LPMS-HR

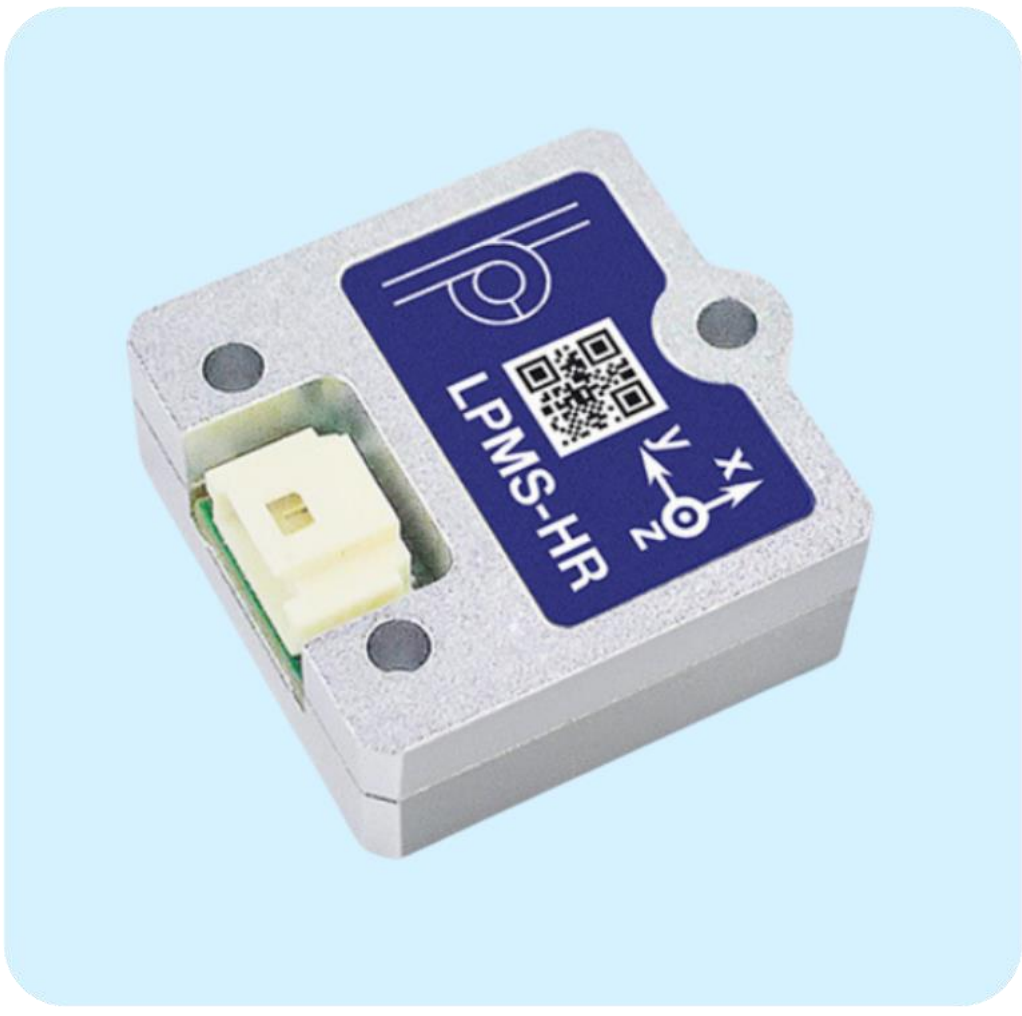
LIFE PERFORMANCE RESEARCH

High-Resolution Inertial Measurement Unit for Robotics & Autonomous Systems

The LPMS-HR is a high-resolution MEMS Inertial Measurement Unit (IMU) designed for precision motion sensing in robotics and autonomous systems. Combining a 3-axis gyroscope and 3-axis accelerometer in a compact aluminum housing, it delivers real-time 6-DOF orientation, linear acceleration, and angular velocity data — the essential motion inputs that keep robots stable, accurate, and aware of their environment.

Available in USB, RS232, and TTL variants, the LPMS-HR integrates cleanly into a wide range of robotic architectures. Its onboard processor computes Euler angles, quaternions, and linear acceleration at output rates up to 1,000 Hz, with baud rates up to 921,600 bps for low-latency integration.

Its aluminum alloy housing and –40°C to +85°C operating range ensure reliable performance across factory floors, outdoor deployments, and vehicle-mounted applications.



Key Feature

- High-Resolution MEMS IMU: 16-bit gyroscope & accelerometer
- 0.01° angular resolution
- Real-time 6-DOF orientation at up to 1,000 Hz
- Euler angles, quaternions, linear acceleration, angular velocity
- USB, RS232, and TTL interface variants
- Wide voltage: 5V (USB) or 5~36V (RS232/TTL)
- Baud rate up to 921,600 bps
- Time synchronization support (SYNC pin)
- Compact: 22.4 × 22.4 × 11 mm, 10g
- Industrial: –40°C to +85°C, aluminum alloy housing
- Connector: Molex 5015680607

Applications

- **Humanoid Robots :** Precision joint and body tracking for balance control and limb coordination
- **Mobile Robots :** Navigation, path-following & dynamic stabilization for AGV/AMR
- **Construction Machinery** : Tilt, pitch & roll monitoring for safety interlocks and leveling systems
- **Platform Stabilization** : Closed-loop feedback for gimbal, camera, antenna, and vehicle stabilization
- **ViL Testing** : High-frequency motion capture in dynamic automotive & robotics test environments
- **Research & Prototyping** : Versatile IMU for academic labs, robotics R&D, and system integrators

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Sensor Specifications

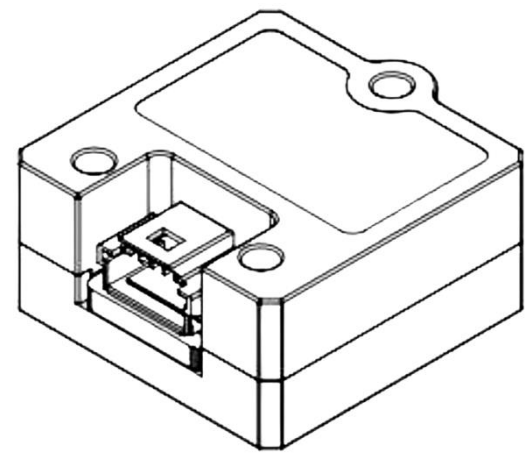
Part number	**LPMS-HR-USB**	**LPMS-HR-RS232**	**LPMS-HR-TTL**
Interface	USB	RS232	TTL
Communication Protocol	LP-BUS/ ASCII	LP-BUS/ ASCII	LP-BUS/ ASCII
Power Supply	5V	5~36V	5~36V
Max Input Current	38mA (@5V)	38mA (@5V); 7mA (@36V)	38mA (@5V); 7mA (@36V)
Power Consumption	0.13W (26mA@5V)	0.105W (21mA@5V)	0.095W (19mA@5V)
Size	22.4 x 22.4 x 11 mm		
Weight	10 (±0.5)g		
Orientation Range	Roll: ±180°; Pitch: ±90°; Yaw: ±180°		
Resolution	0.01°		
Time Synchronization	Supported		
Baud Rate	9,600 ~ 921,600 bps		
Accelerometer Range	3-axis, ±3 / ±6 / ±12 / ±24g, 16-bit		
Accelerometer Zero Bias	20mg		
Accelerometer Temp. Drift	<0.2mg/K		
Accelerometer Bias Instability	X: 31.34 Y: 28.99 Z: 24.95 μg		
Accelerometer Velocity Random Walk	X: 0.029 Y: 0.029 Z: 0.022 m/s/√hr		
Gyroscope Range	3-axis, ±125 / ±250 / ±500 / ±1000 / ±2000 dps, 16-bit		
Gyroscope Zero Bias	±1 dps		
Gyroscope Temp. Drift	±0.015 dps/K		
Gyroscope Noise Density	0.014 dps/√Hz		
Gyroscope Bias Instability	X: 4.31 Y: 3.27 Z: 5.43 °/h		
Gyroscope Angular Random Walk	X: 1.56 Y: 1.21 Z: 1.52 °/√hr		
Data Output Type	Raw data / Euler angles / Quaternion / Linear acceleration / Temperature		
Data Output Rate	5 ~ 1,000 Hz (default: 100 Hz)		
Case Materials	Aluminum		
Operation Temperature	-40 to +85 °C		
Connector Type	Molex 5015680607		

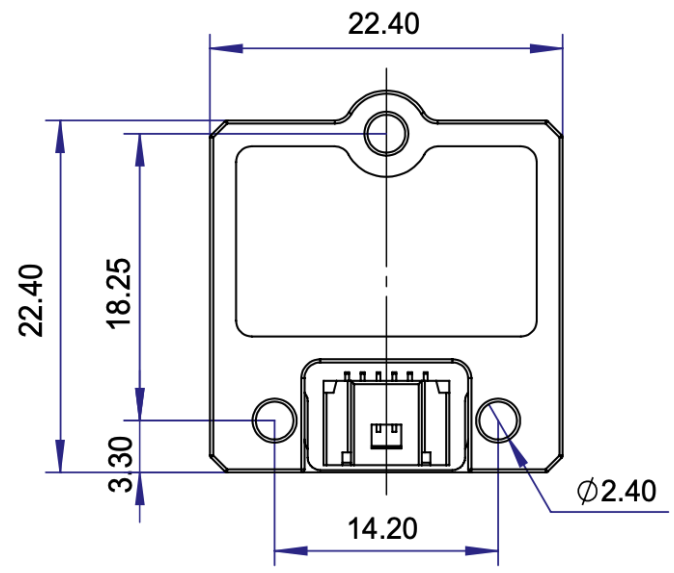
* All specifications measured at standard temperature +25°C. Reference values may vary under different temperature conditions.

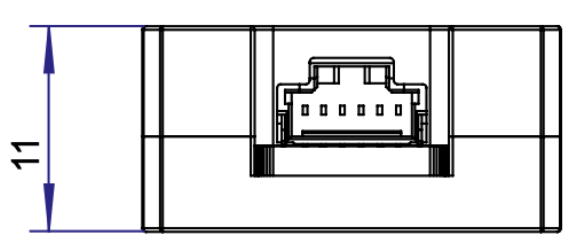
**RS232/TTL Power Supply Caution: When connecting a high-power regulated supply (e.g. 48V-to-24V regulator) via RS232 or TTL, a momentary inrush current may occur at power-on and potentially exceed the sensor's rated limit. Apply power in stages: allow the supply to stabilize fully before connecting to the sensor.

***ASCII Output Mode: In ASCII output mode, the device still responds to LPBUS protocol commands. ASCII output data is computed based on 32-bit floating-point numbers.

Dimensions



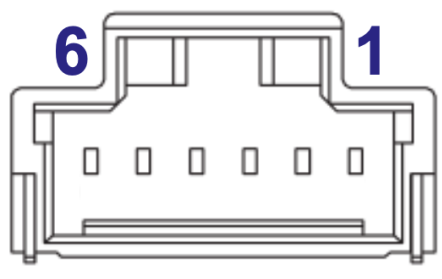




Package details

- LPMS-HR Sensor × 1
- Warranty service x 1
- Data cable × 1

Pinout



Pin	Name	Remark
1	VCC	5V(USB) ; 5 ~ 36V(RS232/TTL)
2	GND	Ground
3	D-/ RS232_TX / UART_TX	-
4	D+/ RS232_RX / UART_RX	-
5	NRST	Active Low, <1.1V
6	SYNC	Sync Input

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