2D Debus & Diebold Meßsysteme GmbH, Alte Karlsruher Str. 8, D-76227 Karlsruhe
Tel.: +49(0)721 94485-0 **Fax.:** +49(0)721 94485-29 **Mail:** mail@2d-datarecording.com

BC-3Axx_3Gyyyy-000 **Box CAN, 3 axes accelerometer, 3 GYRO**

Key Features:

- *6 axes inertia sensor with optimized axes alignement*
- *Individual range selection for accelerometers (±2/4/8/16G) and gyros (±250/500/1000/2000°/s)*
- *Fully programmable CAN Interface(Baudrate/CAN Identifiers)*
- *Built-in coordinate transformation for non-orthogonal mounting compensation*
- *Programmable phase corrected sensor filters for all axes*
- *Additional IIR filter for individual adjustment for all axes*
- *USER programmable channels for additional online mathematical calculations*
- *Roll-angle calculation*
- *Internal sampling with 1600Hz@16bit resolution*
  Output sampling rate free programmable
- *Internal calibration, temperature compensation and physical unit calculation; USER programmable*

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Technical Specifications

Specification 3 axis acceleration	
Range switchable with 3 axis	±2, ±4,±8,±16 G
Error of linearity	<1 % FS
Lowpass filter response(programmable)	5 to 250Hz
Specification yaw-rate sensor	
Sensitivity	± 250,500,1000,2000 °/s
Error for linearity	<1% FS
Lowpass filter response(programmable)	5 to 250 Hz
CAN Output	
CAN ID	User programmable
Transmission rate, programmable by user	from 25 to 800 Hz
Transmission rate, preset to	100Hz
CAN ID 3 axes ACC preset to	0x498
3 axes gyro preset to	0x499
see 2nd page for CAN identifier allocation	
Operating status indicator	
Red LED flashing	
Electrical characteristics	
Power supply	8 – 18 VDC
Consumption @ 12V	40 mA

Mechanical characteristics	
Dimensions	44 x 34 x 15 mm
Weight (incl. cable)	60 g
Housing material	Aluminium
Cable	
type	Raychem EPD
wire cross section	4 x AWG26
length	400 mm
Environmental data	
Operating temperature	-10 to 75 °C
Temperature compensation	25 to 75 °C
Humidity	5 to 95 %
Sealing class	IP 67
Vibration resistance	
Shock	50 G
during a time period of	10 ms
Vibration tested at	12 G
with a frequency of	1000 Hz
Ordering Information	
Use this article number for your order at 2D:	
3 axis ACC, 3 axis Gyro	BC-3Axx3Gyyyy-000

Formula to calculate IIR-filter (ACC_X_IIR – GYRO_Z_IIR; optional)

General:

Every axis is internally sampled with 1600Hz; depending on transmiting (sampling) rate, automatically an average signal is calculated.

Example: If 100Hz transmission rate is selected, every 16 samples are averaged.

Please note: sampling rate for IIR channel can never exceed sampling rate of source channel

Calculation of Filter frequency:

Each IIR channel is directly linked to the original channel with the same name. Using the parameter “filter” you can set the desired filter frequency as follows:

$$f_{out} = \frac{f_{sample}}{2^{filter}}$$

Example: Filterstep 4; Samplingrate$_{(original\ channel)}$ 200Hz→ filter frequency 12.5Hz

Averaging:

If the samplingrate of an IIR channel is set lower than the rate of the dedicated origin channels, an average is calculated by the ratio of origin channel to IIR channel.

Example: If the origin channel is set to 400 Hz and the IIR channel is set to 100 Hz, an additional average of 4 is calculated.

Rotation channel group (ACC_X_ROT – GYRO_X_ROT; optional)

The rotation channels are linked directly to the IIR channels, every change of standard and IIR channel will influence the rotation channel. The misalignment can be compensated by entering the mounting angles in comparison to the orthographic system to the rotation channels.

Example: If sensor is tilt 10 degree forward and mounted upright, mounting angles to insert are: x=90°; y=10°; z=10°

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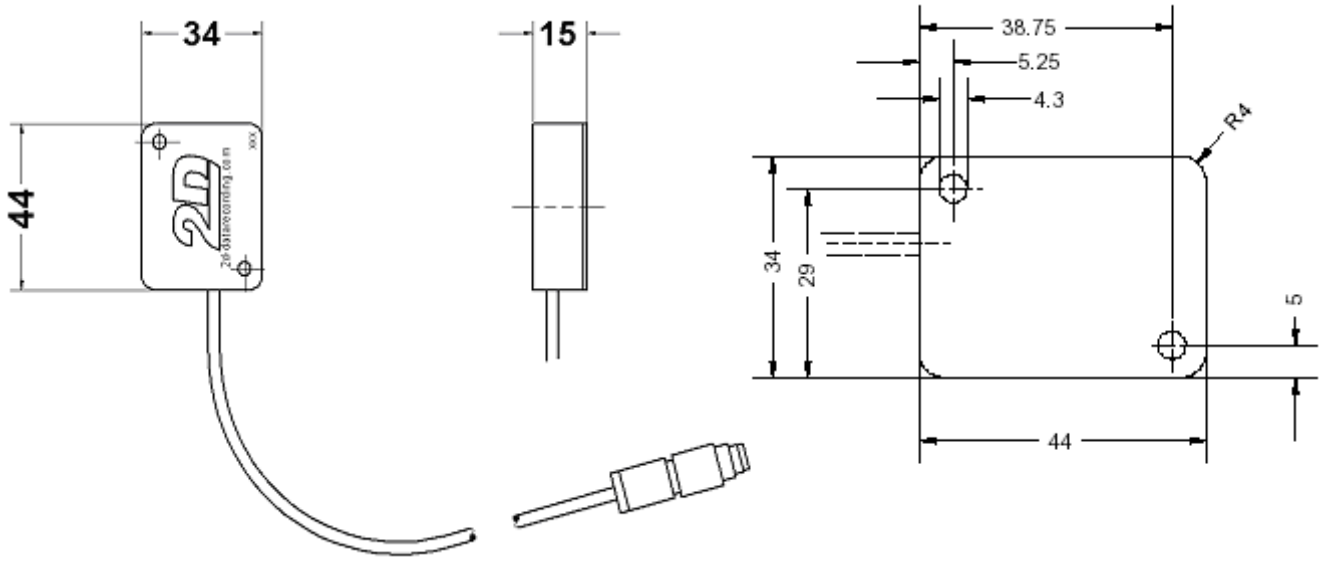
Dimensions



CAN identifier allocation

CAN ID (default)

CAN-ID	Byte 0 Hi	Byte 1 Lo	Byte 2 Hi	Byte 3 Lo	Byte 4 Hi	Byte 5 Lo	Byte 6 Hi	Byte 7 Lo
0x498	ACC_X		ACC_Y		ACC_Z		T_ACC	
0x499	GYRO_X		GYRO_Y		GYRO_Z		T_GYRO	
0x000*	ACC_X_IIR		ACC_Y_IIR		ACC_Z_IIR		T_ACC_IIR	
0x000*	GYRO_X_IIR		GYRO_Y_IIR		GYRO_Z_IIR		T_GYRO_IIR	
0x000*	ACC_X_ROT		ACC_Y_ROT		ACC_Z_ROT		T_ACC_IIR	
0x000*	GYRO_X_IIR		GYRO_Y_IIR		GYRO_Z_IIR		T_GYRO_IIR	

*optional

Formulas to calculate physical values

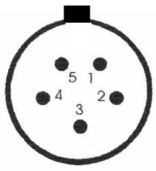
Channel		Multiplicator				Offset
ACC_X [m/s^2]	=	0,005	*	digits	-	163,835
ACC_Y [m/s^2]	=	0,005	*	digits	-	163,835
ACC_Z [m/s^2]	=	0,005	*	digits	-	163,835

Channel		Multiplicator				Offset
GYRO_X [°/s]	=	0,01	*	digits	-	327,67
GYRO_Y [°/s]	=	0,01	*	digits	-	327,67
GYRO_Z [°/s]	=	0,01	*	digits	-	327,67

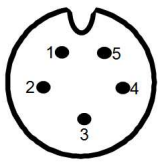
Connector Layout

Pin	Name	Description	Color
1	CAN H	CAN Bus High	White
2	CAN L	CAN Bus Low	Green
3	GND	Ground	Black
4	n.c.	Not Connected	-
5	Vext	Power in (8 – 18V)	red

Connector type



Binder 719, 5 PF
(front side)
mating plug



Binder 719, 5 PM
(front side)
plug @ module

On request other options are possible for the CAN-line connector of all 2D CAN modules.

Please take a look at the product group [Connectors] in the 2D Product catalog.

12.10.2012

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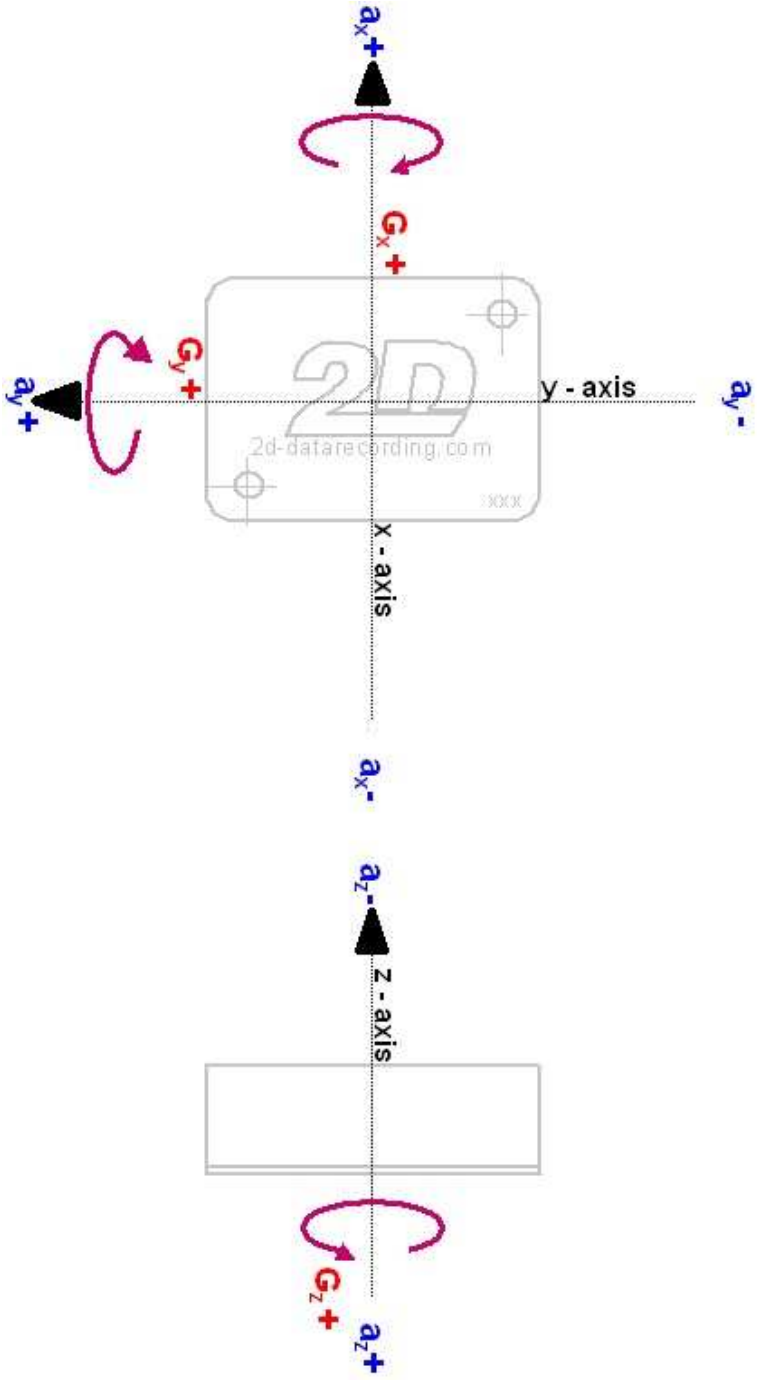
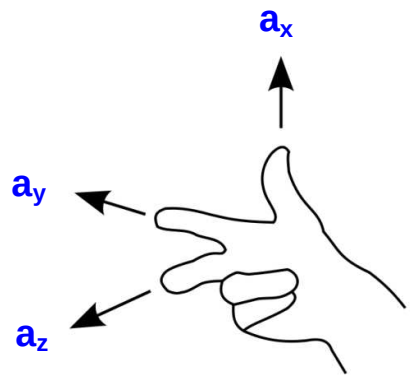
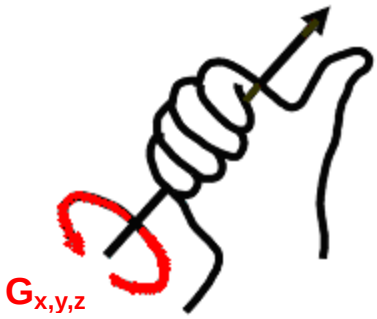
Supplementary Sheet

The Figure shown beneath shows the “correct directions” for the accelerometers in three directions (x, y and z) as well as the three included gyros. The directions are essential if you calibrate this sensor using WinIt.





“right-hand rule“ for orientation of axis a $_{x,y,z}$



“right-hand rule“ for gyro sense of rotations