AIT

IMU-4663-R07 Series
High-Precision Inertial Measurement

Technical Manual

V1.0

High-Precision Inertial Measurement

IMU-4663-R07

FEATURES

- Quadrature Compensation
- Gyro Range: ±500°/s
- Accelerometer Range: ±20g, Optional ±5g, ±50g
- RS422 Interface Output
- Wide Temperature Range: −40°C ~ +85°C
  Temperature Compensation
- Small Size: 1.76 × 1.52 × 0.85 (inch)
  44.8 × 38.6 × 21.5 (mm)

APPLICATIONS

- Pipeline Survey Engineering
- Construction Machinery
- Stable Platform
- Autonomous Driving
- Navigation Platform
- Under Water Robot Navigation
- Unmanned Aerial Vehicle

DESCRIPTION

IMU-4663-R07 uses highly reliable MEMS accelerometers and gyroscopes. The inertial data deviation is estimated by the 6-state Kalman filter with appropriate gain, and the measurement accuracy is ensured by the algorithm. The original data is compensated by nonlinearity, quadrature compensation, various compensations such as temperature compensation and drift compensation can greatly eliminate errors and improve product accuracy. This product has a digital interface, which can be easily integrated into the system.

SPECIFICATIONS

Table 1.

Parameter		Min.	Typ.	Max.	Unit/Note
Power Supply Voltage			5		V DC
Operating Current			200		mA
Operating Temperature Range		−40		85	°C
Gyro	Resolution		0.00006		°/s
	Range		±500		°/s
	Zero Bias Stability at normal Temperature (10s Smoothing)			1	°/h
	Zero bias repeatability at room temperature			0.5	°/h
	ARW		0.05		°/ √h
	Zero bias at full temperature (without temperature compensation)		10		°/h
	Zero bias at full temperature (with temperature compensation)			1	°/h
	Scale factor non-linearity			150	ppm
	Bandwidth		200		Hz
Accelerometer	Range	±20	±5	±50	g

Parameter		Min.	Typ.	Max.	Unit/Note
	Resolution	25	12.5	100	μg
	Zero bias stability at room temperature (10s smoothing)	15	8	50	μg
	Normal Temperature Zero Bias Stability (ALLAN)	5	2	10	μg
	Normal temperature zero bias repeatability	10	5	20	μg
	Bandwidth	150	150	150	Hz
	Scale Factor Non-linearity	1500	1500	3000	ppm
	Noise	25	12.5	100	μg/√Hz
Maximum Output			500		Hz
Start Delay			200		ms

CONNECTIONS

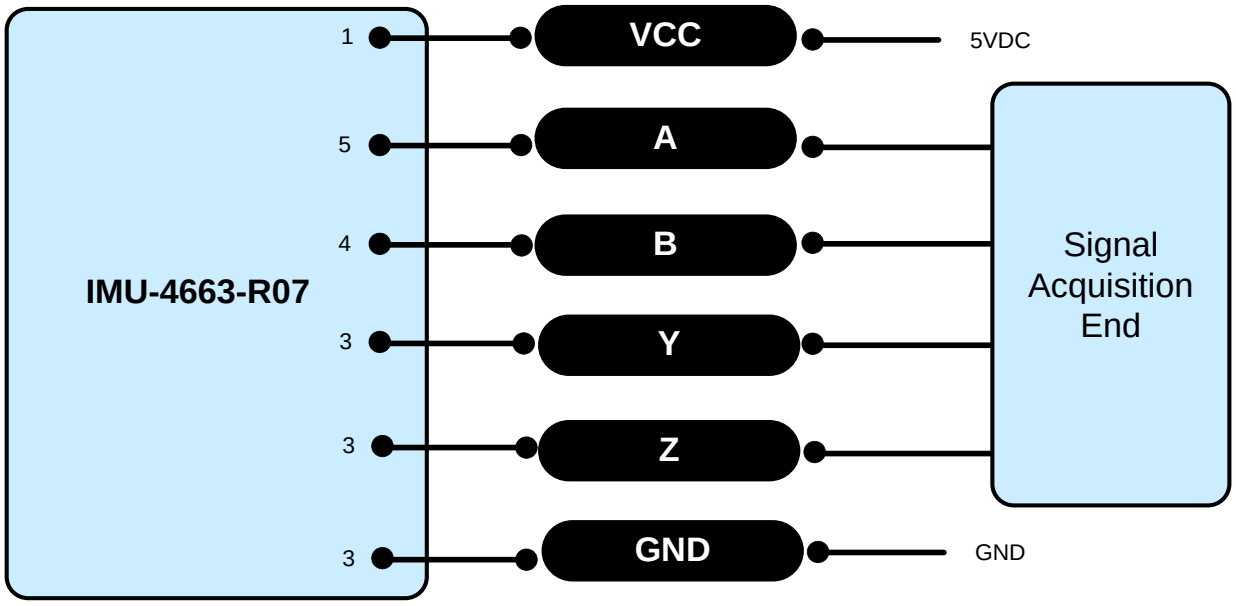


Figure 1. RS422 Wiring Diagram

Table 2. Pin Number, Colors and Functions

No.	Color	Functions
1	T/R-	(Z)
2	RXD-	(B)
8	5VDC	VCC
9	T/R+	(Y)
10	RXD+	(A)
15	GND	-

Axial definition

Data axis conforms to the right-hand rule.

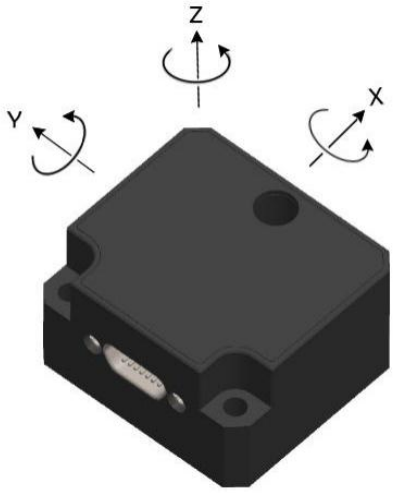
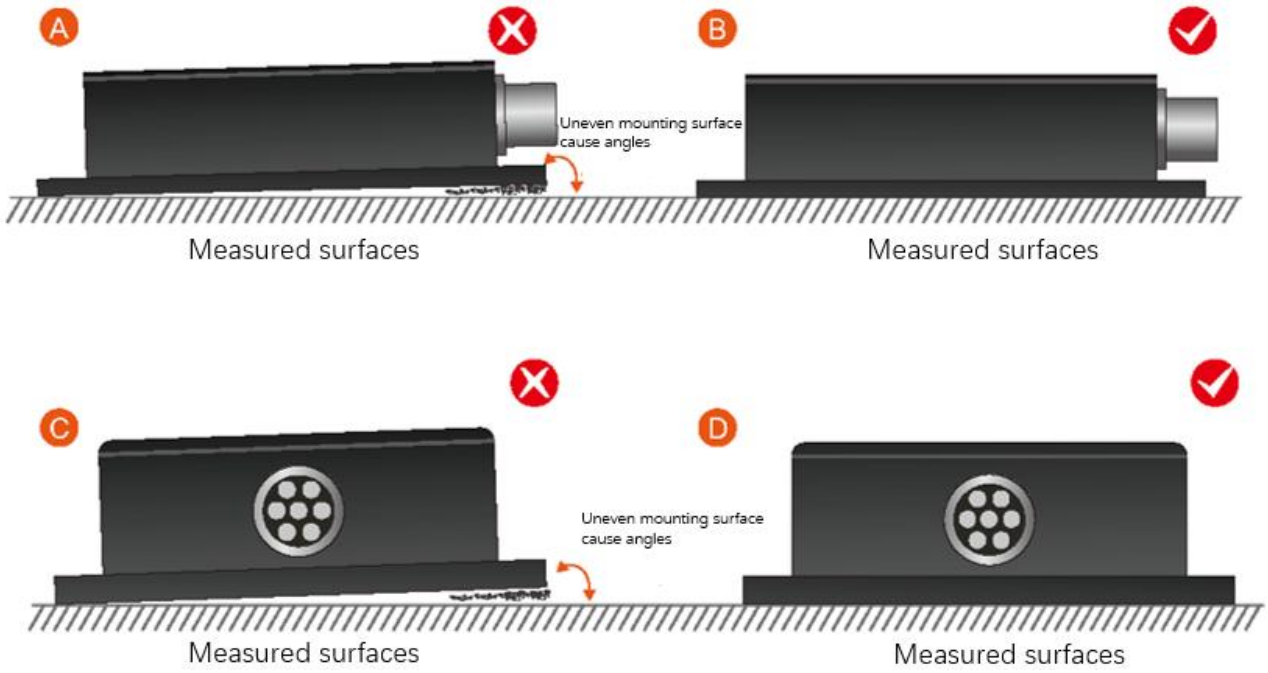


Figure 2. Three-axis attitude, gyroscope & acceleration

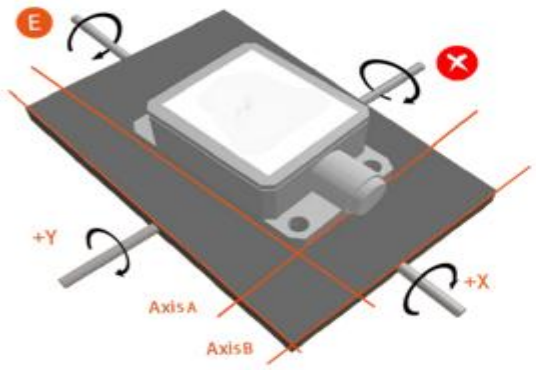
INSTALLATION

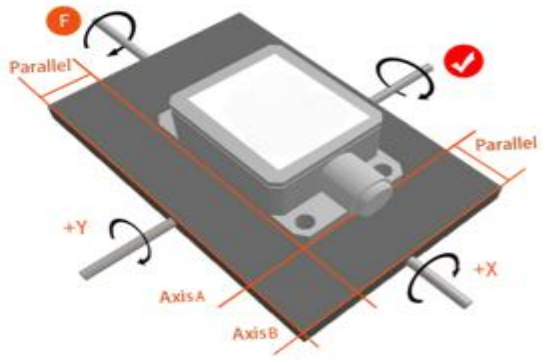
The correct installation method can avoid measurement errors. When installing the sensor, please do the following:

First of all, make sure that the sensor mounting surface is completely close to the measured surface, and the measured surface should be as level as possible. There should be no included angles as shown in Figure A and Figure C. The correct installation method is shown in Figure B and Figure D.



Secondly, the bottom line of the sensor and the axis of the measured object cannot have an angle as shown in Figure E, and the bottom line of the sensor should be kept parallel or orthogonal to the axis of rotation of the measured object during installation. This product can be installed horizontally or vertically (vertical installation needs to be customized), and the correct installation method is shown in Figure F.

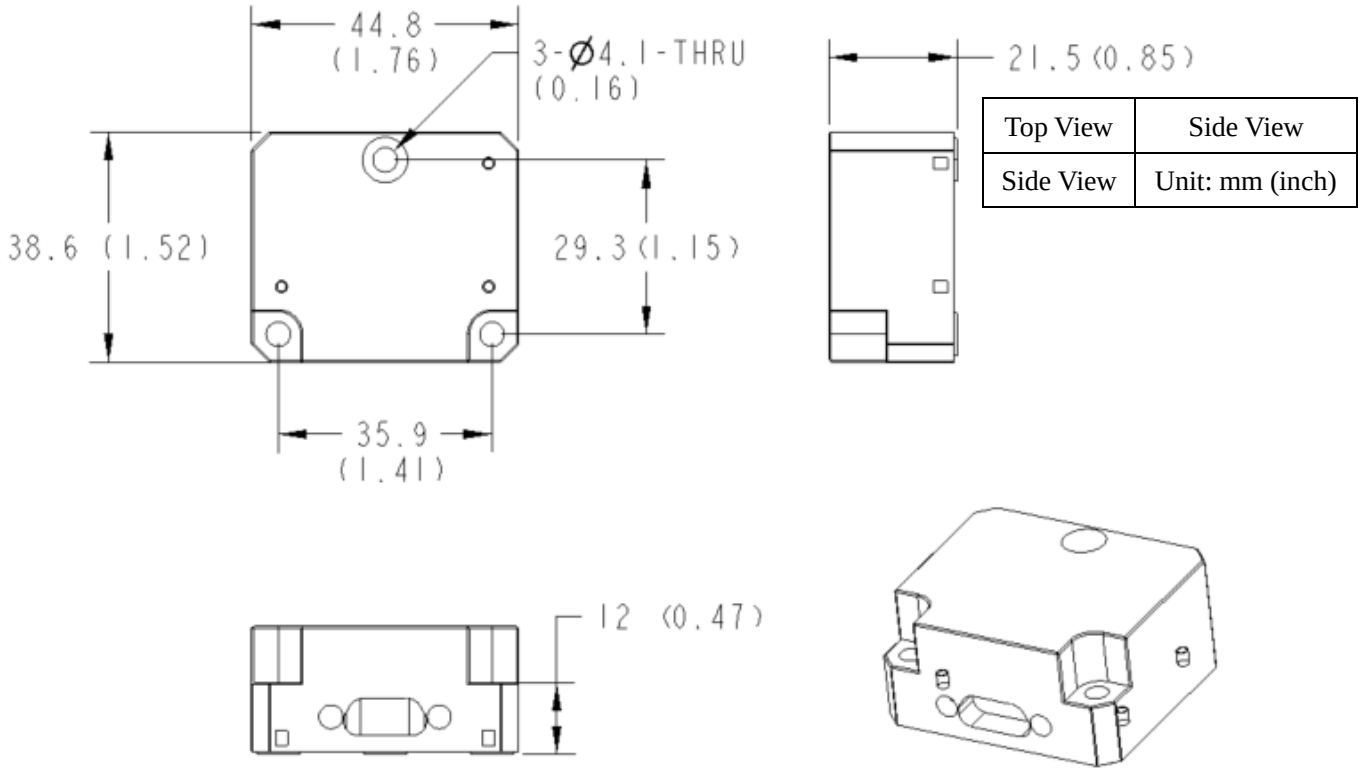




Finally, the mounting surface of the sensor and the surface to be measured must be tightly fixed, smooth in contact, and stable in rotation, and measurement errors due to acceleration and vibration must be avoided.

DIMENSIONS

Outline Dimensions



Top View	Side View
Side View	Unit: mm (inch)

Figure 3. Outline Dimensions

Table 3. Mechanical Characteristic

Connector	J30J-15TJL (30cm)
Protection level	IP65
Shell material	Magnesium alloy sanding oxidation
Installation	Three M4 screws

EXECUTIVE STANDARD

- National Standard for Static Calibration of Biaxial Inclination Sensors (Draft)
- GB/T 191 SJ 20873-2003 General Specification for Tiltmeters and Levelling Devices