Inertial Measurement Unit

(RLVBIMU05)

The IMU05 (RLVBIMU05) is an advanced inertial measurement unit that offers precise measurements of roll, pitch, and yaw rate through three industry leading high-precision gyroscopes which have a bias stability of 1.2 degrees per hour.

Additionally, it provides X, Y, and Z acceleration data with the help of three accelerometers. The IMU is fully calibrated to account for temperature effects, scale factor, bias, and misalignment errors.

Designed to be versatile, the RLVBIMU05 can be used as a standalone sensor with easy connectivity and configuration options through the CAN or serial interface. Alternatively, it can be used in conjunction with VBOX data loggers, allowing for precise synchronisation to GNSS time.

When utilised as an inertial navigation system (INS) together with VBOX 3i or VBOX 4, the RLVBIMU05 seamlessly integrates IMU data with GNSS to generate accurate position, velocity, and body angles. This integration ensures reliable measurements even in situations where satellite signal reception is disrupted or compromised.

The RLVBIMU05 features a splash-proof casing, rated IP67, which makes it suitable for demanding environments such as boat applications or automotive testing. To maintain the IP67 rating, it's important to ensure unused connectors are fitted with Lemo blanking plugs (RLACS080).

Features

- ±450°/s angular rate range in each axis

- ±4 g acceleration range in each axis

- Internal temperature compensation

- 2.5×10^{-10} °/s angular rate resolution

- 5×10^{-14} 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 if fitted with Lemo blanking plugs (RLACS080).

- 0.02° (RMS) roll/pitch angle, 0.1° (RMS) yaw angle and 0.15° (RMS) slip angle accuracy when used as an INS in conjunction with a VBOX 4.

VBOX AUTOMOTIVE

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Specifications

Gyroscopes (Angular rate sensors) [1]	
Dynamic range	±450 °/s
Bias stability[2]	±1.2 °/h
Angle random walk (ARW)[2]	0.08 °/√h
Scale factor	0.05%

Accelerometers[1]	
Dynamic range	±4 g
Bias stability[2]	14 µg
Velocity random walk (VRW)[2]	0.02 (m/s)/√h
Scale factor	0.1%
Linearity (% of full-scale range)	0.1%

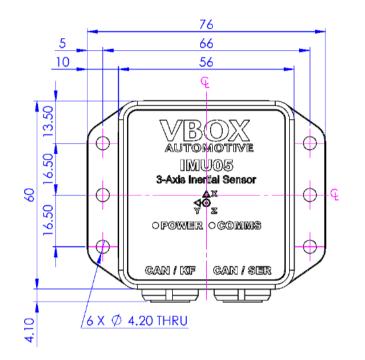| Physical and Environmental	
Dimensions	60 x 76 x 29 mm
Mass	160g
Input Voltage	7 – 30 V DC
Power consumption	< 1W
Operating temperature	-40°C to +85°C
Environmental protection	IP65 rating / IP67 with RLACS080 blanking plugs
Shock survival	1000 g (Half-sine, 0.5msec)

[1]Please 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.
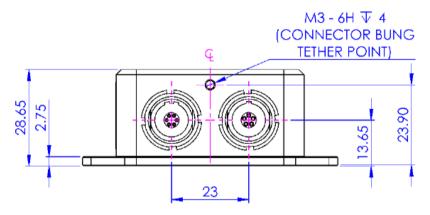
[2] 1- sigma i.e. 1 standard deviation

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Dimension Drawings

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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	

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