

LPMS-U2 Series Hardware Manual ver. 1.0



Revision History

Date	Revision	Changes
2020-03-10	1.0	- Initial release - Combine LPMS-CU2, LPMS-URS2 and LPMS-UTTL2 hardware information into this LPMS-U2 series hardware manual

Table of Contents

I.	Introduction.....	- 1 -
II.	Device Specification.....	- 2 -
III.	Connector Pinout	- 6 -
IV.	Mechanical Information.....	- 7 -



I. Introduction

Welcome to the LP-RESEARCH Motion Sensor LPMS-U2 Series hardware manual.

In this documentation we will explain the hardware information of LPMS-U2 series sensors, which includes the following sensor part numbers.

- LPMS-CU2
- LPMS-URS2
- LPMS-UTTTL2.

We have put a lot of effort into making the LPMS-U2 series a great product, but we are always eager to improve and work on new developments. If you have any further questions or comments regarding this documentation, please feel free to contact us anytime.

For more information on the LPMS-U2 or other product series, please refer to related user manuals, available from the LP-RESEARCH website at the following address: <http://www.lp-research.com>.



II. Device Specification

Table 2-1. Overall specification

Parameters	LPMS-CU2	LPMS-URS2	LPMS-UTTTL2
Output range of Euler angle	Roll : $\pm 180^\circ$; pitch : $\pm 90^\circ$; Yaw : $\pm 180^\circ$		
Bandwidth	400Hz		
Resolution	<0.01°		
Accuracy	<0.5° (Static), <2° RMS (Dynamic)		
Max. instant impact (0.1 ms)	10,000 g		
Output data type	Raw data/Euler/Quaternion/Linear acceleration/Air pressure/Altitude/Temperature		
Internal sampling rate	400Hz		
Communication interface	CAN BUS / USB*	RS232 / USB*	TTL / USB*
Max. baudrate	1M bps		
Communication protocol	LPCAN / CANOpen	LPBUS	
Size	34.5x34x15.7 mm		
Weight	17.6 g		
Max. data update rate	400Hz		
Power consumption	<175mW@3.3V		
Power supply	5V~18V DC / 5V (USB)		
Working temperature	-40~+80 °C		
Connector	DB9(female) / micro-USB type B		

* The USB port is primarily used for the connection with windows-based operation systems. With the use of LpmsControl software, users can easily modify the sensor settings and upgrade the sensor firmware.



Table 2-2. Accelerometer specification

Parameters	Typical Value	Unit
Measurement range	$\pm 2/\pm 4/\pm 8/\pm 16$	g
Sensitivity	0.061/0.122/0.244/0.488	mg/LSB
Linear acceleration sensitivity change vs. temperature	± 1	%
Linear acceleration typical zero-g level offset accuracy	± 40	mg
Linear acceleration zero-rate change vs. temperature	± 0.5	mg/°C
Acceleration noise density	90 (FS= ± 2 g ODR = 104 Hz)	$\mu\text{g}/\sqrt{\text{Hz}}$

Table 2-3. Gyroscope specification

Parameters	Typical Value	Unit
Measurement range	$\pm 125/\pm 245/\pm 500/\pm 1000/\pm 2000$	dps
Sensitivity	4.375/8.75/17.50/35/70	mdps/LSB
Angular rate sensitivity change vs. temperature	± 1.5	%
Angular rate typical zero-rate level	± 10	dps
Angular rate typical zero-rate level change vs. temperature	± 0.05	dps/°C
Rate noise density	7	mdps/ $\sqrt{\text{Hz}}$



Table 2-4. Magnetometer specification

Parameters	Typical Value		Unit
Measurement range	±4/±8/±12/±16		Gauss
Sensitivity	6842/3421/2281/1711		LSB/gauss
Zero-gauss level	±1 (FS=±4 gauss)		gauss
RMS noise (Ultra-high-performance mode)	X axis	3.2	mgauss
	Y axis	3.2	mgauss
	Z axis	4.1	mgauss
Non-linearity	±0.12		%FS

Table 2-5. Pressure and humidity sensor specification

Parameters	Typical Value	Unit
Pressure measurement range	300~1100	hPa
Temperature coefficient of offset	±1.5	Pa/K
Absolute accuracy pressure	±1.0	hPa
Pressure sensitivity	0.18	Pa
Pressure noise	1.3	Pa
Humidity measurement range	0~100	%RH
Humidity accuracy	±3	%RH
Humidity latency (10~90~10 %RH, 25 °C)	±1	%RH
Humidity sensitivity	0.008	%RH
Humidity noise	0.02	%RH
Humidity stability (10~90 %RH, 25 °C)	0.5	%RH/year



Table 2-6. Relation between CAN Bus baudrate and max. update rate

Baudrate (kbps)	Max. Update Rate (Hz)
125	200
250	400
500	400
1000	400

Table 2-7. Relation between LPBUS baudrate and max. update rate

Baudrate (kbps)	Max. Update Rate (Hz)
125	100
250	200
500	400
1000	400

Table 2-8. Default baudrate settings

CAN Bus	RS232/TTL	USB
125kbps	115200bps, 8N1	921600bps, 8N1

III.Connector Pinout

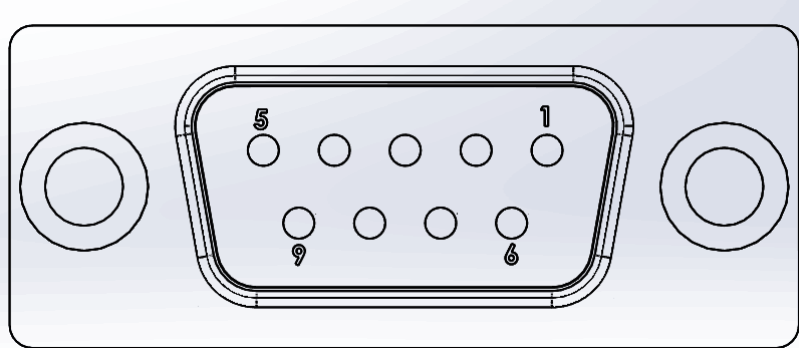


Fig. 3.1 DB9 connector pin number

Table 3-1. Connector signals

Pin no.	Signal	Remark
1	VDD	+5V~+18VDC
2	LPMS-CU2: CAN-	Reserved must be floating.
	LPMS-URS2: RS232_TX	
	LPMS-UTTTL2: Reserved	
3	LPMS-CU2: Reserved	Reserved must be floating.
	LPMS-URS2: RS232_RX	
	LPMS-UTTTL2: Reserved	
4	LPMS-CU2: Reserved	Reserved must be floating.
	LPMS-URS2: Reserved	
	LPMS-UTTTL2: UART_RX	
5	GND	Signal ground
6	GND	Signal ground
7	LPMS-CU2: CAN+	Reserved must be floating.
	LPMS-URS2: Reserved	
	LPMS-UTTTL2: Reserved	
8	LPMS-CU2: Reserved	Reserved must be floating.
	LPMS-URS2: Reserved	
	LPMS-UTTTL2: UART_TX	
9	Reserved	Reserved must be floating.

IV. Mechanical Information

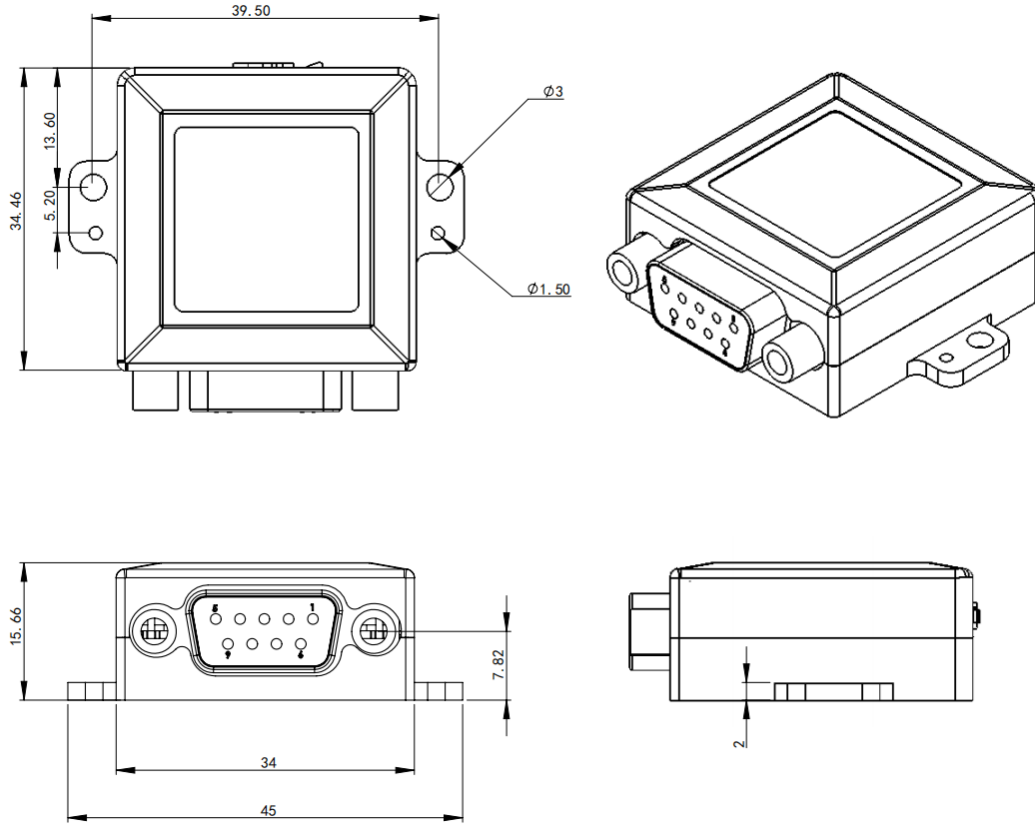


Fig. 4.1. Sensor dimension

