Inertial Measurement Unit

(RLVBIMU04)

Racelogic's Inertial Measurement Unit (RLVBIMU04) provides highly accurate measurements of pitch, roll, and yaw rate using three rate gyros, as well as x, y, z acceleration via three accelerometers. The CAN based unit is temperature compensated and has improved calibration and stability.

The RLVBIMU04 is designed for use either as a stand-alone sensor with simple connection and configuration via the CAN bus interface, or for use with VBOX GPS data loggers.

When used in conjunction with VBOX 3i, data from the IMU can be seamlessly integrated with GPS to produce pitch and roll angle accurate to 0.1˚ (RMS) as well as smoother velocity data. This ensures GPS data even when satellite reception is interrupted.

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

Using synchronous 16bit sampling for each of the internal sensors provides a high degree of accuracy, with yaw rate resolution typically 0.014 degrees per second and acceleration resolution down to 0.15 mg.

Features

- Yaw rate range ±450˚/s

- Acceleration range ±5 g in each axis

- Internal temperature compensation

- Yaw rate resolution 0.014˚/s

- Acceleration resolution 0.15 mg

- CAN Bus interface

- Integration with GNSS for consistent and accurate data in weak/degraded satellite signal conditions.

- Splash proof: IP67 rating

- 0.1˚ (RMS) pitch/roll accuracy and 0.5˚ (RMS) yaw angle accuracy when used in conjunction with a VBOX3i
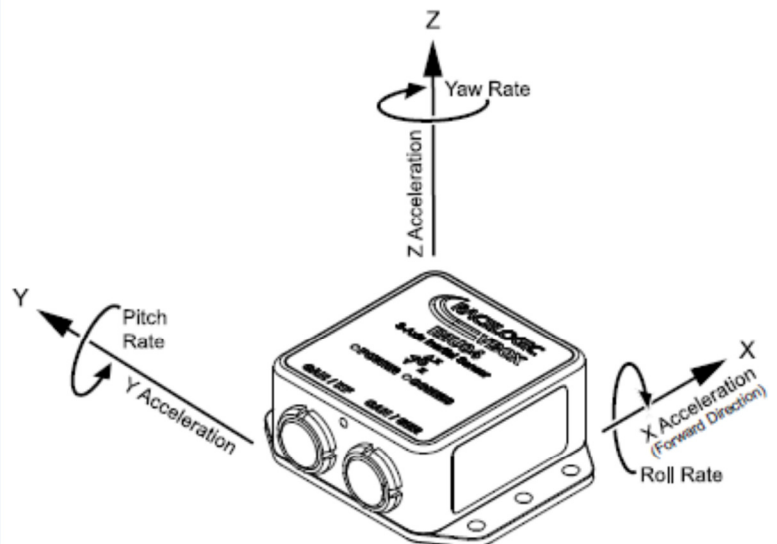
Specification

Specification	
Gyroscopes (Angular rate sensors)	
Dynamic range	Full-Scale: ±450°/s
Nonlinearity	% of full scale: 0.01%
Resolution	16 bit ADC (0.014 °/s)
Bandwidth	50 Hz
Noise density	0.015 °/s/√Hz
Bias stability	±0.0035 °/s
Bias repeatability (1 year)	0.5 °/s
Accelerometers	
Range	±5G
Nonlinearity	% of full scale: 0.03 %
Resolution	16 bit ADC (0.15 mg)
Bandwidth	50 Hz
Noise density	150 µg/√Hz
Bias stability	40 µg
Bias repeatability (1 year)	0.005 g
Temperature Sensor	
Temperature calibration range	0˚C to 55˚C
Temperature resolution	0.1˚C
Maximum Power Consumption	1.7W
Typical Power Consumption	1.3W
Voltage	7 – 30V DC.
Operating Temperature	-20 to +70 ˚C
Maximum Ratings (Shock)	Powered (0.5ms): 2000g

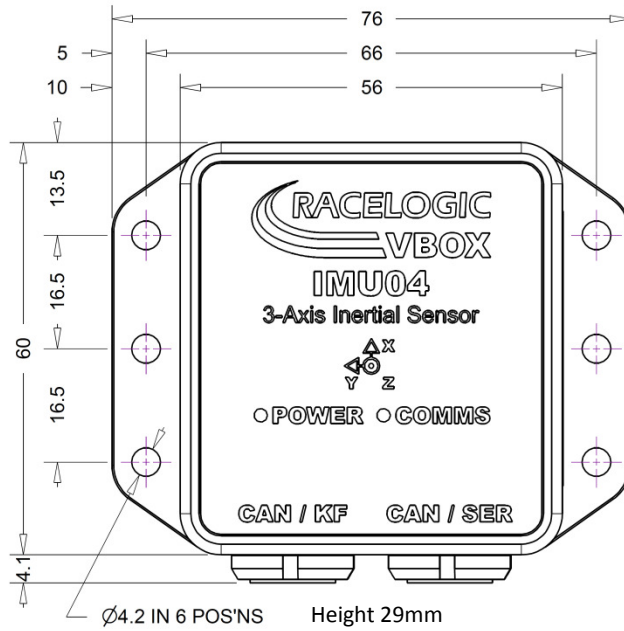## Outputs

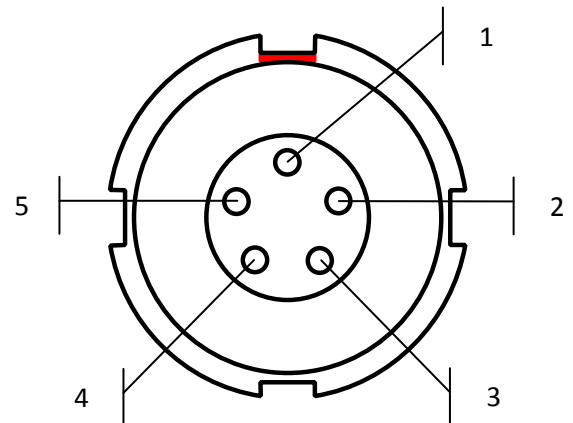| Outputs	
Number of Channels	7
Channel Names	Yaw Rate, Pitch Rate, Roll Rate, X Acceleration, Y Acceleration, Z Acceleration, Temperature

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 7V to 30V 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 7V to 30V DC
6	I	1PPS
Chassis		Ground