

# Enclosures PwrPak7-E1™



## COMPACT OEM7® ENCLOSURE DELIVERS NOVATEL'S LEADING SPAN® GNSS+INS TECHNOLOGY



### 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. 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 PwrPak7-E1 contains an Epson G320N MEMS IMU to deliver world class NovAtel 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 PwrPak7-E1 is a robust, high precision receiver that is software upgradable in the field to provide the custom performance required for your application demands.

The PwrPak7-E1 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. It also has enhanced connection options including serial, USB, CAN and Ethernet.

### PRECISE THINKING MAKES IT POSSIBLE

Developed for efficient and rapid integration, 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. All of our products are backed by a team of highly skilled design and customer support engineers, ready to answer your integration questions.

### FEATURES

- + SPAN enabled enclosure featuring NovAtel's tightly coupled GNSS+INS engine
- + 555 channel, all-constellation, multi-frequency positioning solution
- + Multi-channel L-Band supports TerraStar correction services
- + Commercially exportable IMU
- + Multiple communication interfaces for easy integration and installation
- + Built-in Wi-Fi support
- + 16 GB of internal storage
- + Can be paired with an external receiver to support ALIGN® GNSS azimuth aiding for low dynamic applications

If you require more information about our enclosures, visit [www.novatel.com/products/gnss-receivers/enclosures/](http://www.novatel.com/products/gnss-receivers/enclosures/)

# PwrPak7-E1™



## PERFORMANCE<sup>1</sup>

### Channel Configuration

555 Channels

### Signal Tracking

GPS L1 C/A, L1C, L2C, L2P, L5

GLONASS<sup>2</sup> L1 C/A, L2C, L2P,

L3, L5

Galileo<sup>3</sup> E1, E5 AltBOC

E5a, E5b, E6

BeiDou<sup>4</sup> B1I, B1C, B2I, B2a, B3I

QZSS L1 C/A, L1C, L2C, L5, L6

NavIC (IRNSS) L5

SBAS L1, L5

L-Band up to 5 channels

### GNSS Horizontal Position

#### Accuracy (RMS)

Single point L1 1.5 m

Single point L1/L2 1.2 m

SBAS<sup>5</sup> 60 cm

DGPS 40 cm

TerraStar-L<sup>6</sup> 40 cm

TerraStar-C PRO<sup>6</sup> 4 cm

RTK 1 cm + 1 ppm

Initialization time <10 s

Initialization reliability >99.9%

#### 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 125 Hz

#### Time to First Fix

Cold start<sup>7,16</sup> <40 s

Hot start<sup>8,16</sup> <19 s

Time Accuracy<sup>9</sup> 20 ns RMS

Velocity Limit<sup>10</sup> 515 m/s

## IMU PERFORMANCE<sup>11</sup>

## 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>14</sup>	0.02	0.03	0.020	0.015	0.020	0.020	0.090
	SP	1.00	0.60	0.020	0.015	0.020	0.020	0.090
	PP <sup>15</sup>	0.01	0.02	0.015	0.010	0.008	0.008	0.038
10 s	RTK <sup>14</sup>	0.25	0.15	0.065	0.025	0.040	0.040	0.130
	SP	1.25	0.70	0.065	0.025	0.040	0.040	0.130
	PP <sup>15</sup>	0.01	0.02	0.015	0.010	0.008	0.008	0.038

<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> Hardware ready for L3 and L5.

<sup>3</sup> E1bc and E6bc support only.

<sup>4</sup> Designed for BeiDou Phase 2 and 3, B1, B2 and B3 compatibility.

<sup>5</sup> GPS only.

<sup>6</sup> Requires a subscription to a TerraStar data service. Subscriptions available from NovAtel.

<sup>7</sup> Typical value. No almanac or ephemerides and no approximate position or time.

<sup>8</sup> Typical value. Almanac and recent ephemerides saved and approximate position and time entered.

<sup>9</sup> Time accuracy does not include biases due to RF or antenna delay.

<sup>10</sup> Export licensing restricts operation to a maximum of 515 metres per second, message output impacted above 500 m/s.

<sup>11</sup> Supplied by IMU manufacturer.

<sup>12</sup> Typical value. Consult the OEM7 User Documentation for power supply considerations.

<sup>13</sup> GNSS only. IMU measurements may not be valid.

<sup>14</sup> 1 ppm should be added to all position values to account for additional error due to baseline length.

<sup>15</sup> Post-processing results using Inertial Explorer software. The survey data used to generate these statistics had frequent changes in azimuth.

<sup>16</sup> Available in Q2 2019.

### Gyroscope Performance

Input range ±150 deg/s

Rate bias stability 3.5 deg/hr

Angular random walk 0.1 deg/√hr

### Accelerometer Performance

Range ±5 g

Bias stability 0.1 mg

Velocity random walk 0.5 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

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 510 g

### Power

Input voltage +9 to +36 VDC

Power consumption<sup>12</sup> 1.8 W

### Antenna LNA Power Output

Output voltage 5 VDC ±5%

Maximum current 200 mA

## Connectors

Antenna TNC

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

Waterproof IEC 60529 IPX7

Dust IEC 60529 IP6X

### Vibration (operating)

Random MIL-STD-810 514.6

Category 24, 20g RMS

Sinusoidal IEC 60068-2-6

### Acceleration (operating)

MIL-STD 810G, Method 513.6

Procedure II (16 g)

Bump IEC 60068-2-27 (25 g)

### Shock (non-operating)<sup>13</sup>

MIL-STD-810G, 516.6,

Procedure 1,

40 g 11 ms terminal sawtooth

### Compliance

Industry Canada,

FCC, CE, RoHS, WEEE

## 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
- ANT series antennas
- GrafNav/GravNet®
- Inertial Explorer®
- NovAtel Connect

For the most recent details of this product:

[www.novatel.com/products/gnss-receivers/enclosures/pwrpak7-e1](http://www.novatel.com/products/gnss-receivers/enclosures/pwrpak7-e1)

## novatel.com

sales@novatel.com

1-800-NOVATEL (U.S. and

Canada) or 403-295-4900

China 0086-21-68882300

Europe 44-1993-848-736

SE Asia and Australia

61-400-883-601

**Version 4** Specifications subject to change without notice.

©2018 NovAtel Inc. All rights reserved.

NovAtel, PwrPak7, OEM7, SPAN, VEXXIS, GrafNav, GrafNet, Inertial Explorer, ALIGN and NovAtel CORRECT are registered trademarks of NovAtel Inc.

PwrPak7-E1 and RTK ASSIST are trademarks of NovAtel Inc.

Printed in Canada.

D21652 August 2018

