

PIM222A

The PIM222A provides precise GNSS positioning designed to enable autonomy at scale

Proven GNSS precision for ADAS and autonomy

The PIM222A harnesses NovAtel's deep experience delivering precise positioning in the most demanding applications for mass deployment in advanced driver assistance systems and autonomous vehicles.

Automotive quality, easy integration

Built with automotive-qualified hardware in a package that is easy to integrate, the PIM222A leverages SPAN technology from NovAtel to provide accurate position data in urban environments that challenge GNSS availability.

Rich feature array, variable production volumes

The lightweight, power-efficient, solder-down module can be produced in low or high volumes with feature options such as multi-frequency, multi-constellation, RTK and dual-antenna precision, which maximizes slow-speed and initialization performance.



Benefits

- Instant position and attitude — faster IMU calibration
- Maintains accuracy longer into GNSS blackouts
- Tracks and holds more satellites for sustained solutions
- Higher resolution of application dynamics
- Proven precision for automotive applications

Features

- Dual antenna with IMU
- Differential Distance Measurement Instrument (DMI) input via CAN
- High sensitivity
- 50 Hz attitude
- High-volume affordability

Performance¹

Signal Tracking (Mode 1)

Primary RF

GPS	L1, L2
Galileo	E1, E5b
BeiDou	B1I, B2I

Secondary RF

GPS	L1
Galileo	E1
BeiDou	B1I

Signal Tracking (Mode 2)

Primary RF

GPS	L1, L5
Galileo	E1, E5a
BeiDou	B1I, B2a

Secondary RF

GPS	L1, L5
Galileo	E1, E5a
BeiDou	B1I, B2a

Horizontal Position Accuracy (RMS)

Single Point L1	1.5 m
Single Point L1/L2	1.2 m
RTK	0.1 m
RTK (CEP50) ²	1 cm + 1 ppm

GNSS INS Bridging 30 cm @ 10s outage

GNSS Outages³

INS positioning error ⁴	0.3 m
INS heading error ⁴	0.5°
Dead reckoning with DMI ⁵	0.5% at 1 km

Maximum Data Rate

Solutions	up to 50 Hz
Raw IMU measurements	up to 100 Hz
Raw GNSS measurements	1 Hz

Time to First Fix

Cold start ⁶	40 s (typical)
Hot start ⁷	10 s (typical)
RTK initialization	15 s
Boot time	5 s

Time Accuracy⁸ 20 ns RMS

Velocity Accuracy 0.04 m/s RMS

Attitude Accuracy (RMS)

INS heading	1°
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Physical and Electrical

Dimensions 35 × 42 × 4.2 mm

Weight 12 g

Power

Input voltage	
VCC	+3.3 VDC ±5%
VBATT for Real Time Clock	+3.0 VDC +5%/-10%

Power Consumption

Dual frequency GNSS	1.2 W (typ.)
Power down power consumption	0.3 mA

Signals to Module Interfaces

GNSS RF In	2
UART	Up to 3
USB 2.0 service port (device, 12 Mbit/s) ⁹	1
PPS (Timemark)	1
SPI (for external IMU)	2
CAN Bus	1
External LNA short status	2
Error line	1

Environmental

AEC Automotive Grade Grade 2

Temperature

Operating	-40°C to +105°C
Storage	-50°C to +105°C

Humidity

Operating	MIL-STD-810G (CH1), Method 507.6, Procedure II, 40°C @ 95% RH
Non-operating	MIL-STD-810G (CH1), Method 507.6, Procedure II, 30°C - 60°C @ 95% RH

Random Vibration

Operating	MIL-STD-810G (CH1), Method 514.7, Category 24, (7.7 g RMS)
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Sinusoidal Vibration

Non-operating	IEC 60068-2-6 (5.0 g)
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Shock

Operating	MIL STD 810G (CH1), Method 516.7 Procedure I (40 g)
Non-operating	MIL STD 810G (CH1), Method 516.7 Procedure V (75 g)

Bump

Operating	ISO 9022-31-06 (25 g)
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Acceleration

Operating	MIL-STD-810G (CH1), Method 513.7, Procedure II (4g, 8g)
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Features

- RTK correction support for RTCM v3.x MSM
- Navigation output support for NMEA 0183 v4.11 and GNSS+INS binary logs
- Solution integrity flags based Receiver Autonomous Integrity Monitoring (RAIM)
- Dual receiver ALIGN heading solution
- Pulse Per Second (PPS) output
- SPAN GNSS+INS technology internal or external IMU integration
- Differential odometer over CAN bus



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 sources.

2. Static roof top.

3. The relative errors that are accumulated during the outages, not the absolute accuracy.

4. Over 10 second GNSS outage

5. Assuming 60km/hr for 60 seconds, DMI update 20Hz to 100Hz.

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. Driver available for Windows.

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