

# AIMS $\mu$ Motion IMU Racing



## FEATURES

- MEMS sensors
- 6 DOF
- Ultra-small size
- Light weight
- Low cost / High performance
- CAN 2.0B interface
- RS-232 interface
- Flexible mounting
- Robust mechanical housing

The AIMS  $\mu$ Motion from KebNi Inertial Sensing is an ultra-small, six degrees of freedom (6 DOF) measurement unit and can be used for analysis of movements, control systems etc.

## TYPICAL APPLICATIONS

- Electronic Stability Control Unit for vehicles
- Throttle Supervising Unit for vehicles
- Active Suspension Control Unit for vehicles
- Evaluation system for movement analysis for vehicles
- Track/road/driver analysis
- Detection of road characteristics for cars and motorbikes
- Six degrees of freedom (6 DOF) measurement system for racing
- Tuning of chassis systems
- Platform/antenna stabilization
- Autonomous vehicle systems
- Racing boats

**Technical Data**

<b>Housing:</b>	Sealed IP67
<b>Physical Dimensions:</b>	49 x 45.3 x 21.8 mm (L x W x H)
<b>Connector A, Power and I/O:</b>	Binder 7-pin Micro (712 99 0421 00 07)
<b>Cable:</b>	PUR $\varnothing$ 5.2 mm, Length 400 mm (Note 1)
<b>Power Supply:</b>	12 VDC typical (8 – 18 VDC)
<b>Output Interface:</b>	CAN 2.0B and RS-232
<b>Operating Temperature Range:</b>	-20°C to +70°C (Note 1)
<b>Storage Temperature Range:</b>	-40°C to +85°C
<b>Weight:</b>	90 grams
<b>Update Rate:</b>	200 samples/second (Note 1)
<b>Vibration Resistance:</b>	6 g <sub>rms</sub> (5 – 200 Hz) 3 g <sub>rms</sub> (200 – 500 Hz)
<b>Shock Resistance:</b>	150 g, half-sine 0.5 ms

**Acceleration Performance**

<b>Range:</b>	$\pm$ 18 g
<b>Bias Error:</b>	7.5 mg, 1 $\sigma$ (Note 2)
<b>Scale Factor Error @ 1 g:</b>	7.5 mg, 1 $\sigma$ (Note 2)
<b>Non-linearity:</b>	1.25 % of FS (Note 3)
<b>Noise:</b>	0.36 mg/ $\sqrt{\text{Hz}}$ (Note 3)
<b>Bandwidth:</b>	30 Hz (Note 1)
<b>Misalignment:</b>	4 mrad (Note 3)

**Angular Rate Performance**

<b>Range:</b>	$\pm$ 150 °/s
<b>Bias Error:</b>	0.3 °/s, 1 $\sigma$ (Note 2)
<b>Scale Factor Error:</b>	0.75 %, 1 $\sigma$ (Note 2)
<b>Non-linearity:</b>	0.75 % of FS (Note 3)
<b>Noise:</b>	0.38 °/s/ $\sqrt{\text{Hz}}$ (Note 3)
<b>Bandwidth:</b>	30 Hz (Note 1)
<b>Misalignment:</b>	4 mrad (Note 3)

*Note 1: Other configurations are available upon request*

*Note 2: Max value over full temperature range*

*Note 3: Max value at +25°C*

**CAN 2.0B INTERFACE**

This is the standard interface with a baud rate of 1 Mbit with an 11 bit identifier and a data update rate of 200 samples/second.

Every sample is delivered on the CAN-bus with two CAN-IDs; one for the accelerometer data and one for the gyroscope data. The byte format is Little-Endian (Intel x86 format) with a SP of 60%. There are 5 TQ before SP and 4 TQ after SP. The synchronization jump width is 2 TQ.

Accelerometers		Gyroscopes	
Output	Value	Output	Value
32767	-704 $\mu$ g	32767	-6400 $\mu^\circ$ /s
32768	0 g	32768	0 $^\circ$ /s
32769	+704 $\mu$ g	32769	+6400 $\mu^\circ$ /s

CAN-ID 1, Identifier: 0x508 (11 bit)

Byte 0-1	Byte 2-3	Byte 4-5
Accelerometer X (16 bit)	Accelerometer Y (16 bit)	Accelerometer Z (16 bit)

CAN-ID 2, Identifier: 0x510 (11 bit)

Byte 0-1	Byte 2-3	Byte 4-5
Gyroscope X (16 bit)	Gyroscope Y (16 bit)	Gyroscope Z (16 bit)

Other interface formats (baud rate, ID etc.) are available upon request.

**RS-232 INTERFACE**

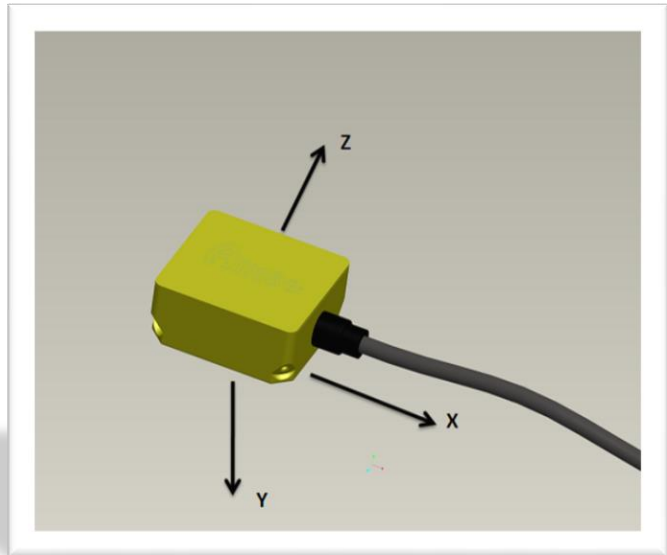
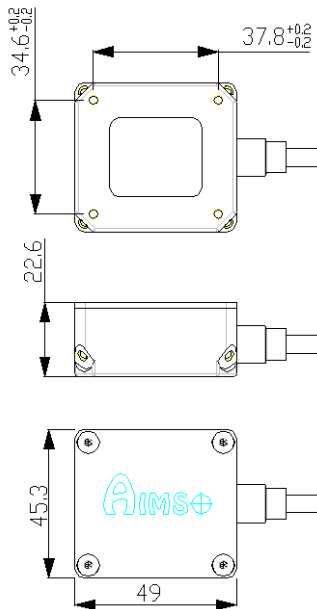
The serial interface is a 115.2 kbps RS-232 link.

The settings for the communication are 1 start bit, 8 data bits, no parity and 1 stop bit.

Accelerometers		Gyroscopes	
Output	Value	Output	Value
32767	-704 $\mu$ g	32767	-6400 $\mu$ °/s
32768	0 g	32768	0 °/s
32769	+704 $\mu$ g	32769	+6400 $\mu$ °/s

Byte No.	Description	Data
0	STARTFLAG	0x7F
1	STARTFLAG	0x7F
2	STARTFLAG	0x7F
3	Gyroscope X	BIT 15 to 8
4	Gyroscope X	BIT 7 to 0
5	Accelerometer X	BIT 15 to 8
6	Accelerometer X	BIT 7 to 0
7	Gyroscope Y	BIT 15 to 8
8	Gyroscope Y	BIT 7 to 0
9	Accelerometer Y	BIT 15 to 8
10	Accelerometer Y	BIT 7 to 0
11	Gyroscope Z	BIT 15 to 8
12	Gyroscope Z	BIT 7 to 0
13	Accelerometer Z	BIT 15 to 8
14	Accelerometer Z	BIT 7 to 0

**MECHANICAL DRAWING**



**PINNING**

Pin	Signal
1	GND
2	TX
3	CANL
4	BOOT
5	CANH
6	RX
7	V-batt

