AIMS Navigation IMU

FEATURES

- **MEMS sensors**
- **6 DOF**
- **High performance**
- **Extended calculation performance**
- **CAN 2.0B interface**
- **2 x RS-232/422/485 interface**
- **Rugged EMC enclosure**
- **Vibration damper available**

The AIMS Navigation IMU from KebNi Inertial Sensing is a high performance six degrees of freedom (6 DOF) Inertial Measurement Unit (IMU) and can be used in for example control and navigation systems for vehicles and boats.
The IMU delivers fully temperature compensated accelerometer and gyro data. The onboard floating-point unit enables implementation of customer specific software upon request.

TYPICAL APPLICATIONS

- Platform stabilisation
- Vehicle and boat control system
- Autonomous and remote operated vehicle systems
- Evaluation system for movement analysis of boats, cars and motorcycles
- Track/road/driver analysis
- Inertial navigation system (INS)
- Adjustment of chassis systems
- Racing boats

Technical data

Technical Data

Housing:	Aluminum, sealed IP67
Physical Dimensions:	86 x 83 x 37 mm (L x W x H, excl. connector)
Connector A, Power and I/O:	M12, 17-pos. female (Phoenix P/N 1419739)
Power Supply:	12/24 VDC typical (8 - 30 VDC), internal filtering complies with ISO 7637-2
Output Interface:	CAN 2.0B and 2 x RS-232/485/422
Operating Temperature Range:	-20°C to +70°C *(Note 1)*
Storage Temperature Range:	-40°C to +85°C
Weight:	400 grams
Update Rate:	200 samples/second *(Note 1)*
Vibration Resistance:	6 g_{rms} (5 - 200 Hz), 3 g_{rms} (200 - 500 Hz) for all directions
Shock Resistance:	150 g, half-sine 0.5 ms

Technical data

Acceleration Performance

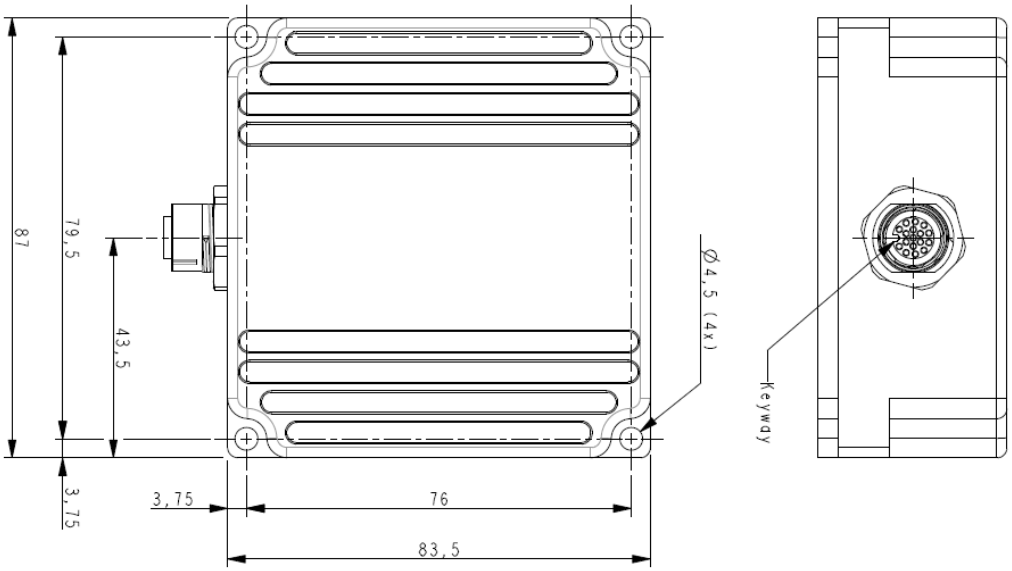
Range:	±2 g *(Note 1)*
Bias Error:	0.6 mg, 1σ *(Note 2)*
In-run Bias Stability	8 µg *(Note 4)*
Scale Factor Error @ 1 g:	0.25 mg, 1σ *(Note 2)*
Non-linearity:	0.8 % of FS *(Note 3)*
Noise:	0.04 mg/√Hz *(Note 3)*
Bandwidth:	15 Hz *(Note 1)*
Misalignment:	1 mrad *(Note 3)*

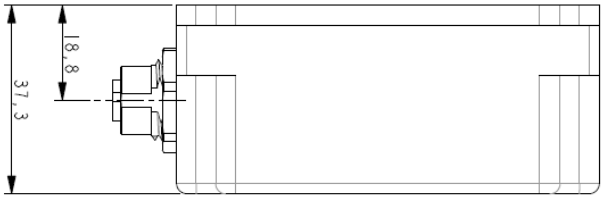
Angular Rate Performance

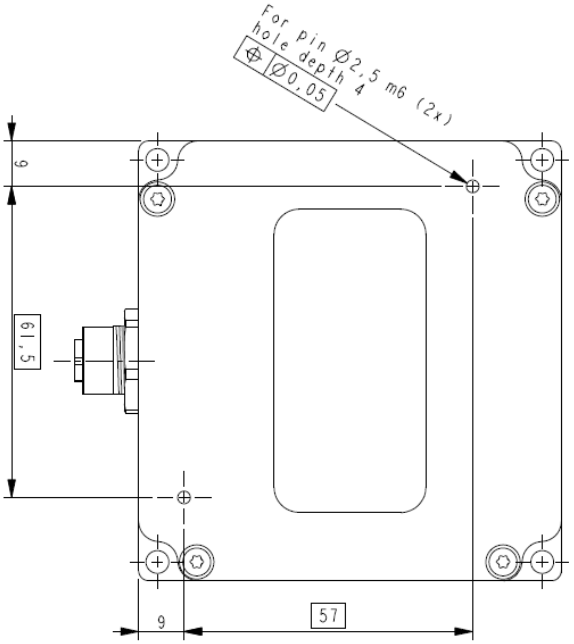
Range:	±120 °/s *(Note 1)*
Bias Error:	0.06 °/s, 1σ *(Note 2)*
In-run Bias Stability	5 °/h *(Note 4)*
Scale Factor Error:	0.06 %, 1σ *(Note 2)*
Non-linearity:	0.25 % of FS *(Note 3)*
Noise:	0.08 °/s/√Hz *(Note 3)*
Bandwidth:	15 Hz *(Note 1)*
Misalignment:	1 mrad *(Note 3)*

Note 1: Other configurations are available upon request
Note 2: Max value over full temperature range
Note 3: Max value at +25°C
Note 4: Allan Variance method, constant temperature, typical value

MECHANICAL DRAWING



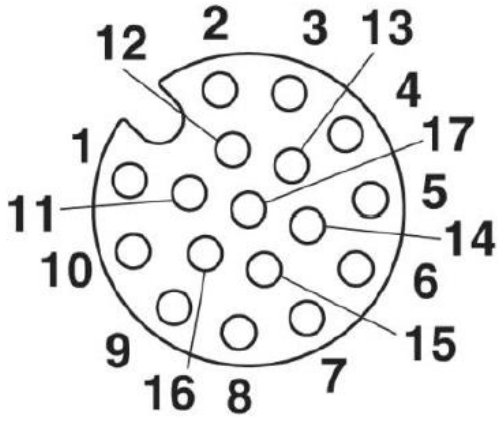




PIN ASSIGNMENT

Pin no.	Signal
1	PWR
2	BOOT
3	GND
4	B RS232RX/RS422RX+
5	B RS422TX+
6	B RS422RX-
7	CANH
8	B RS232TX/RS422TX-
9	RESET
10	CANL
11	A RS232RX/RS422RX+
12	A RS422RX-
13	A RS422TX+
14	A RS232TX/RS422TX-
15	RS232/RS422 Select A*
16	RS232/RS422 Select B*
17	RSGND

** Set to high for RS232, floating or grounded for RS422/RS485*
Only serial port "A" is used as standard



17-pos. M12 connector, female

COORDINATE SYSTEM

CAN 2.0B INTERFACE

The CAN interface has 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 three CAN-IDs; one for each axis. The byte format is Big-Endian (Motorola format) with a sampling point of 60%. There are 5 time quanta before sampling point and 4 time quanta after SP. The synchronization jump width is 2 time quanta.

Data	Format	Size	LSB
Accelerometers	Two complement	24 bit	0.25 µg
Gyros	Two complement	24 bit	16 µ°/s
Temperature	Binary	8 bit	0.5 °C

Temperatures are offset, 45 °C (0 = -45 °C)

CAN-ID 1, Identifier: 0x210

Byte 0-2	Byte 3	Byte 4-6	Byte 7
Gyro X (24bit)	Temp Gyro X (8bit)	Acc X (24bit)	Temp Acc X (8bit)

CAN-ID 2, Identifier: 0x214

Byte 0-2	Byte 3	Byte 4-6	Byte 7
Gyro Y (24bit)	Temp Gyro Y (8bit)	Acc Y (24bit)	Temp Acc Y (8bit)

CAN-ID 3, Identifier: 0x224

Byte 0-2	Byte 3	Byte 4-6	Byte 7
Gyro Z (24bit)	Temp Gyro Z (8bit)	Acc Z (24bit)	Temp Acc Z (8bit)

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

RS-232/422/485 INTERFACE: Sensor data

The serial interface is a 115.2 kbps link with an update rate of 200 samples/s. The settings for the communication are 1 start bit, 8 data bits, no parity and 1 stop bit. Data format (scale factor etc.) is the same as for the CAN-interface.

Byte No.	Description	Data
0	STARTFLAG	0x7F
1	STARTFLAG	0x7F
2	STARTFLAG	0x7F
3	Gyro X	BIT 23 to 16
4	Gyro X	BIT 15 to 8
5	Gyro X	BIT 7 to 0
6	Temp gyro X	BIT 7 to 0
7	Acc X	BIT 23 to 16
8	Acc X	BIT 15 to 8
9	Acc X	BIT 7 to 0
10	Temp acc X	BIT 7 to 0
11	Gyro Y	BIT 23 to 16
12	Gyro Y	BIT 15 to 8
13	Gyro Y	BIT 7 to 0
14	Temp gyro Y	BIT 7 to 0
15	Acc Y	BIT 23 to 16
16	Acc Y	BIT 15 to 8
17	Acc Y	BIT 7 to 0
18	Temp acc Y	BIT 7 to 0
19	Gyro Z	BIT 23 to 16
20	Gyro Z	BIT 15 to 8
21	Gyro Z	BIT 7 to 0
22	Temp gyro Z	BIT 7 to 0
23	Acc Z	BIT 23 to 16
24	Acc Z	BIT 15 to 8
25	Acc Z	BIT 7 to 0
26	Temp acc Z	BIT 7 to 0
27	Checksum	BIT 7 to 0

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