PwrPak7-E1

Compact OEM7 Enclosure Delivers Leading SPAN GNSS+INS Technology by Hexagon | NovAtel

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.

SPAN-Enabled MEMS Receiver

The PwrPak7-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 PwrPak7-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 PwrPak7-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. 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.

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

Features

- Low noise commercial grade Gyros and Accelerometers
- Dedicated Wheel Sensor input
- TerraStar correction services supported over multi-channel L-Band and IP connections
- Advanced interference mitigation
- SPAN GNSS+INS capability with configurable application profiles
- 16 GB of internal storage
- Built-in Wi-Fi support

Performance[1]

Signal Tracking

GPS	L1 C/A, L1C, L2C, L2P, L5
GLONASS[2]	L1 C/A, L2 C/A, L2P, L3, L5
Galileo[3]	E1, E5 AltBOC, E5a, E5b, E6
BeiDou	B1I, B1C, B2I, B2a, B2b, B3I
QZSS	L1 C/A, L1C, L2CL5, L6
NavIC (IRNSS)	L5
SBAS	L1, L5
L-Band	up to 5 channels

Horizontal Position Accuracy (RMS)

Single Point L1	1.5 m
Single Point L1/L2	1.2 m
SBAS4	60 cm
DGPS	40 cm
TerraStar-L[5]	40 cm
TerraStar-C PRO[5]	2.5 cm
TerraStar-X[5]	2 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 Solution	up to 200 Hz
IMU Raw Data Rate	125 Hz or 200 Hz

Time to First Fix

Cold start[6]	< 39 s (typ)
Hot start[7]	< 20 s (typ)

Time Accuracy[8] 20 ns RMS

Velocity Limit[9] 515 m/s

IMU Performance[10]

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	0.05 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 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 510 g

Power

Input voltage	+9 to +36 VDC
Power consumption[11]	3.4 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

Ingress Protection Rating IP67

Vibration (operating)

Random
MIL-STD 810H, Method 514.8 (Cat 24, 20 g RMS)
Sinusoidal IEC 60068-2-6

Acceleration (operating)

MIL-STD-810H, Method 513.8 Procedure II (16 g)

Bump (operating)

IEC 60068-2-27 (25 g)

Shock (operating)[12]

MIL-STD-810H, Method 516.8, 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 Application Suite

Hardware Options

PwrPak7M-E1 no Wi-Fi, no 16 GB internal storage

Performance During GNSS Outages[1]

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[13]	0.02	0.03	0.020	0.010	0.020	0.020	0.090
	PPP	0.06	0.15					
	SP	1.00	0.60					
	Post Processed[14]	0.01	0.02	0.010	0.007	0.009	0.009	0.044
10 s	RTK[13]	0.27	0.13	0.070	0.020	0.040	0.040	0.130
	PPP	0.31	0.25					
	SP	1.25	0.70					
	Post Processed[14]	0.02	0.02	0.020	0.010	0.009	0.009	0.044
60 s	RTK[13]	15.02	1.63	0.720	0.065	0.095	0.095	0.210
	PPP	15.06	1.75					
	SP	16.00	2.20					
	Post Processed[14]	0.35	0.10	0.030	0.011	0.014	0.014	0.048

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. Hardware ready for L3 and L5. 3. E1bc and E6bc support only. 4. GPS-only. 5. Requires a subscription to a TerraStar data service. Subscriptions available from NovAtel. 6. Typical value. No almanac or ephemerides and no approximate position or time. 7. Typical value. Almanac and recent ephemerides saved and approximate position and time entered. 8. Time accuracy does not include biases due to RF or antenna delay. 9. Export licensing restricts operation to a maximum of 515 meters per second, message output impacted above 500 m/s. 10. Supplied by IMU manufacturer. 11. Typical values using serial port communication without interference mitigation. Consult the OEM7 User Documentation for power supply considerations 12. GNSS only. IMU measurements may not be valid. 13. 1 ppm should be added to all position values to account for additional error due to baseline length. 14. Post-processing results using Inertial Explorer software. The survey data used to generate these statistics had frequent changes in azimuth.

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

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