimensions 147 x 125 x 55 mm

Weight 560 g

### Power

Input voltage +9 to +36 VDC

Power consumption<sup>13</sup> 4.15 W

### 2 Antenna LNA Power Outputs

Output voltage 5 VDC ±5%

Maximum current 200 mA

### Connectors

2 Antenna SMA

USB device Micro A/B

USB host Micro A/B

Serial, CAN, Event I/O DSUB HD26

Ethernet RJ45

Data Logging Push button

Power SAL M12, 5 pin, male

### 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

#### Random Vibration

MIL-STD-810G(CH1),

Method 514.7 – Profiles:

» Rail CAT 11 – 0.5 g RMS

» Composite Wheeled Vehicle

CAT 4 – 2.24 g RMS

» Aircraft Propeller

CAT 13 – 4.5 g RMS

#### Acceleration (operating)

MIL-STD-810G(CH1),

Method 513.7, Procedure II (16g)

**Bump** IEC 60068-2-27 (25g)

### Shock (non-operating)<sup>14</sup>

MIL-STD-810G(CH1),

Method 516.7, Procedure 1,

40 g 11 ms terminal sawtooth

### COMPLIANCE

FCC, ISED, CE and

Global Type Approvals

### INCLUDED ACCESSORIES

- Power cable
- USB cable
- DSUB HD26 to DB9 RS-232 cable

### OPTIONAL ACCESSORIES

- Full breakout cable for DSUB HD26 connector
- DSUB HD26 to M12 IMU cable
- RJ45 Ethernet cable
- VEXXIS® GNSS-500 and GNSS-800 series antennas
- Compact GNSS antennas
- GrafNav/GrafNet®
- Inertial Explorer®
- NovAtel Connect

For the most recent details of this product:

[www.novatel.com/products/span-gnss-inertial-systems/span-combined-systems/pwrpak7d-e2/](http://www.novatel.com/products/span-gnss-inertial-systems/span-combined-systems/pwrpak7d-e2/)

## PERFORMANCE DURING GNSS OUTAGES<sup>1</sup>

Outage Duration	Positioning Mode	POSITION ACCURACY (M) RMS		VELOCITY ACCURACY (M/S) RMS		ATTITUDE ACCURACY (DEGREES) RMS		
		Horizontal	Vertical	Horizontal	Vertical	Roll	Pitch	Heading
0 s	RTK <sup>15</sup>	0.02	0.03	0.015	0.010	0.013	0.013	0.070
	SP	1.00	0.60	0.015	0.010	0.013	0.013	0.070
	PP <sup>16</sup>	0.01	0.02	0.010	0.010	0.005	0.005	0.011
10 s	RTK <sup>15</sup>	0.15	0.10	0.040	0.020	0.022	0.022	0.085
	SP	1.15	0.70	0.040	0.020	0.022	0.022	0.085
	PP <sup>16</sup>	0.02	0.02	0.010	0.014	0.005	0.005	0.011
60 s	RTK <sup>15</sup>	5.00	1.00	0.220	0.035	0.035	0.035	0.120
	SP	6.00	1.60	0.220	0.035	0.035	0.035	0.120
	PP <sup>16</sup>	0.17	0.06	0.013	0.015	0.005	0.005	0.013

<sup>1</sup> 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 sources.  
<sup>2</sup> Model-configurable to track L5/E5a (all / Galileo) through L2 (GPS) or L3/E5B/B2 (GLONASS / Galileo / BeiDou) through L2 (GLONASS). See manual for details.  
<sup>3</sup> Hardware ready for L3 and L5.  
<sup>4</sup> E1bc support only.  
<sup>5</sup> L-Band and SBAS reception on primary antenna only.  
<sup>6</sup> GPS only.  
<sup>7</sup> Requires a subscription to a TerraStar data service. Subscriptions available from NovAtel.  
<sup>8</sup> Typical value. No almanac or ephemerides and no approximate position or time.  
<sup>9</sup> Typical value. Almanac and recent ephemerides saved and approximate position and time entered.  
<sup>10</sup> Time accuracy does not include biases due to RF or antenna delay.  
<sup>11</sup> Export licensing restricts operation to a maximum of 515 meters per second, message output impacted above 500 m/s.  
<sup>12</sup> Supplied by IMU manufacturer.  
<sup>13</sup> Typical value. Consult the OEM7 User Documentation for power supply considerations.  
<sup>14</sup> GNSS only. IMU measurements may not be valid.  
<sup>15</sup> 1 ppm should be added to all position values to account for additional error due to baseline length.  
<sup>16</sup> Post-processing results using Inertial Explorer software. The survey data used to generate these statistics had frequent changes in azimuth.

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