

Inertial Measurement Unit (RLVBIMU05-S)



The IMU05-S (RLVBIMU05-S) is an advanced inertial measurement unit that offers precise measurements of roll, pitch, and yaw rate through three best in class MEMS high-precision gyroscopes which have a bias stability of only 0.8 deg/hr.

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-S 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, the RLVBIMU05-S 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 IMU05-S 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

- 0.8°/hr bias drift
- $\pm 450^\circ/\text{s}$ angular rate range in each axis
- $\pm 10\text{ g}$ acceleration range in each axis
- Internal temperature compensation
- $2.5 \times 10^{-10} \text{ }^\circ/\text{s}$ angular rate resolution
- $6 \times 10^{-13}\text{ g}$ 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 accuracy and $<0.1^\circ$ (RMS) yaw angle accuracy when used as an INS in conjunction with a VBOX 3i.

Inertial Measurement Unit (RLVBIMU05-S)



Specifications

| Gyroscopes (Angular rate sensors) ¹ | |
|--|----------|
| Dynamic range | ±450°/s |
| Bias stability ² | ±0.8°/h |
| Angle random walk (ARW) ² | 0.06°/√h |
| Scale factor | 0.05% |

| Accelerometers ¹ | |
|---|----------------|
| Dynamic range | ±10 g |
| Bias stability ² | 12 µg |
| Velocity random walk (VRW) ² | 0.025 (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 | 160 g |
| 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, 0.5 msec) |

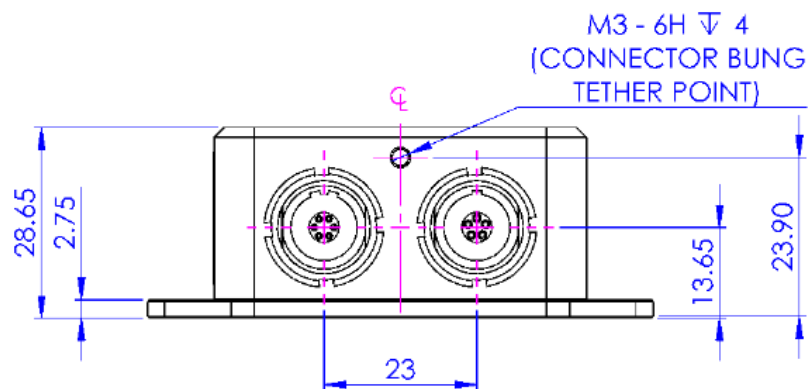
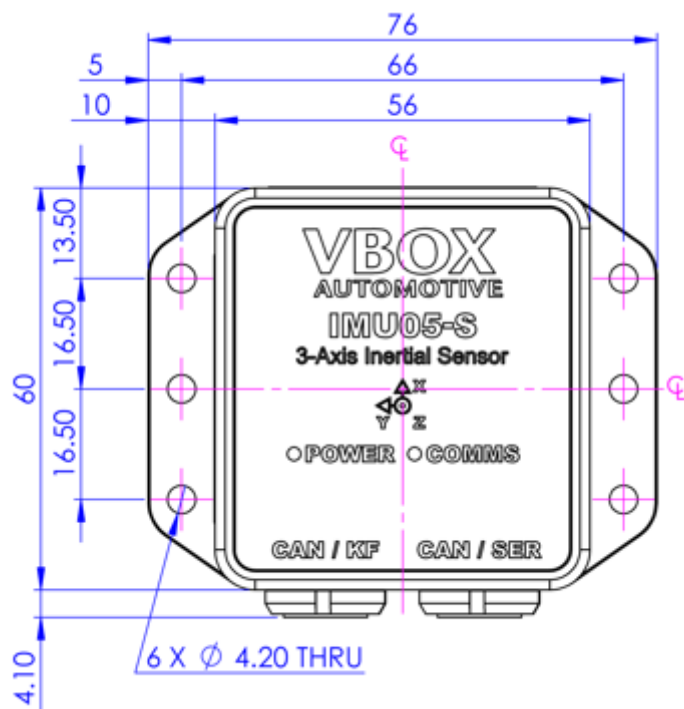
¹Please note: Inertial measurement sensors are highly sensitive mechanical systems. Their performance and life span can be impacted by severe vibration or heavy knocks, and we can only guarantee the gyroscope and accelerometer specifications for a maximum of 2 years from the date of purchase.

² 1- sigma i.e. 1 standard deviation

Inertial Measurement Unit (RLVBIMU05-S)



Dimension Drawings



Inertial Measurement Unit (RLVBIMU05-S)



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 | |