

Inertial Measurement Unit (RLVBIMU04)



Racelogic's Inertial Measurement Unit (RLVBIMU04-V2) provides highly accurate measurements of roll, pitch, and yaw rate using three gyroscopes, as well as X, Y, Z accelerations via three accelerometers. The IMU is fully calibrated for temperature effects, scale factor, bias and misalignment errors.

The RLVBIMU04 is designed for use either as a stand-alone sensor with simple connection and configuration via the CAN or serial interface, or for use with VBOX data loggers when the IMU can be precisely synchronised to GNSS time.

When used as an inertial navigation system (INS) in conjunction with VBOX 3i, data from the IMU can be seamlessly integrated with GNSS to produce accurate position, velocity and body angles, even when satellite signal reception is interrupted or degraded.

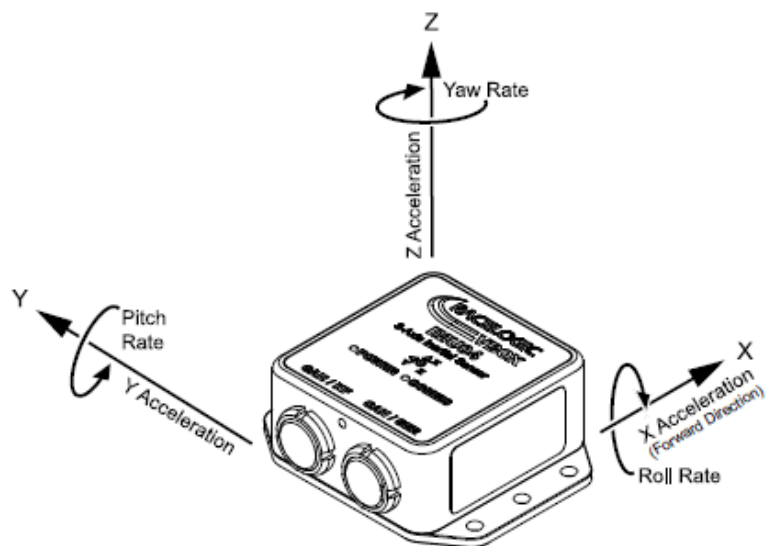
The RLVBIMU04 is constructed with a splash-proof casing, which is rated to IP67*, making it ideal for use on boats or in harsh environments, as well as automotive testing.

*providing unused connectors are fitted with Lemo blanking plugs (RLACS080)



Features

- $\pm 450^\circ/\text{s}$ angular rate range in each axis
- $\pm 20 \text{ g}$ acceleration range in each axis
- Internal temperature compensation
- $0.00085^\circ/\text{s}$ angular rate resolution
- 0.00004 g acceleration resolution
- CAN or Serial interface
- Integration with GNSS for consistent and accurate data in weak/degraded satellite signal conditions.
- Splash proof: IP65 rating / IP67 providing unused connectors are fitted with Lemo blanking plugs (RLACS080).
- 0.06° (RMS) roll/pitch accuracy and 0.5° (RMS) yaw angle accuracy when used as an INS in conjunction with a VBOX 3i.



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Specification

Gyroscopes (Angular rate sensors) ¹	
Dynamic range	±450 °/s
Nonlinearity (% of full scale)	0.01%
Effective resolution ²	20 bits (0.00085 °/s)
Bandwidth	50 Hz
Noise density (Random walk)	0.01 °/s/√Hz (0.6 °/√hr)
Bias stability	±0.0028 °/s
Bias repeatability (1 year)	0.2 °/s
Accelerometers¹	
Range	±20 g
Nonlinearity (± 1 g) ³	typical 0.03 % FS; max. 0.05 % FS
Effective resolution ²	20 bits (0.00004 g)
Bandwidth	50 Hz
Noise density (Random walk)	90 µg/√Hz (0.055 m/s/√hr)
Bias stability	15 µg
Bias repeatability (1 year)	0.005 g
Temperature Sensor	
Temperature calibration range	-40°C to 105°C
Temperature resolution	0.1°C
Current	~150 mA
Voltage	8 – 30 V DC.
Operating Temperature	-40°C to +85°C
Max Ratings (Shock)	Powered (0.5ms): 2000g
Dimensions	60 x 76 x 29 mm
Output rate	100 Hz
Channels	Roll Rate, Pitch Rate, Yaw Rate, X Acceleration, Y Acceleration, Z Acceleration and Temperature

¹Please note: Inertial measurement sensors are highly sensitive mechanical systems. Their performance and life span can be impacted by severe vibration or heavy knocks, and we can only guarantee the gyroscope and accelerometer specifications for a maximum of 2 years from the date of purchase.

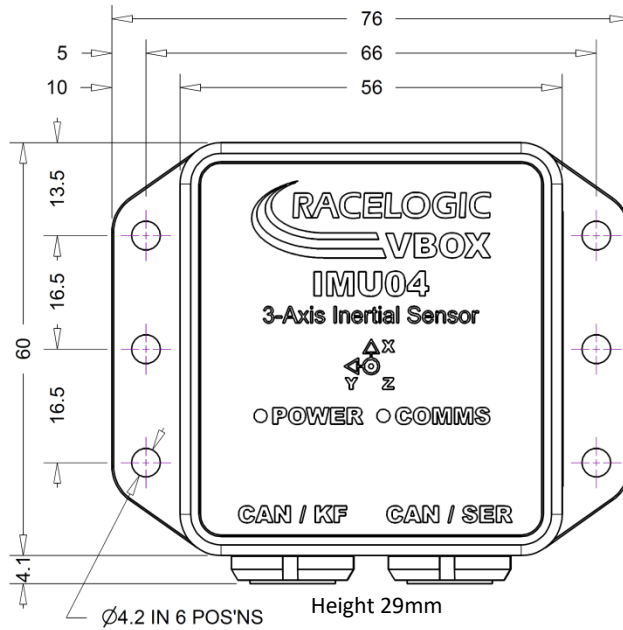
²Effective resolution is after allowing for oversampling and averaging.

³For full scale range of ± 20g the nonlinearity is 0.1%.

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Dimensions



Lemo Socket Connections CAN / SER

Pin	I/O	Function
1	O	TxD, Serial Data Transmit – Configuration – RS232
2	I	RxD, Serial Data Receive – Configuration – RS232
3	I/O	CAN High
4	I/O	CAN Low
5		+ V Power 7 V to 30 V DC
Chassis		Ground

Lemo Socket Connections CAN / KF

Pin	I/O	Function
1	O	TxD, Serial Data Transmit – RS232
2	I	RxD, Serial Data Receive – RS232
3	I/O	CAN High
4	I/O	CAN Low
5		+ V Power 7 V to 30 V DC
6	I	1PPS
Chassis		Ground