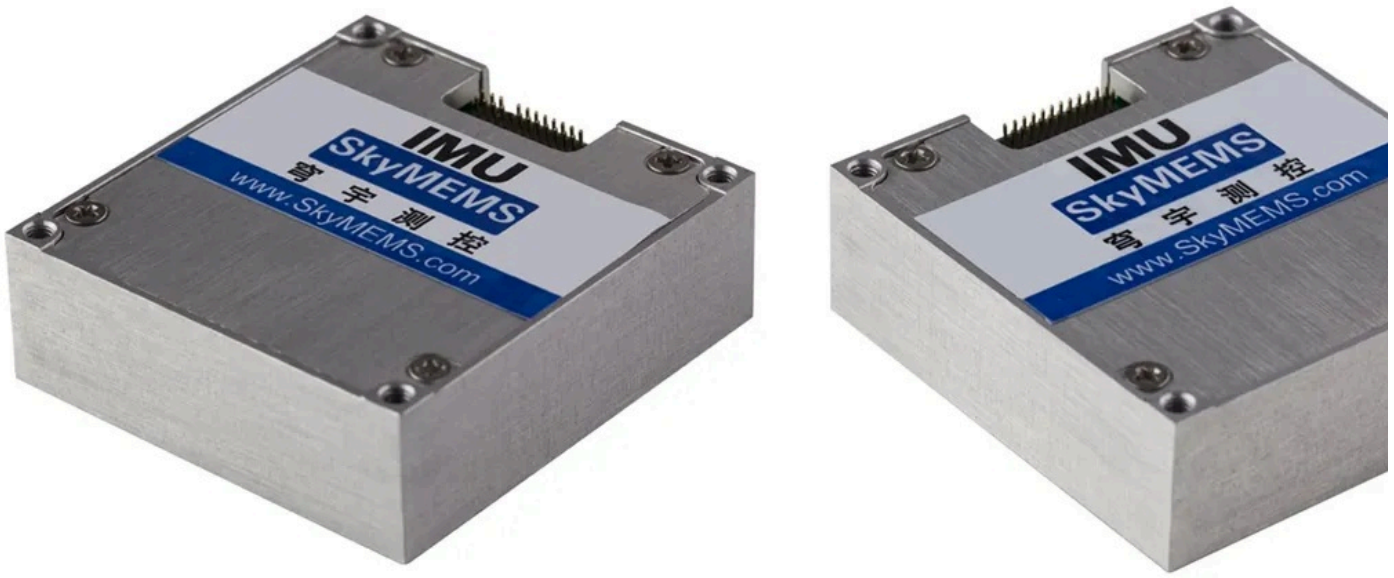

IMU688 UAV IMU

Precision IMU688 UAV IMU, compatible with ADIS16488, widely applied in tactical UAS navigation, precise guided bomb, rocket, seeker, platform stabilization, etc.

- Precision Tactical Grade 6 DoF MEMS Inertial Measurement Unit
- Compatible with ADIS16488 Interface and Protocol
- Dynamic Range: Gyro ±450°/s, Acc ±16g
- Bias Stability: Gyro: 6°/h (GJB), Acc 0.06mg (Allan)
- Ability to Access with GNSS, Aerospcace Reliability

- Full Temperature Range Accuracy: Built-in High
- Performance Temperature Calibration andCompensation Algorithm

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Product Categories

Brief Introduction

IMU688 UAV IMU from China factory is a high-performance tactical grade MEMS Inertial Measurement Unit, it is composed of 6°/h (10s average, fixed temperature, Z axis) bias stability MEMS gyroscope and 60ug (Allan) bias stability MEMS accelerometer, which can output precise 3-axis outputs of angular rate and 3 axis acceleration data. IMU688 Inertial Measurement Unit adopts latest capacitive technology and advanced MEMS components, which reduces the cost deeply. The system enjoys small size and light weight, it features a Mil-Standard reliability and is housed in an ultra-durable and compact aluminum

housing. IMU688 has been widely applied in tactical UAS Navigation & Control, Seeker, Platform Stabilization, etc.

Technical Specifications

Parameter Test ConditionValueUnitGyroscopesAccelerometerCommunication InterfaceWorking Environment

Min	Typical	Max			
Dynamic Range				450	°/s
Bias Stability	Allan variance, Z axis		1.6		°/h
	Allan variance, X axis and Y axis		3.2		°/h
	10s average (-40~+70°C, fixed temperature), Z axis		6		°/h
	10s average (-40~+70°C, fixed temperature), X axis and Y axis		12		°/h

Bias	Bias range, Z axis		±0.14		°/s
	Bias range, X axis and Y axis		±0.4		°/s
	Bias range in full temperature range, Z axis (temperature change rate≤1℃/min, temperature range: -40~+70°C)		±0.04		°/s
	Bias range in full temperature range, X axis and Y axis (temperature change rate≤1℃/min, temperature range: -40~+70°C)		±0.12		°/s
	Startup time by time repeatability , Z axis		0.004		°/s
	Startup time by time repeatability , X,Y axis		0.012		°/s
	Startup day by day repeatability , Z axis		0.006		°/s
	Startup day by day repeatability , X,Y axis		0.018		°/s
	Linear Acceleration Effect on Bias		0.004		°/s/g
	Vibration effect on bias, change between before and after (vibration condition: 20~2000Hz, 6.06g)		0.004		°/s/g
	Vibration effect on bias, change between before and in-run (vibration condition: 20~2000Hz, 6.06g)		0.004		°/s/g

Scale Factor	Scale factor accuracy, Z axis		0.6		%
	Scale factor accuracy, X axis and Y axis		1.2		%
	Scale factor nonlinearity, Z axis		0.02		%FS
	Scale factor nonlinearity, X axis and Y		0.04		%FS
Radom Walk			0.5		º/√h
Resolution		3.052×10−7			º/s/LSB
Bandwidth			200		Hz
Dynamic Range			16		g
Bias Stability	Allan variance		0.06		mg
	10s average (-40~+70°C, fixed temperature)		0.4		mg
Bias	Bias range		16	30	mg
	Bias range in full temperature range, peak-peak value (temperature change rate≤1℃/min, temperature range: -40~+70°C)		10	20	mg
	Bias repeatability			1	mg
	Bias Temperature Coefficient		0.1	0.2	mg/°C
Scale Factor	Scale factor accuracy			4	%
	Scale factor nonlinearity			0.2	%FS
Resolution		1.221×10−8			g/LSB

Bandwidth			200		Hz
1 Channel SPI	Baud rate			15	MHz
1 Channel UART	Baud rate		230.4		Kbps
1 Channel CAN	Baud rate			1	MHz
Sampling Rate	SPI		200		Hz
	UART		200		Hz
	CAN		200		Hz
Electronic Characteristics					
Voltage		3	3.3	3.6	V
Power Consumption				1.5	W
Ripple Wave	P-P			100	mV
Physical Characteristics					
Dimension		47*44*14			mm
Weight			50		grams
Working Temperature		-40		70	°C
Storage Temperature		-45		75	°C
Vibration Resistance		20~2000Hz, 6.06g			
Shock Resistance		1000g, 0.5ms			
Reliability					
MTBF			20000		h

Continuous Working Time			120		h

Typical Application

IMU688 UAV IMU from China manufacturer is a high performance 6 DoF MEMS-based inertial sensors, which has been widely used in the following fields:

– Tactical Unmanned Aircraft

– Seeker

– Platform Stabilization

– Target Drones

IMU688 Inertial Measurement Unit widely used in Autonomous Vehicles

The typical China IMU688 UAV IMU supplier for autonomous vehicles use includes a three-axis accelerometer and three-axis rate sensor. The inertial measurement unit (IMU) is a device that directly measures a vehicle's three linear acceleration components and three rotational rate components (and thus its six degrees of freedom). An IMU is unique among the sensors typically found in an unmanned vehicle because an IMU needs no connection to or knowledge of the external world. This environment independence makes the IMU a core technology for both safety and sensor-fusion. An accurate IMU can also determine and track attitude precisely. When driving, the direction or heading of the unmanned vehicle is as crucial as its position. Driving in a slightly wrong direction even briefly may put the unmanned vehicle in the wrong lane. Dynamic control of the unmanned vehicle requires sensors with dynamic response. An IMU does a nice job of tracking dynamic attitude and position changes accurately. Its fully environment-independent nature lets an IMU track position even in tricky scenarios such as slipping and skidding where tires lose traction. IMU688 IMU modules provide reliable performance with

good accuracy in dynamic environment, it has been widely used in autonomous vehicles by the Chinese leading companies, now more than hundreds of thousands IMU688 IMU modules are used in the autonomous vehicles.

Product Advantages

Why Selecting IMU688 UAV IMU?

IMU688 China UAV IMU is designed and produced by SkyMEMS, it enjoys high performance and accuracy, and high reliability with competitive price, which can be compatible with ADIS16488 interface and protocol. It is a tactical inertial measurement unit sensor, which has the main following advantages:

1. ### High Accuracy, High Performance and Powerful Functions

IMU688 Inertial Measurement Unit is a precision 6 DoF MEMS inertial measurement unit, which enjoys excellent technical advantages: – Precision 6 DoF MEMS Inertial Measurement Unit – Compatible with ADIS16488 Interface and Protocol – Dynamic Range: Gyro ±450°/s, Acc ±16g – Bias Stability: Gyro: 6°/h (GJB), Acc 0.06mg (Allan) – Ability to Access with GNSS, Aerospcace Reliability – Full Temperature Range Accuracy: Built-in High Performance Temperature Calibration and Compensation Algorithm IMU688 Inertial Measurement Unit adopts big brand components, high-class glue encapsulation, advanced production craft, and fully calibrated, which assured that our products have real actual precise and perfect performance.

2. **Aerospace Level Reliability, 12-step Strictest Quality Control**

We have advanced product test team and measurement equipment, and we cherish the quality as the life of the company, all our products must pass the strictest quality control procedures, our unique 12-step quality control assures our products enjoy top level quality.

3. **Competitive Price, ODM supported**

With strict cost control and massive production, we can provide the most competitive cost-effective prices, and we have abundant ODM service experience for customers around the world, that is why we can build up long term win-win cooperation with our customers.

4. **Successful Applications in many Fields, 200+ Customers are Using**

We are continuously focusing on MEMS measurement & control technologies, and have developed the most advanced inertial measurement unit IMU80. and IMU688 has been widely used in tactical UAS Navigation & Control, Seeker, Platform Stabilization, etc. and now more than 200 customers are using

our tactical IMU around the world.

5. World-class Production Line, Fast Delivery

We have the world class production line to assure that the production procedures are scientific, precise, and normative, which also can assure our products to be fast delivered.

6. Service with Heart, Professional Technical Support

We have the professional technical support engineer team, which can provide 24-hour technical support and excellent after-sale service. Serving customers with heart is the principle of SkyMEMS, Customer demand is the fundamental driving force of our development. We treat our customers with heart, customers' satisfaction is the direction and target of SkyMEMS. Through continuously technology innovation and service upgrading, we will realize win-win cooperation with customers.

FAQ

Q: Why does IMU688 UAV IMU becomes so hot selling product?

A: 1) IMU688 UAV IMU from China factory is very mature tactical inertial measurement unit, which has been widely used in Tactical Unmanned Aircraft, Precise Guided Bomb, Rocket, Seeker, Platform Stabilization, Target Drones etc. for many years, and now the sold qty can reach 10k per year 2) since we produce IMU688 in big qty, so IMU688 IMU module can enjoy ultra-cost-effective, which assure that it can be widely used. 3) IMU688 can be compatible with ADIS16488, and we can provide faster delivery, usually we have them in stock, we only need to do the tests before delivery. 4) we can provide customized design for IMU modules, so that make the IMU module more suitable for your application, we can provide the most flexible solution to our customers. 5) IMU688 IMU module provide the most reliability, its quality has been proven by the leading companies in China.

Q: How to keep IMU688 China UAV IMU good after time? What a procedure?

A: In fact, before we do the high and low temperature compensation and turntable calibration, we have done ESS in the high and low temperature box for 48 hours to release the environmental stress and ensure that the stress deformation is as small as possible. But after a long time, 10 months or a year later, due to the characteristics of the MEMS sensor itself, the performance may have little change. At this time, if the customer has high accuracy requirement, they can return to our factory for calibration again.

Q: What is IMU688 UAV IMU working temperature?

A: The test temperature is -40 to 85 °, and the actual temperature may exceed 85 ° when testing high temperature. Actually, during the test, we kept IMU688 stay at both -40° and 85° for an hour

Q: What is the Working Principle of IMU688 UAV IMU?

A: IMUs operate by use of reference data, bias values from an initial starting point, and calculate changes to these values using its integrated sensors. A central processing unit calculates directional information; position, speed, orientation, and direction of movement, at a given time in space using the IMU. The sensors suffer from orientation drift as they calculate these variables using a process known as dead-reckoning and are subject to accumulative errors.

Q: What is Dead reckoning?

A: Dead reckoning is the calculation of current position by use of a previously determined location and the advancement of that position by a known or estimated directional speed over an elapsed time. The process was first used in marine navigation and relied upon manual measurements. IMUs calculate

accurate directional information using integrated sensors and operate using these same principles. Orientation drift is the propagation of orientation errors. Small measurement errors of acceleration and angular velocity produce larger errors in velocity that are compounded into even greater errors in position. Orientation drift, the difference between the actual position and orientation from the measured values, increases with respect to time as measurement errors are compounded. IMUs typically incorporate some amount of calibration in order to compensate for orientation drift.

Q: What are the Degrees of freedom of IMU688 UAV IMU?

A: IMUs measure six degrees of freedom. This includes the measurement of linear motion over three perpendicular axes (surge, heave, and sway), as well as rotational movement about three perpendicular axes (roll, pitch, and yaw). This yields six independent measurements that together define the movement of an object or vehicle.

Q: What are the Sensor types that IMU688 UAV IMU from China manufacturer is composed of?

A: The IMU688 UAV IMU is comprised of at least two dedicated sensors, one or more linear accelerometers and one or more gyroscopes or angular accelerometers. An optional magnetometer may be integrated into the unit to calibrate against orientation drift. Accelerometers detect the direction and magnitude of change in velocity. Simple accelerometers measure linear motion while biaxial and triaxial accelerometers detect a change in velocity over a plane or three-dimensional space, respectively. The IMU possesses a triaxial (sometimes referred to as a triad) accelerometer, or otherwise uses multiple accelerometers that are aligned across perpendicular axes. Gyroscopes detect the angular rate or orientation about a given directional vector. The angular rate is relative to a reference surface. The IMU uses multi-axis gyros to provide measurements in three orthogonal directions. These angular movements must be aligned with those of the accelerometer.

Q: How about the delivery time?

A: for our standard model, if we have them in stock, only need 2~3days to re-test before shipping, if it is out of stock, then need around 2 weeks to arrange the production and tests. For the ODM electronic product, if needing to modify the structure, it will need around 3~4 weeks to arrange the production and tests.

Q: How to arrange the payment?

A: about the payment, please pay to our company account, the beneficiary’s name: NANJING SKY MEMS TECHNOLOGY CO., LTD. And our email is only @skymems.com to contact with u formally. To notice this to avoid the loss.

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