

# AIMS FOG02 IMU



## FEATURES

- Fiber optic gyroscopes
- 6 DOF
- High performance
- Floating point unit
- CAN 2.0B interface
- RS-232/485/422 interface
- Rugged EMC enclosure

The AIMS FOG02 IMU from KebNi Inertial Sensing is a high performance six degree of freedom (6 DOF) Inertial Measurement Unit (IMU) and can be used in for example control and navigation systems. The IMU is equipped with Fiber Optic Gyros (FOG) for demanding applications where high gyro performance are required. The IMU delivers fully temperature compensated accelerometer and gyro data.

## TYPICAL APPLICATIONS

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



Technical data

**Technical Data**

<b>Housing:</b>	Aluminum, sealed IP67
<b>Physical Dimensions:</b>	103 x 102 x 68.3 mm (L x W x H excl. connector)
<b>Connector A, Power and I/O:</b>	D38999/24ZB35PN
<b>Power Supply:</b>	12/24 VDC typical (8 - 30 VDC)
<b>Output Interface:</b>	CAN 2.0B and RS-232/485/422
<b>Operating Temperature Range:</b>	-20°C to +50°C <i>(Note 1)</i>
<b>Storage Temperature Range:</b>	-40°C to +85°C
<b>Weight:</b>	0.5 kg
<b>Update Rate:</b>	200 samples/second <i>(Note 1)</i>
<b>Vibration Resistance:</b>	2 g <sub>rms</sub> (5 - 200 Hz)
<b>Shock Resistance:</b>	40 g, half-sine 0.5 ms

**Acceleration Performance**

<b>Range:</b>	$\pm 10$ g (Note 1)
<b>Bias Error:</b>	2 mg, $1\sigma$ (Note 2)
<b>Scale Factor Error @ 1 g:</b>	0.25 mg, $1\sigma$ (Note 2)
<b>Non-linearity:</b>	0.9 % of FS (Note 3)
<b>Noise:</b>	0.18 mg/ $\sqrt{\text{Hz}}$ (Note 3)
<b>Bandwidth:</b>	60 Hz (Note 1)
<b>Misalignment:</b>	3 mrad (Note 3)

**Angular Rate Performance**

<b>Range:</b>	$\pm 120$ °/s (Note 1)
<b>Bias Error:</b>	0.008 °/s, $1\sigma$ (Note 2)
<b>In-run Bias Stability</b>	1 °/h (Note 4)
<b>Scale Factor Error:</b>	0.15 %, $1\sigma$ (Note 2)
<b>Non-linearity:</b>	0.5 % of FS (Note 3)
<b>Noise:</b>	0.001 °/s/ $\sqrt{\text{Hz}}$ (Note 3)
<b>Bandwidth:</b>	60 Hz (Note 1)
<b>Misalignment:</b>	2 mrad (Note 3)

Note 1: Other configurations are available upon request

Note 2: Max value over full temperature range

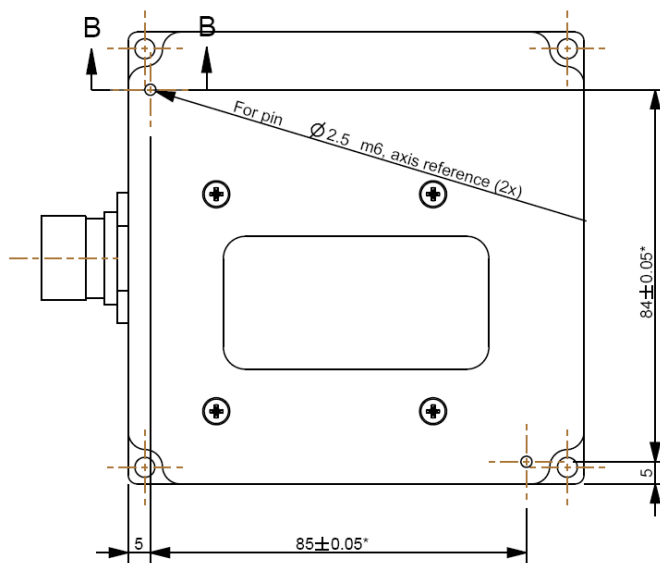
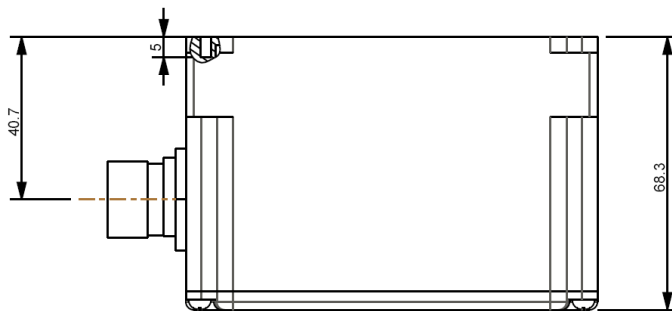
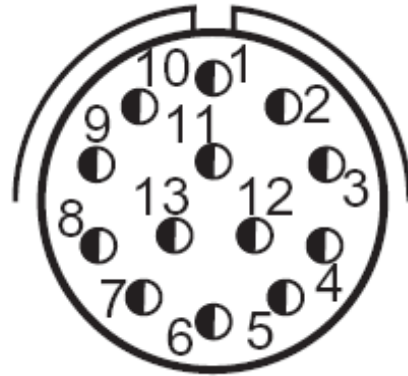
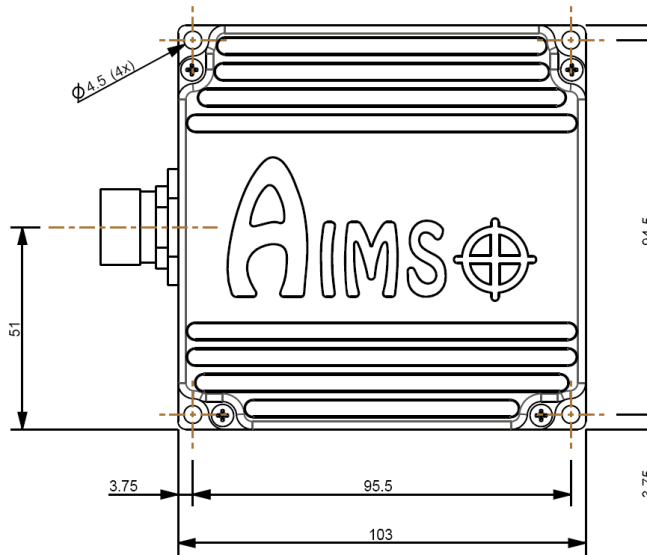
Note 3: Max value at +25°C

Note 4: Allan Variance method, constant temperature, typical value

# AIMS FOG02

1011230214

## MECHANICAL DRAWING



\* Tolerance for pin placement

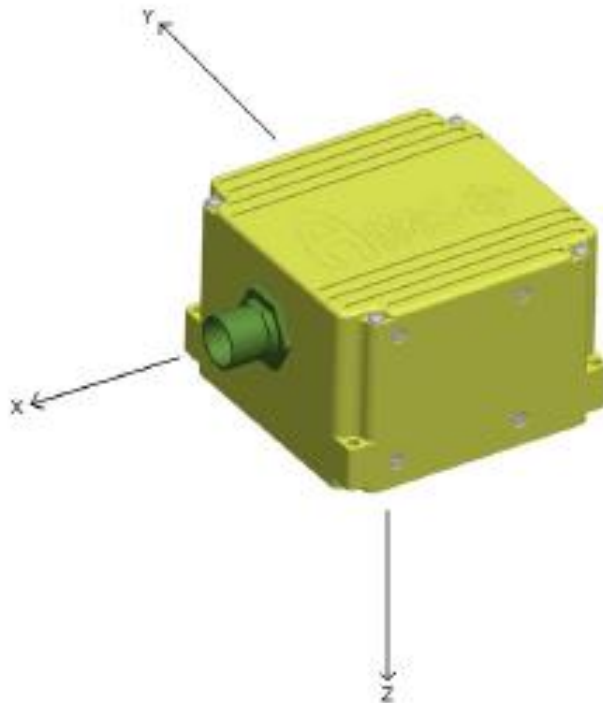
## PIN ASSIGNMENT

## 1011230214

Pin no.	Signal
1	Input Power
2	RS422RX-
3	RS422RX+ / RS232 RX
4	RS422TX- / RS232 TX
5	RS422TX+
6	CAN L
7	CAN H
8	Serial Boot
9	Reset
10	N/C
11	GND
12	SELRS *
13	GND Return SELRS *

\* Connect pin 12 with 13 for RS232 operation,  
not connected for RS422/RS485 operation.

### COORDINATE SYSTEM



**1011230214****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 80%. There are 12 time quanta before sampling point and 3 time quanta after SP.

Data	Format	Size	LSB
Accelerometers	Two complement	24 bit	1.25 $\mu\text{g}$
Gyroscopes	Two complement	24 bit	40 $\mu\text{/s}$
Temperature	Binary	8 bit	0.5 $^{\circ}\text{C}$

Temperatures are offset, 45  $^{\circ}\text{C}$  ( 0 = -45  $^{\circ}\text{C}$ )

CAN-ID 1, Identifier: 0x210

Byte 0-2	Byte 3	Byte 4-6	Byte 7
GyroX (24bit)	Temp GyroX (8bit)	AccX (24bit)	Temp AccX (8bit)

CAN-ID 2, Identifier: 0x214

Byte 0-2	Byte 3	Byte 4-6	Byte 7
GyroY (24bit)	Temp GyroY (8bit)	AccY (24bit)	Temp AccY (8bit)

CAN-ID 3, Identifier: 0x224

Byte 0-2	Byte 3	Byte 4-6	Byte 7
GyroZ (24bit)	Temp GyroZ (8bit)	AccZ (24bit)	Temp AccZ (8bit)

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

**RS-232/RS-485/RS-422 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	GyroX	BIT 23 to 16
4	GyroX	BIT 15 to 8
5	GyroX	BIT 7 to 0
6	Temp gyroX	BIT 7 to 0
7	AccX	BIT 23 to 16
8	AccX	BIT 15 to 8
9	AccX	BIT 7 to 0
10	Temp accX	BIT 7 to 0
11	GyroY	BIT 23 to 16
12	GyroY	BIT 15 to 8
13	GyroY	BIT 7 to 0
14	Temp gyroY	BIT 7 to 0
15	AccY	BIT 23 to 16
16	AccY	BIT 15 to 8
17	AccY	BIT 7 to 0
18	Temp accY	BIT 7 to 0
19	GyroZ	BIT 23 to 16
20	GyroZ	BIT 15 to 8
21	GyroZ	BIT 7 to 0
22	Temp gyroZ	BIT 7 to 0
23	AccZ	BIT 23 to 16
24	AccZ	BIT 15 to 8
25	AccZ	BIT 7 to 0
26	Temp accZ	BIT 7 to 0

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